**Third Generation Partnership Project (3GPP™)**

**DRAFT Meeting Report  
for  
TSG RAN WG4  
meeting: 97e**

**Electronic Meeting, Online, 02/11/2020 to 13/11/2020**

Report generated on Monday, 2020-10-26 16:26 UTC

Contents:

2 Approval of the agenda 13

3 Letters / reports from other groups / meetings 13

4 Rel-15 New radio access technology 16

4.1 System Parameters Maintenance [NR\_newRAT-Core] 16

4.2 UE RF requirements maintenance [NR\_newRAT] 18

4.2.1 [FR1] Maintenance for 38.101-1 [NR\_newRAT-Core] 18

4.2.1.1 Maintenance for Transmitter characteristics [NR\_newRAT-Core] 19

4.2.1.2 Maintenance for Receiver characteristics [NR\_newRAT-Core] 26

4.2.2 [FR2] Maintenance for 38.101-2 [NR\_newRAT-Core] 28

4.2.2.1 Regulatory Tx/Rx spurious emission limits handling [NR\_newRAT-Core] 29

4.2.2.2 Maintenance for Transmitter characteristics [NR\_newRAT-Core] 32

4.2.2.3 Maintenance for Receiver characteristics [NR\_newRAT-Core] 37

4.2.3 Maintenance for 38.101-3 [NR\_newRAT-Core] 38

4.2.3.1 [FR1] Maintenance for Transmitter characteristics within FR1 [NR\_newRAT-Core] 39

4.2.3.2 [FR1+FR2] Maintenance for Transmitter characteristics involving both FR1 and FR2 [NR\_newRAT-Core] 45

4.2.3.3 [FR1] Maintenance for Receiver characteristics within FR1 [NR\_newRAT-Core] 46

4.2.3.4 [FR1+FR2] Maintenance for Receiver characteristics involving both FR1 and FR2 [NR\_newRAT-Core] 48

4.3 UE EMC [NR\_newRAT-Core] 48

4.3.1 General [NR\_newRAT-Core] 48

4.3.2 Emission requirements [NR\_newRAT-Core] 48

4.3.3 Immunity requirements [NR\_newRAT-Core] 48

4.4 BS RF [NR\_newRAT-Core] 48

4.4.1 General [NR\_newRAT-Core] 48

4.4.2 Transmitter characteristics maintenance [NR\_newRAT-Core] 48

4.4.3 Receiver characteristics maintenance [NR\_newRAT-Core] 49

4.5 BS conformance testing [NR\_newRAT-Perf] 49

4.5.1 General [NR\_newRAT-Perf] 49

4.5.2 BS specifications clean-ups (including conformance testing and core) [NR\_newRAT-Perf/Core] 49

4.5.2.1 eAAS specifications [NR\_newRAT-Perf/Core] 49

4.5.2.2 MSR specifications [NR\_newRAT-Perf/Core] 56

4.5.2.3 NR conformance testing specifications [NR\_newRAT-Perf] 63

4.5.3 Conducted conformance testing (38.141-1) [NR\_newRAT-Perf] 66

4.5.4 Radiated conformance testing (38.141-2) [NR\_newRAT-Perf] 66

4.6 BS EMC [NR\_newRAT-Core] 69

4.6.1 Core requirements [NR\_newRAT-Core] 69

4.6.1.1 Emission requirements [NR\_newRAT-Core] 69

4.6.1.2 Immunity requirements [NR\_newRAT-Core] 69

4.6.2 Performance requirements [NR\_newRAT-Perf] 70

4.7 RRM core requirements maintenance (38.133/36.133) [NR\_newRAT-Core] 71

4.8 RRM perf. requirements maintenance (38.133/36.133) [NR\_newRAT-Perf] 89

4.9 Demodulation and CSI requirements maintenance (38.101-4/38.104) [NR\_newRAT-Perf] 113

4.9.1 UE demodulation requirements [NR\_newRAT-Perf] 113

4.9.2 CSI requirements [NR\_newRAT-Perf] 115

4.9.3 BS demodulation requirements [NR\_newRAT-Perf] 116

4.10 Positioning specs maintenance (36.171, 37.171 and 38.171) [NR\_newRAT-Perf or TEI] 117

4.11 Testability Maintenance (38.810) [FS\_NR\_test\_methods] 117

5 LTE maintenance (up to Rel15) [WI code or TEI] 117

5.1 BS RF requirements [WI code or TEI] 117

5.2 UE RF requirements [WI code or TEI] 119

5.3 RRM requirements [WI code or TEI] 121

5.4 Demodulation and CSI requirements [WI code or TEI] 124

5.4.1 UE demodulation and CSI requirements [WI code or TEI] 124

5.4.2 BS demodulation requirements [WI code or TEI] 125

6 Rel-16 Work Items for LTE 126

6.1 Additional MTC enhancements for LTE [LTE\_eMTC5] 126

6.1.1 RF core requirements maintenance [LTE\_eMTC5-Core] 126

6.1.2 RRM core requirements maintenance [LTE\_eMTC5-Core] 126

6.1.3 RRM perf. requirements [LTE\_eMTC5-Perf] 129

6.1.3.1 General [LTE\_eMTC5-Perf] 129

6.1.3.2 Test cases [LTE\_eMTC5-Perf] 129

6.1.4 Demodulation and CSI requirements maintenance (36.101) [LTE\_eMTC5-Perf] 130

6.1.4.1 UE demodulation requirements [LTE\_eMTC5-Perf] 130

6.1.4.2 CSI requirements [LTE\_eMTC5-Perf] 131

6.2 Additional enhancements for NB-IoT [NB\_IOTenh3] 131

6.2.1 RF core requirements maintenance [NB\_IOTenh3-Core] 131

6.2.2 RRM core requirements maintenance [NB\_IOTenh3-Core] 131

6.2.3 RRM perf. requirements [NB\_IOTenh3-Perf] 132

6.2.3.1 General [NB\_IOTenh3-Perf] 132

6.2.3.2 Test cases [NB\_IOTenh3-Perf] 132

6.2.4 Demodulation and CSI requirements maintenance (36.101/36.104) [NB\_IOTenh3-Perf] 133

6.2.4.1 UE demodulation requirements [NB\_IOTenh3-Perf] 133

6.2.4.2 BS demodulation requirements [NB\_IOTenh3-Perf] 133

6.3 Even further Mobility enhancement in E-UTRAN [LTE\_feMob] 134

6.3.1 RRM core requirements maintenance [LTE\_feMob-Core] 134

6.3.2 RRM perf. requirements [LTE\_feMob-Perf] 135

6.3.2.1 General [LTE\_feMob-Perf] 135

6.3.2.2 Test cases [LTE\_feMob-Perf] 135

6.4 R16 LTE maintenance [WI code] 135

6.4.1 BS RF requirements [WI code] 135

6.4.2 UE RF requirements [WI code] 135

6.4.3 RRM requirements [WI code] 139

6.4.4 Demodulation and CSI requirements [WI code] 140

6.4.4.1 UE demodulation and CSI requirements [WI code] 140

6.4.4.2 BS demodulation requirements [WI code] 140

7 Rel-16 non-spectrum related work items for NR 140

7.1 NR-based access to unlicensed spectrum [NR\_unlic] 140

7.1.1 System Parameters [NR\_unlic-Core] 140

7.1.1.1 60kHz SCS [NR\_unlic-Core] 140

7.1.1.2 Wideband operation related [NR\_unlic-Core] 141

7.1.1.3 Others [NR\_unlic-Core] 143

7.1.2 UE RF requirements [NR\_unlic-Core] 144

7.1.2.1 Transmitter characteristics [NR\_unlic-Core] 145

7.1.2.2 Receiver characteristics [NR\_unlic-Core] 146

7.1.3 Band combination related (Analysis, TPs, etc.) [NR\_unlic-Core] 147

7.1.4 BS RF requirements [NR\_unlic-Core] 148

7.1.4.1 General [NR\_unlic-Core] 148

7.1.4.2 Transmitter characteristics [NR\_unlic-Core] 150

7.1.4.3 Receiver characteristics [NR\_unlic-Core] 152

7.1.5 BS conformance testing [NR\_unlic-Perf] 152

7.1.5.1 General [NR\_unlic-Perf] 152

7.1.5.2 Transmitter characteristics [NR\_unlic-Perf] 153

7.1.5.3 Receiver characteristics [NR\_unlic-Perf] 153

7.1.6 RRM core requirements maintenance (38.133) [NR\_unlic-Core] 153

7.1.6.1 General [NR\_unlic-Core] 153

7.1.6.2 Cell re-selection [NR\_unlic-Core] 155

7.1.6.3 Handover [NR\_unlic-Core] 155

7.1.6.4 RRC connection mobility control [NR\_unlic-Core] 155

7.1.6.5 SCell activation/deactivation (delay and interruption) [NR\_unlic-Core] 156

7.1.6.6 Active TCI state switching [NR\_unlic-Core] 159

7.1.6.7 Active BWP switching [NR\_unlic-Core] 160

7.1.6.8 RLM [NR\_unlic-Core] 160

7.1.6.9 Beam management [NR\_unlic-Core] 161

7.1.6.10 Measurement requirements [NR\_unlic-Core] 162

7.1.6.11 Measurement capability and reporting criteria [NR\_unlic-Core] 165

7.1.6.12 Timing [NR\_unlic-Core] 166

7.1.6.13 Other requirements [NR\_unlic-Core] 168

7.1.7 RRM perf. requirements (38.133) [NR\_unlic-Perf] 168

7.1.7.1 General [NR\_unlic-Perf] 168

7.1.7.2 Test cases [NR\_unlic-Perf] 170

7.1.8 Demodulation and CSI requirements (38.101-4/38.104) [NR\_unlic-Perf] 172

7.1.8.1 General [NR\_unlic-Perf] 172

7.1.8.2 UE demodulation requirements [NR\_unlic-Perf] 175

7.1.8.2.1 PDSCH requirements [NR\_unlic-Perf] 175

7.1.8.2.2 PDCCH requirements [NR\_unlic-Perf] 176

7.1.8.3 CSI requirements [NR\_unlic-Perf] 177

7.1.8.4 BS demodulation requirements [NR\_unlic-Perf] 178

7.1.8.4.1 PUSCH requirements [NR\_unlic-Perf] 178

7.1.8.4.2 PUCCH requirements [NR\_unlic-Perf] 179

7.1.8.4.3 PRACH requirements [NR\_unlic-Perf] 181

7.2 NR mobility enhancement [NR\_Mob\_enh] 182

7.2.1 RRM core requirements maintenance (38.133) [NR\_Mob\_enh-Core] 182

7.2.2 RRM perf. requirements (38.133) [NR\_Mob\_enh-Perf] 184

7.2.2.1 General [NR\_Mob\_enh-Perf] 184

7.2.2.2 Test cases [NR\_Mob\_enh-Perf] 185

7.3 5G V2X with NR sidelink [5G\_V2X\_NRSL] 186

7.3.1 General [5G\_V2X\_NRSL] 186

7.3.2 System parameters maintenance [5G\_V2X\_NRSL-Core] 187

7.3.3 UE RF requirements maintenance [5G\_V2X\_NRSL-Core] 187

7.3.3.1 Transmitter characteristics [5G\_V2X\_NRSL-Core] 187

7.3.3.2 Receiver characteristics [5G\_V2X\_NRSL-Core] 188

7.3.4 Concurrent operation maintenance (scenarios, requirements, etc) [5G\_V2X\_NRSL-Core] 189

7.3.4.1 Transmitter characteristics [5G\_V2X\_NRSL-Core] 189

7.3.4.2 Receiver characteristics [5G\_V2X\_NRSL-Core] 191

7.3.5 RRM core requirements maintenance (38.133) [5G\_V2X\_NRSL-Core] 192

7.3.6 RRM perf. requirements (38.133) [5G\_V2X\_NRSL-Perf] 193

7.3.6.1 General [5G\_V2X\_NRSL-Perf] 193

7.3.6.2 L1 SL-RSRP measurement accuracy [5G\_V2X\_NRSL-Perf] 194

7.3.6.3 Test cases [5G\_V2X\_NRSL-Perf] 194

7.3.6.3.1 UE transmit timing [5G\_V2X\_NRSL-Perf] 195

7.3.6.3.2 Initiation/Cease of SLSS Transmission [5G\_V2X\_NRSL-Perf] 195

7.3.6.3.3 Selection / Reselection of V2X Synchronization Reference Source [5G\_V2X\_NRSL-Perf] 195

7.3.6.3.4 L1 SL-RSRP measurements [5G\_V2X\_NRSL-Perf] 196

7.3.6.3.5 Congestion control measurements [5G\_V2X\_NRSL-Perf] 197

7.3.6.3.6 Interruptions [5G\_V2X\_NRSL-Perf] 197

7.3.6.3.7 Others [5G\_V2X\_NRSL-Perf] 197

7.3.7 Demodulation and CSI requirements (38.101-4) [5G\_V2X\_NRSL-Perf] 197

7.3.7.1 General [5G\_V2X\_NRSL-Perf] 197

7.3.7.2 Single link test [5G\_V2X\_NRSL-Perf] 198

7.3.7.3 Multiple link test [5G\_V2X\_NRSL-Perf] 200

7.4 Integrated Access and Backhaul for NR [NR\_IAB] 202

7.4.1 General [NR\_IAB-Core] 202

7.4.1.1 System parameters maintenance [NR\_IAB-Core] 202

7.4.1.2 Others [NR\_IAB-Core] 204

7.4.2 RF requirements maintenance [NR\_IAB-Core] 205

7.4.2.1 Transmitter characteristics [NR\_IAB-Core] 205

7.4.2.1.1 Tx Power related requirements [NR\_IAB-Core] 205

7.4.2.1.2 Transmitted signal quality [NR\_IAB-Core] 206

7.4.2.1.3 Unwanted emissions [NR\_IAB-Core] 207

7.4.2.1.4 Others [NR\_IAB-Core] 208

7.4.2.2 Receiver characteristics [NR\_IAB-Core] 208

7.4.2.2.1 Sensitivity and dynamic range requirements [NR\_IAB-Core] 208

7.4.2.2.2 In-band selectivity and blocking requirements [NR\_IAB-Core] 209

7.4.2.2.3 Others [NR\_IAB-Core] 210

7.4.3 RF conformance testing [NR\_IAB-Perf] 210

7.4.3.1 General and work plan [NR\_IAB-Perf] 210

7.4.3.2 Common test issues for conducted and radiated conformance testing [NR\_IAB-Perf] 211

7.4.3.2.1 Test configurations [NR\_IAB-Perf] 211

7.4.3.2.2 Test models [NR\_IAB-Perf] 212

7.4.3.2.3 Others [NR\_IAB-Perf] 212

7.4.3.3 Conducted conformance testing [NR\_IAB-Perf] 213

7.4.3.3.1 Transmitter characteristics [NR\_IAB-Perf] 213

7.4.3.3.2 Receiver characteristics [NR\_IAB-Perf] 213

7.4.3.3.3 Other test issues [NR\_IAB-Perf] 214

7.4.3.4 Radiated conformance testing [NR\_IAB-Perf] 214

7.4.3.4.1 Transmitter characteristics [NR\_IAB-Perf] 214

7.4.3.4.2 Receiver characteristics [NR\_IAB-Perf] 214

7.4.3.4.3 Other test issues [NR\_IAB-Perf] 214

7.4.4 RRM core requirements maintenance [NR\_IAB-Core] 214

7.4.5 RRM perf. requirements [NR\_IAB-Perf] 216

7.4.5.1 General [NR\_IAB-Perf] 216

7.4.5.2 Test cases [NR\_IAB-Perf] 217

7.4.6 EMC core requirements maintenance [NR\_IAB-Core] 218

7.4.6.1 General [NR\_IAB-Core] 218

7.4.6.2 Emission requirements [NR\_IAB-Core] 219

7.4.6.3 Immunity requirements [NR\_IAB-Core] 219

7.4.7 EMC performance requirements [NR\_IAB-Perf] 220

7.4.8 Demodulation and CSI requirements [NR\_IAB-Perf] 220

7.4.8.1 General [NR\_IAB-Perf] 220

7.4.8.2 IAB-DU performance requirements [NR\_IAB-Perf] 221

7.4.8.3 IAB-MT performance requirements [NR\_IAB-Perf] 222

7.5 Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements [LTE\_NR\_DC\_CA\_enh] 222

7.5.1 RF requirements maintenance [LTE\_NR\_DC\_CA\_enh-Core] 223

7.5.2 RRM core requirements maintenance (38.133/36.133) [LTE\_NR\_DC\_CA\_enh-Core] 225

7.5.2.1 Early Measurement reporting [LTE\_NR\_DC\_CA\_enh-Core] 226

7.5.2.2 Efficient and low latency serving cell configuration, activation and setup [LTE\_NR\_DC\_CA\_enh-Core] 228

7.5.3 RRM perf. requirements (38.133) [LTE\_NR\_DC\_CA\_enh-Perf] 230

7.5.3.1 General [LTE\_NR\_DC\_CA\_enh-Perf] 230

7.5.3.2 Test cases [LTE\_NR\_DC\_CA\_enh-Perf] 232

7.5.4 Demodulation and CSI requirements (38.101-4) [LTE\_NR\_DC\_CA\_enh-Perf] 232

7.6 UE power saving in NR [NR\_UE\_pow\_sav] 233

7.6.1 RRM core requirements maintenance (38.133) [NR\_UE\_pow\_sav-Core] 233

7.6.2 RRM perf. requirements (38.133) [NR\_UE\_pow\_sav-Perf] 235

7.6.2.1 General [NR\_UE\_pow\_sav-Perf] 235

7.6.2.2 Test cases [NR\_UE\_pow\_sav-Perf] 236

7.6.3 Demodulation and CSI requirements (38.101-4) [NR\_UE\_pow\_sav-Perf] 238

7.7 NR Positioning Support [NR\_pos] 239

7.7.1 General [NR\_pos-Core/Perf] 239

7.7.2 RRM core requirements maintenance (38.133) [NR\_pos-Core] 240

7.7.2.1 PRS-RSTD measurement requirements [NR\_pos-Core] 240

7.7.2.2 PRS-RSRP measurement requirements [NR\_pos-Core] 242

7.7.2.3 UE Rx-Tx time difference measurement requirements [NR\_pos-Core] 244

7.7.2.4 Other requirements [NR\_pos-Core] 245

7.7.3 RRM perf. requirements (38.133) [NR\_pos-Perf] 247

7.7.3.1 General [NR\_pos-Perf] 247

7.7.3.2 UE requirements and test cases [NR\_pos-Perf] 248

7.7.3.2.1 Measurement accuracy requirements [NR\_pos-Perf] 248

7.7.3.2.1.1 PRS RSTD [NR\_pos-Perf] 248

7.7.3.2.1.2 PRS RSRP [NR\_pos-Perf] 250

7.7.3.2.1.3 UE Rx-Tx time difference [NR\_pos-Perf] 252

7.7.3.2.2 Test cases [NR\_pos-Perf] 253

7.7.3.2.3 Other [NR\_pos-Perf] 254

7.7.3.3 gNB requirements [NR\_pos-Perf] 255

7.8 Physical layer enhancements for NR URLLC [NR\_L1enh\_URLLC-Core] 258

7.8.1 Demodulation and CSI requirements (38.101-4/38.104) [NR\_L1enh\_URLLC-Perf] 258

7.8.1.1 Performance requirements with ultra-low BLER [NR\_L1enh\_URLLC-Perf] 258

7.8.1.1.1 UE demodulation requirements [NR\_L1enh\_URLLC-Perf] 258

7.8.1.1.2 CSI requirements [NR\_L1enh\_URLLC-Perf] 259

7.8.1.1.3 BS demodulation requirements [NR\_L1enh\_URLLC-Perf] 261

7.8.1.2 Performance requirements with higher BLER [NR\_L1enh\_URLLC-Perf] 264

7.8.1.2.1 UE demodulation requirements [NR\_L1enh\_URLLC-Perf] 264

7.8.1.2.2 BS demodulation requirements [NR\_L1enh\_URLLC-Perf] 267

7.9 Enhancements on MIMO for NR [NR\_eMIMO] 271

7.9.1 UE RF core requirements maintenance (38.101) [NR\_eMIMO-Core] 271

7.9.1.1 DMRS enhancement with PI/2 BPSK [NR\_eMIMO-Core] 271

7.9.1.2 Uplink Tx Full Power transmission [NR\_eMIMO-Core] 271

7.9.2 RRM core requirements maintenance (38.133) [NR\_eMIMO-Core] 271

7.9.3 RRM perf. requirements (38.133) [NR\_eMIMO-Perf] 273

7.9.3.1 General [NR\_eMIMO-Perf] 273

7.9.3.2 L1-SINR measurement accuracy [NR\_eMIMO-Perf] 273

7.9.3.3 Test cases [NR\_eMIMO-Perf] 275

7.9.3.3.1 L1-SINR measurements [NR\_eMIMO-Perf] 275

7.9.3.3.2 BFR for SCell [NR\_eMIMO-Perf] 276

7.9.3.3.3 DL/UL beam indication with reduced latency and overhead [NR\_eMIMO-Perf] 277

7.9.3.3.4 Others [NR\_eMIMO-Perf] 277

7.9.4 Demodulation and CSI requirements (38.101-4) [NR\_eMIMO-Perf] 278

7.9.4.1 General [NR\_eMIMO-Perf] 278

7.9.4.2 Demodulation requirements [NR\_eMIMO-Perf] 279

7.9.4.2.1 Single-DCI based SDM scheme [NR\_eMIMO-Perf] 279

7.9.4.2.2 Multi-DCI based transmission scheme [NR\_eMIMO-Perf] 280

7.9.4.2.3 Single-DCI based transmission schemes (URLLC) [NR\_eMIMO-Perf] 281

7.9.4.3 CSI requirements [NR\_eMIMO-Perf] 282

7.10 Add support of NR DL 256QAM for FR2 [NR\_DL256QAM\_FR2] 284

7.10.1 Demodulation and CSI requirements (38.101-4) [NR\_DL256QAM\_FR2-Perf] 284

7.10.1.1 UE Demodulation requirements [NR\_DL256QAM\_FR2-Perf] 284

7.10.1.2 SDR requirements [NR\_DL256QAM\_FR2-Perf] 286

7.10.1.3 CSI requirements [NR\_DL256QAM\_FR2-Perf] 287

7.11 RF requirements for NR frequency range 1 (FR1) [NR\_RF\_FR1] 288

7.11.1 RF core requirements maintenance [NR\_RF\_FR1-Core ] 288

7.11.1.1 Intra-band contiguous DL CA for FR1 [NR\_RF\_FR1-Core] 288

7.11.1.2 Intra-band UL CA for FR1 power class 3 [NR\_RF\_FR1-Core] 289

7.11.1.3 DC location for intra-band UL CA [NR\_RF\_FR1-Core] 290

7.11.1.4 Switching period between case 1 and case 2 [NR\_RF\_FR1-Core] 291

7.11.2 RRM core requirements maintenance (38.133) [NR\_RF\_FR1-Core] 292

7.11.3 RRM perf. requirements (38.133) [NR\_RF\_FR1-Perf] 293

7.11.3.1 General [NR\_RF\_FR1-Perf] 294

7.11.3.2 Test cases [NR\_RF\_FR1-Perf] 294

7.12 NR RF requirement enhancements for frequency range 2 (FR2) [NR\_RF\_FR2\_req\_enh] 295

7.12.1 RF core requirements maintenance [NR\_RF\_FR2\_req\_enh-Core] 295

7.12.1.1 Beam Correspondence based on configured DL RS (SSB or CSI-RS) [NR\_RF\_FR2\_req\_enh-Core] 295

7.12.1.2 Others [NR\_RF\_FR2\_req\_enh-Core] 296

7.12.2 RRM core requirements maintenance (38.133) [NR\_RF\_FR2\_req\_enh-Core] 299

7.13 NR RRM requirement enhancement [NR\_RRM\_Enh-Core] 299

7.13.1 RRM core requirements maintenance (38.133) [NR\_RRM\_Enh-Core] 299

7.13.1.1 SRS carrier switching requirements [NR\_RRM\_Enh\_Core] 299

7.13.1.2 CGI reading requirements with autonomous gap [NR\_RRM\_Enh\_Core] 300

7.13.1.3 BWP switching on multiple CCs [NR\_RRM\_Enh\_Core] 302

7.13.1.4 Spatial relation switch for uplink [NR\_RRM\_Enh\_Core] 305

7.13.1.5 Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam and/or common beam [NR\_RRM\_Enh\_Core] 306

7.13.1.6 Other requirements maintenance [NR\_RRM\_Enh\_Core] 307

7.13.2 RRM perf. requirements (38.133) [NR\_RRM\_Enh-Perf] 310

7.13.2.1 General [NR\_RRM\_Enh-Perf] 310

7.13.2.2 Test cases [NR\_RRM\_Enh-Perf] 310

7.13.2.2.1 SRS carrier switching requirements [NR\_RRM\_Enh-Perf] 310

7.13.2.2.2 Multiple Scell activation/deactivation [NR\_RRM\_Enh-Perf] 312

7.13.2.2.3 CGI reading requirements with autonomous gap [NR\_RRM\_Enh-Perf] 313

7.13.2.2.4 BWP switching on multiple CCs [NR\_RRM\_Enh-Perf] 314

7.13.2.2.5 Inter-frequency measurement requirement without MG [NR\_RRM\_Enh-Perf] 316

7.13.2.2.6 Mandatory MG patterns [NR\_RRM\_Enh-Perf] 317

7.13.2.2.7 UE-specific CBW change [NR\_RRM\_Enh-Perf] 319

7.13.2.2.8 Spatial relation switch for uplink [NR\_RRM\_Enh-Perf] 320

7.13.2.2.9 Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam [NR\_RRM\_Enh-Perf] 321

7.14 NR RRM requirements for CSI-RS based L3 measurement [NR\_CSIRS\_L3meas] 322

7.14.1 RRM core requirements maintenance (38.133) [NR\_CSIRS\_L3meas-Core] 322

7.14.2 RRM perf. requirements (38.133) [NR\_CSIRS\_L3meas-Perf] 329

7.14.2.1 General [NR\_CSIRS\_L3meas-Perf] 329

7.14.2.1.1 CSI-RSRP requirements [NR\_CSIRS\_L3meas -Perf] 330

7.14.2.1.2 CSI-RSRQ requirements [NR\_CSIRS\_L3meas -Perf] 333

7.14.2.1.3 CSI-SINR requirements [NR\_CSIRS\_L3meas -Perf] 334

7.14.2.2 Test cases [NR\_CSIRS\_L3meas-Perf] 335

7.15 NR support for high speed train scenario [NR\_HST] 339

7.15.1 RRM core requirements maintenance (38.133) [NR\_HST-Core] 339

7.15.2 RRM perf. requirements (38.133) [NR\_HST-Perf] 341

7.15.2.1 General [NR\_HST-Perf] 341

7.15.2.2 Test cases [NR\_HST-Perf] 342

7.15.3 Demodulation and CSI requirements (38.101-4 / 38.104) [NR\_HST-Perf] 344

7.15.3.1 UE demodulation and CSI requirements [NR\_HST-Perf] 344

7.15.3.1.1 Requirements for DPS transmission scheme(s) [NR\_HST-Perf] 344

7.15.3.1.2 Requirements for HST-SFN [NR\_HST-Perf] 346

7.15.3.1.3 Requirements for HST single tap [NR\_HST-Perf] 347

7.15.3.1.4 Requirements for multi-path fading channels [NR\_HST-Perf] 348

7.15.3.1.5 Applicability rule [NR\_HST-Perf] 348

7.15.3.2 BS demodulation requirements [NR\_HST-Perf] 349

7.15.3.2.1 PUSCH requirements [NR\_HST-Perf] 349

7.15.3.2.2 PRACH requirements [NR\_HST-Perf] 351

7.15.3.2.3 UL timing adjustment requirements [NR\_HST-Perf] 353

7.16 NR performance requirement enhancement [NR\_perf\_enh-Perf] 356

7.16.1 UE demodulation and CSI requirements (38.101-4) [NR\_perf\_enh-Perf] 356

7.16.1.1 NR CA PDSCH requirements [NR\_perf\_enh-Perf] 356

7.16.1.2 PMI reporting requirements with larger number of Tx ports [NR\_perf\_enh-Perf] 358

7.16.1.3 FR1 CA and EN-DC power imbalance requirements [NR\_perf\_enh-Perf] 360

7.16.1.4 NR CA CQI reporting requirements [NR\_perf\_enh-Perf] 362

7.16.1.5 Release independent [NR\_perf\_enh-Perf] 363

7.16.2 BS demodulation requirements (38.104) [NR\_perf\_enh-Perf] 364

7.17 Over the air (OTA) base station (BS) testing TR [OTA\_BS\_testing-Perf] 365

7.17.1 General [OTA\_BS\_testing-Perf] 365

7.17.2 MU / TT values: derivation and tables [OTA\_BS\_testing-Perf] 365

7.17.3 Annexes [OTA\_BS\_testing-Perf] 367

7.17.4 Others [OTA\_BS\_testing-Perf] 367

7.18 2-step RACH for NR [NR\_2step\_RACH-Perf] 368

7.18.1 RRM core requirements maintenance (38.133) [NR\_2step\_RACH-Core] 368

7.18.2 RRM perf. requirements (38.133) [NR\_2step\_RACH-Perf] 369

7.18.2.1 General [NR\_2step\_RACH-Perf] 369

7.18.2.2 Test cases [NR\_2step\_RACH-Perf] 369

7.18.3 BS Demodulation requirements (38.104) [NR\_2step\_RACH-Perf] 370

7.18.4 Others [NR\_2step\_RACH-Perf] 374

7.19 R16 NR maintenance [WI code or TEI16] 374

7.19.1 UE transient period capability [TEI16] 374

7.19.2 Transmit diversity and power class related to UL MIMO [TEI16] 375

7.19.2.1 R16 support of transmit diversity [TEI16] 375

7.19.2.2 Power class related to UL MIMO and other related req. (MPR, SEM, etc) [TEI16 or NR\_newRAT-Core] 378

7.19.3 Other UE RF [WI code or TEI16] 379

7.19.4 BS RF [WI code or TEI16] 393

7.19.5 RRM [WI code or TEI16] 396

7.19.6 Demodulation and CSI [WI code or TEI16] 400

7.19.7 NR MIMO OTA test methods (38.827) [FS\_NR\_MIMO\_OTA\_test] 400

8 Rel-16 UE feature list 401

9 Rel-16 spectrum related Work Items for NR 403

9.1 LTE/NR spectrum sharing in band 48/n48 frequency range [NR\_n48\_LTE\_48\_coex-Core] 403

9.1.1 General [NR\_n48\_LTE\_48\_coex-Core] 403

9.1.2 Channel raster, sync raster, and UL shift [NR\_n48\_LTE\_48\_coex-Core] 403

10 Rel-17 spectrum related Work Items for NR 404

10.1 NR intra band Carrier Aggregation for xCC DL/yCC UL including contiguous and non-contiguous spectrum (x>=y) [NR\_CA\_R17\_intra] 404

10.1.1 Rapporteur Input (WID/TR/CR) [NR\_CA\_R17\_intra-Core /Perf] 404

10.1.2 UE RF for FR1 [NR\_CA\_R17\_intra-Core] 405

10.1.3 UE RF for FR2 [NR\_CA\_R17\_intra-Core] 407

10.2 NR inter-band Carrier Aggregation/Dual Connectivity for 2 bands DL with x bands UL (x=1, 2) [NR\_CADC\_R17\_2BDL\_xBUL] 407

10.2.1 Rapporteur Input (WID/TR/CR) [NR\_CADC\_R17\_2BDL\_xBUL-Core/Perf] 407

10.2.2 NR inter band CA without any FR2 band(s) [NR\_CADC\_R17\_2BDL\_xBUL-Core] 408

10.2.3 NR inter band CA with at least one FR2 band [NR\_CADC\_R17\_2BDL\_xBUL-Core] 412

10.3 DC of 1 LTE band and 1 NR band [DC\_R17\_1BLTE\_1BNR\_2DL2UL] 413

10.3.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core/Perf] 413

10.3.2 EN-DC without FR2 band [DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core] 414

10.3.3 EN-DC with FR2 band [DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core] 416

10.4 DC of 2 LTE band and 1 NR band [DC\_R17\_2BLTE\_1BNR\_3DL2UL] 418

10.4.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_2BLTE\_1BNR\_3DL2UL-Core/Perf] 419

10.4.2 EN-DC without FR2 band [DC\_R17\_2BLTE\_1BNR\_3DL2UL-Core] 419

10.4.3 DMEN-DC with FR2 band [DC\_R17\_2BLTE\_1BNR\_3DL2UL-Core] 428

10.5 DC of 3 LTE band and 1 NR band [DC\_R17\_3BLTE\_1BNR\_4DL2UL] 430

10.5.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_3BLTE\_1BNR\_4DL2UL-Core/Perf] 431

10.5.2 EN-DC without FR2 band [DC\_R17\_3BLTE\_1BNR\_4DL2UL-Core] 432

10.5.3 EN-DC with FR2 band [DC\_R17\_3BLTE\_1BNR\_4DL2UL-Core] 440

10.6 DC of 4 LTE band and 1 NR band [DC\_R17\_4BLTE\_1BNR\_5DL2UL] 441

10.6.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_4BLTE\_1BNR\_5DL2UL-Core/Perf] 441

10.6.2 EN-DC without FR2 band [DC\_R17\_4BLTE\_1BNR\_5DL2UL-Core] 441

10.6.3 EN-DC with FR2 band [DC\_R17\_4BLTE\_1BNR\_5DL2UL-Core] 443

10.7 DC of x bands (x=1,2, 3, 4) LTE inter-band CA and 2 bands NR inter-band CA [DC\_R17\_xBLTE\_2BNR\_yDL2UL] 444

10.7.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_xBLTE\_2BNR\_yDL2UL-Core/Per] 444

10.7.2 EN-DC including NR inter CA without FR2 band [DC\_R17\_xBLTE\_2BNR\_yDL2UL-Core] 444

10.7.3 EN-DC including NR inter CA with FR2 band [DC\_R17\_xBLTE\_2BNR\_yDL2UL-Core] 468

10.8 Band combinations for SA NR supplementary uplink (SUL), NSA NR SUL, NSA NR SUL with UL sharing from the UE perspective (ULSUP) [NR\_SUL\_combos\_R17] 471

10.8.1 Rapporteur Input (WID/TR/CR) [NR\_SUL\_combos\_R17-Core/Per] 471

10.8.2 UE RF [NR\_SUL\_combos\_R17-Core] 471

10.9 NR Inter-band Carrier Aggregation for 3 bands DL with 1 band UL [NR\_CA\_R17\_3BDL\_1BUL] 474

10.9.1 Rapporteur Input (WID/TR/CR) [NR\_CA\_R17\_3BDL\_1BUL-Core/Per] 474

10.9.2 UE RF [NR\_CA\_R17\_3BDL\_1BUL-Core] 474

10.10 NR Inter-band Carrier Aggregation for 4 bands DL with 1 band UL [NR\_CA\_R17\_4BDL\_1BUL] 478

10.10.1 Rapporteur Input (WID/TR/CR) [NR\_CA\_R17\_4BDL\_1BUL-Core/Per] 478

10.10.2 UE RF [NR\_CA\_R17\_4BDL\_1BUL-Core] 479

10.11 NR Inter-band Carrier Aggregation/Dual connectivity for 3 bands DL with 2 bands UL [NR\_CADC\_R17\_3BDL\_2BUL] 479

10.11.1 Rapporteur Input (WID/TR/CR) [NR\_CADC\_R17\_3BDL\_2BUL-Core/Per] 479

10.11.2 UE RF [NR\_CADC\_R17\_3BDL\_2BUL-Core] 480

10.12 DC of x bands (x=1,2) LTE inter-band CA (xDL/xUL) and y bands (y=3-x) NR inter-band CA [DC\_R17\_xBLTE\_yBNR\_3DL3UL] 483

10.12.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_xBLTE\_yBNR\_3DL3UL-Core/Per] 483

10.12.2 UE RF [DC\_R17\_xBLTE\_yBNR\_3DL3UL-Core] 484

10.13 DC of x bands (x=1,2,3) LTE inter-band CA (xDL/1UL) and 3 bands NR inter-band CA (3DL/1UL) [DC\_R17\_xBLTE\_3BNR\_yDL2UL] 484

10.13.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_xBLTE\_3BNR\_yDL2UL -Core/Per] 484

10.13.2 UE RF [DC\_R17\_xBLTE\_3BNR\_yDL2UL-Core] 484

10.14 NR inter-band Carrier Aggregation and Dual connectivity for DL 4 bands and 2UL bands [NR\_CADC\_R17\_4BDL\_2BUL] 485

10.14.1 Rapporteur Input (WID/TR/CR) [NR\_CADC\_R17\_4BDL\_2BUL -Core/Per] 485

10.14.2 UE RF [NR\_CADC\_R17\_4BDL\_2BUL -Core] 486

10.15 NR inter-band CA for 5 bands DL with x bands UL (x=1, 2) [NR\_CADC\_R17\_5BDL\_xBUL\_3DL3UL] 487

10.15.1 Rapporteur Input (WID/TR/CR) [NR\_CADC\_R17\_5BDL\_xBUL -Core/Per] 487

10.15.2 UE RF [NR\_CADC\_R17\_5BDL\_xBUL -Core] 488

10.16 DC of 5 bands LTE inter-band CA (5DL/1L) and 1 NR band (1DL/1UL) [DC\_R17\_5BLTE\_1BNR\_6DL2UL] 488

10.16.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_5BLTE\_1BNR\_6DL2UL-Core/Per] 488

10.16.2 UE RF [DC\_R17\_5BLTE\_1BNR\_6DL2UL-Core] 488

10.17 DC of x bands (x=2,3,4) LTE inter-band CA (xDL/1UL) and 1 NR FR1 band (1DL/1UL) and 1 NR FR2 band (1DL/1UL) [DC\_R17\_xBLTE\_2BNR\_yDL3UL] 489

10.17.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_xBLTE\_2BNR\_yDL3UL-Core/Per] 489

10.17.2 UE RF [DC\_R17\_xBLTE\_2BNR\_yDL3UL-Core] 489

10.18 SAR schemes for UE power class 2 (PC2) for NR inter-band Carrier Aggregation and supplemental uplink (SUL) configurations with 2 bands UL [NR\_SAR\_PC2\_interB\_SUL\_2BUL] 491

10.18.1 General and Rapporteur Input (WID/TR/CR) [NR\_SAR\_PC2\_interB\_SUL\_2BUL-Core/Per] 491

10.18.2 PC2 for inter-band CA [NR\_SAR\_PC2\_interB\_SUL\_2BUL-Core] 492

10.18.3 PC2 for SUL [NR\_SAR\_PC2\_interB\_SUL\_2BUL-Core] 494

10.19 High power UE (power class 2) for NR inter-band Carrier Aggregation with 2 bands downlink and 2 bands uplink [NR\_PC2\_CA\_R17\_2BDL\_2BUL] 495

10.19.1 Rapporteur Input (WID/TR/CR) [NR\_PC2\_CA\_R17\_2BDL\_2BUL-Core/Per] 495

10.19.2 UE RF [NR\_PC2\_CA\_R17\_2BDL\_2BUL-Core] 495

10.20 High power UE (power class 2) for EN-DC with 1 LTE band + 1 NR TDD band [ENDC\_UE\_PC2\_R17\_NR\_TDD] 496

10.20.1 Rapporteur Input (WID/TR/CR) [ENDC\_UE\_PC2\_R17\_NR\_TDD -Core/Per] 496

10.20.2 UE RF [ENDC\_UE\_PC2\_R17\_NR\_TDD -Core] 497

10.21 Adding channel bandwidth support to existing NR bands [NR\_bands\_R17\_BWs] 497

10.21.1 General and Rapporteur Input (WID/TR/CR) [NR\_bands\_R17\_BWs -Core/Per] 497

10.21.2 UE RF requirement [NR\_bands\_R17\_BWs -Core] 498

10.21.2.1 Reference sensitivity [NR\_bands\_R17\_BWs -Core] 499

10.21.2.2 MPR/A-MPR/NS signaling [NR\_bands\_R17\_BWs -Core] 499

10.21.2.3 others [NR\_bands\_R17\_BWs -Core] 499

10.21.3 BS RF requirement [NR\_bands\_R17\_BWs -Core] 499

10.22 Introduction of channel bandwidths 35MHz and 45MHz for NR [NR\_FR1\_35MHz\_45MHz\_BW] 500

10.22.1 General and Rapporteur Input (WID/TR/CR) [NR\_FR1\_35MHz\_45MHz\_BW-Core/Per] 500

10.22.2 Spectrum utilization [NR\_FR1\_35MHz\_45MHz\_BW-Core] 501

10.22.3 UE RF requirements [NR\_FR1\_35MHz\_45MHz\_BW-Core] 501

10.22.4 BS RF requirements [NR\_FR1\_35MHz\_45MHz\_BW-Core] 503

10.22.5 Others [NR\_FR1\_35MHz\_45MHz\_BW-Core] 505

10.23 Band combinations for Uu and V2X con-current operation [NR\_LTE\_V2X\_PC5\_combos] 506

10.23.1 General and Rapporteur Input (WID/TR/CR) [NR\_LTE\_V2X\_PC5\_combos-Core/Per] 506

10.23.2 UE RF requirement for concurrent operation between NR Uu band and NR PC5 band [NR\_LTE\_V2X\_PC5\_combos-Core] 506

10.23.3 UE RF requirement for concurrent operation between LTE Uu band and NR PC5 band [NR\_LTE\_V2X\_PC5\_combos-Core] 507

10.23.4 UE RF requirement for concurrent operation between NR Uu band and LTE PC5 band [NR\_LTE\_V2X\_PC5\_combos-Core] 507

10.23.5 UE RF requirement for concurrent operation of LTE/NR CA/DC band combinations + PC5 V2X [NR\_LTE\_V2X\_PC5\_combos-Core] 507

10.24 Introduction of FR2 FWA UE with maximum TRP of 23dBm for band n257 and n258 [NR\_FR2\_FWA\_Bn257\_Bn258] 507

10.24.1 UE RF (38.101-2) [NR\_FR2\_FWA\_Bn257\_Bn258-Core] 507

10.24.2 RRM Core requirements (38.133) [NR\_FR2\_FWA\_Bn257\_Bn258-Core] 509

10.24.3 RRM Perf. requirements (38.133) [NR\_FR2\_FWA\_Bn257\_Bn258-Perf] 509

10.24.4 Others [NR\_FR2\_FWA\_Bn257\_Bn258-Core/Perf] 510

10.25 Introduction of NR band n13 [NR\_n13] 510

10.25.1 UE RF (38.101-1) [NR\_n13-Core] 510

10.25.2 BS RF (38.104) [NR\_n13-Core] 510

10.25.3 RRM (38.133) [NR\_n13-Core] 513

10.25.4 Others [NR\_n13-Core/Perf] 513

10.26 Introduction of 1880-1920MHz SUL band for NR [NR\_SUL\_band\_1880\_1920MHz] 513

10.26.1 UE RF (38.101-1) [NR\_SUL\_band\_1880\_1920MHz-Core] 513

10.26.2 BS RF (38.104) [NR\_SUL\_band\_1880\_1920MHz -Core] 513

10.26.3 RRM (38.133) [NR\_SUL\_band\_1880\_1920MHz -Core] 516

10.26.4 Others [NR\_SUL\_band\_1880\_1920MHz -Core/Perf] 516

10.27 Introduction of 2300-2400MHz SUL band for NR [NR\_SUL\_band\_2300\_2400MHz] 516

10.27.1 UE RF (38.101-1) [NR\_SUL\_band\_2300\_2400MHz -Core] 516

10.27.2 BS RF (38.104) [NR\_SUL\_band\_2300\_2400MHz -Core] 516

10.27.3 RRM (38.133) [NR\_SUL\_band\_2300\_2400MHz -Core] 519

10.27.4 Others [NR\_SUL\_band\_2300\_2400MHz -Core/Perf] 519

10.28 Introduction of NR 47 GHz band [NR\_47GHz\_Band] 519

10.28.1 UE RF (38.101-2) [NR\_47GHz\_Band -Core] 519

10.28.2 BS RF (38.104) [NR\_47GHz\_Band -Core] 520

10.28.3 RRM (38.133) [NR\_47GHz\_Band -Core] 521

10.28.4 Others [NR\_47GHz\_Band -Core/Perf] 521

10.29 Introduction of NR band n24 [NR\_band\_n24] 522

10.29.1 UE RF (38.101-1) [NR\_band\_n24-Core] 522

10.29.2 BS RF (38.104) [NR\_band\_n24-Core] 523

10.29.3 RRM (38.133) [NR\_band\_n24-Core] 524

10.29.4 Others [NR\_band\_n24-Core/Perf] 524

10.30 Introduction of 1.6 GHz NR SUL band with same uplink frequency range of Band 24 [NR\_SUL\_UL\_n24] 525

10.30.1 UE RF (38.101-1) [NR\_SUL\_UL\_n24-Core] 525

10.30.2 BS RF (38.104) [NR\_SUL\_UL\_n24-Core] 526

10.30.3 RRM (38.133) [NR\_SUL\_UL\_n24-Core] 528

10.30.4 Others [NR\_SUL\_UL\_n24-Core/Perf] 528

11 Reply to ITU-R LS (RP-200042) 530

11.1 Study on IMT parameters for frequency ranges 6.425-7.125GHz and 10.0-10.5GHz [FS\_6425\_10500MHz \_NR] 530

11.1.1 UE parameters 531

11.1.2 BS parameters 532

11.1.3 Coexistence study 533

11.1.3.1 Simulation assumptions 533

11.1.3.2 Downlink 534

11.1.3.3 Uplink 535

11.1.4 Antenna characteristics 536

11.1.5 Relevant information for the sharing and compatibility studies 537

12 Rel-17 non-spectrum related work items for NR 537

12.1 Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) requirements for NR UEs [NR\_MIMO\_OTA] 537

12.1.1 General [NR\_MIMO\_OTA] 537

12.1.2 Performance Requirements [NR\_MIMO\_OTA-Core] 538

12.1.2.1 Performance Requirements for FR1 [NR\_MIMO\_OTA-Core] 538

12.1.2.2 Performance Requirements for FR2 [NR\_MIMO\_OTA-Core] 539

12.1.3 Testing methodologies [NR\_MIMO\_OTA-Core] 539

12.1.3.1 Testing parameters for Performance [NR\_MIMO\_OTA-Core] 540

12.1.3.2 Optimization of test methodologies [NR\_MIMO\_OTA-Core] 541

12.1.3.3 Channel model validation [NR\_MIMO\_OTA-Core] 541

12.2 RF requirements enhancement for NR frequency range 1 (FR1) [NR\_RF\_FR1\_enh] 542

12.2.1 General and work plan [NR\_RF\_FR1\_enh -Core] 542

12.2.2 RF core requirements [NR\_RF\_FR1\_enh -Core] 542

12.2.2.1 UL MIMO configuration for SUL band configurations [NR\_RF\_FR1\_enh -Core] 542

12.2.2.2 2Tx switching between carrier 1 and carrier 2 [NR\_RF\_FR1\_enh -Core] 543

12.2.2.3 Tx switching between 1 carrier on band A and 2 contiguous aggregated carriers on band B [NR\_RF\_FR1\_enh -Core] 544

12.2.2.4 HPUE for TDD intra-band contiguous UL CA [NR\_RF\_FR1\_enh -Core] 544

12.3 NR RF requirement enhancements for frequency range 2 (FR2) [NR\_RF\_FR2\_req\_enh2] 546

12.3.1 General and work plan [NR\_RF\_FR2\_req\_enh2-Core] 546

12.3.2 RF core requirements [NR\_RF\_FR2\_req\_enh2-Core] 546

12.3.2.1 Inter-band DL CA enhancements [NR\_RF\_FR2\_req\_enh2-Core] 546

12.3.2.1.1 Applicability of CBM/IBM for different CA configurations [NR\_RF\_FR2\_req\_enh2-Core] 546

12.3.2.1.2 Feasibility study for CA configurations within same frequency group based on IBM [NR\_RF\_FR2\_req\_enh2-Core] 547

12.3.2.1.3 Feasibility study for CA configurations between different frequency groups based on CBM [NR\_RF\_FR2\_req\_enh2-Core] 548

12.3.2.1.4 UE requirements for CA configurations CA\_n258A-n260A and CA\_n257A-n259A based on IBM [NR\_RF\_FR2\_req\_enh2-Core] 548

12.3.2.1.5 UE requirements for CA configurations within the same frequency group based on CBM [NR\_RF\_FR2\_req\_enh2-Core] 549

12.3.2.2 Inter-band UL CA [NR\_RF\_FR2\_req\_enh2-Core] 549

12.3.2.2.1 Feasibility study for CA configurations within same frequency group based on IBM and CBM [NR\_RF\_FR2\_req\_enh2-Core] 549

12.3.2.2.2 Feasibility study for CA configurations between different frequency groups based on CBM [NR\_RF\_FR2\_req\_enh2-Core] 549

12.3.2.2.3 UE requirements for CA configuration CA\_n257A-n259A based on IBM [NR\_RF\_FR2\_req\_enh2-Core] 550

12.3.2.3 UL gaps for self-calibration and monitoring [NR\_RF\_FR2\_req\_enh2-Core] 550

12.4 NR RRM further enhancement [NR\_RRM\_enh2-Core] 551

12.4.1 Work plan [NR\_RRM\_enh2-Core] 551

12.5 NR measurement gap enhancements [NR\_MG\_enh-Core] 552

12.5.1 Work plan [NR\_MG\_enh-Core] 552

12.6 Enhancement for NR high speed train scenario in FR1 [NR\_HST\_FR1\_enh-Core] 552

12.6.1 Work plan [NR\_HST\_FR1\_enh-Core] 552

12.7 NR support for high speed train scenario in FR2 [NR\_HST\_FR2\_enh] 552

12.7.1 General and work plan [NR\_HST\_FR2\_enh-Core] 552

12.7.2 High speed train deployment scenario in FR2 [NR\_HST\_FR2\_enh-Core] 553

12.7.3 UE RF core requirements [NR\_HST\_FR2\_enh-Core] 554

12.8 Solutions for NR to support non-terrestrial networks (NTN) [NR\_NTN\_solutions] 555

12.8.1 General and work plan [NR\_NTN\_solutions] 555

12.8.2 Use cases, deployment scenarios, and regulatory information [NR\_NTN\_solutions-Core] 556

12.8.3 Coexistence aspects [NR\_NTN\_solutions -Core] 557

12.8.3.1 Simulation assumptions [NR\_NTN\_solutions -Core] 557

12.8.3.2 UE requirements aspects [NR\_NTN\_solutions -Core] 558

12.8.3.3 BS requirements aspects [NR\_NTN\_solutions -Core] 558

12.8.4 RRM requirements [NR\_NTN\_solutions-Core] 558

12.9 UE Power Saving Enhancements [NR\_UE\_pow\_sav\_enh] 559

12.9.1 General and work plan [NR\_UE\_pow\_sav\_enh] 559

12.9.2 Feasibility and performance impact of relaxing UE measurements for RLM and/or BFD [NR\_UE\_pow\_sav\_enh] 560

12.10 NR Sidelink enhancement [NRSL\_enh] 561

12.10.1 General and work plan [NRSL\_enh] 561

12.10.2 Spectrum request for SL operation [NRSL\_enh-Core] 562

13 Rel-17 Study Items for NR 562

13.1 Study on enhanced test methods for FR2 in NR [FS\_FR2\_enhTestMethods] 562

13.1.1 Test methodology for high DL power and low UL power test cases [FS\_FR2\_enhTestMethods] 562

13.1.2 Polarization basis mismatch [FS\_FR2\_enhTestMethods] 563

13.1.3 Enhanced test methods for inter-band (FR2+FR2) CA [FS\_FR2\_enhTestMethods] 565

13.1.4 Extreme temperature conditions [FS\_FR2\_enhTestMethods] 566

13.1.5 Enhanced test methods for FR2 DL 256QAM RF [FS\_FR2\_enhTestMethods] 566

13.1.6 Test time reduction [FS\_FR2\_enhTestMethods] 566

13.1.7 Testability for band n262 [FS\_FR2\_enhTestMethods] 566

13.1.7.1 Extension of frequency applicability of permitted methods in 38.810 [FS\_FR2\_enhTestMethods] 566

13.1.7.2 Extension of frequency applicability of enhancement objectives 1-6 [FS\_FR2\_enhTestMethods] 567

13.2 Study on supporting NR from 52.6 GHz to 71 GHz [FS\_NR\_52\_to\_71GHz] 567

13.2.1 Numerology, Channel BW [FS\_NR\_52\_to\_71GHz] 567

13.2.1.1 General [FS\_NR\_52\_to\_71GHz] 567

13.2.1.2 Timing considerations [FS\_NR\_52\_to\_71GHz] 569

13.2.1.3 Phase noise and RF impairments related to response to RAN1 [FS\_NR\_52\_to\_71GHz] 570

13.2.2 BS aspect [FS\_NR\_52\_to\_71GHz] 571

13.2.3 UE aspect [FS\_NR\_52\_to\_71GHz] 572

13.2.4 Others [FS\_NR\_52\_to\_71GHz] 573

13.3 Study on Efficient utilization of licensed spectrum that is not aligned with existing NR channel bandwidths [FS\_NR\_eff\_BW\_util] 573

13.3.1 General and work plan [FS\_NR\_eff\_BW\_util] 573

13.3.2 Input on operator licensed channel bandwidths in FR1 that do not align with existing NR channel bandwidths [FS\_NR\_eff\_BW\_util] 574

13.3.3 Evaluation of use of larger channel bandwidths than operator licensed bandwidth [FS\_NR\_eff\_BW\_util] 575

13.3.4 Evaluation of use of overlapping UE channel bandwidths (from both UE and network perspective) [FS\_NR\_eff\_BW\_util] 575

13.3.4.1 UE perspective [FS\_NR\_eff\_BW\_util] 575

13.3.4.2 Network perspective [FS\_NR\_eff\_BW\_util] 576

13.3.5 Others [FS\_NR\_eff\_BW\_util] 576

14 Rel-17 Work Items for LTE 576

14.1 LTE inter-band Carrier Aggregation for 2 bands DL with 1 band UL [LTE\_CA\_R17\_2BDL\_1BUL] 576

14.1.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_2BDL\_1BUL-Core/Perf] 576

14.1.2 UE RF with harmonic, close proximity and isolation issues [LTE\_CA\_R17\_2BDL\_1BUL-Core] 577

14.1.3 UE RF without specific issues [LTE\_CA\_R17\_2BDL\_1BUL-Core] 577

14.2 LTE inter-band Carrier Aggregation for 3 bands DL with 1 band UL [LTE\_CA\_R17\_3BDL\_1BUL] 577

14.2.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_3BDL\_1BUL-Core/Perf] 578

14.2.2 UE RF with harmonic, close proximity and isolation issues [LTE\_CA\_R17\_3BDL\_1BUL-Core] 578

14.2.3 UE RF without specific issues [LTE\_CA\_R17\_3BDL\_1BUL-Core] 578

14.3 LTE inter-band Carrier Aggregation for x bands DL (x=4, 5) with 1 band UL 578

14.3.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_xBDL\_1BUL-Core] 579

14.3.2 UE RF with 4 LTE bands CA [LTE\_CA\_R17\_xBDL\_1BUL-Core] 579

14.3.3 UE RF with 5 LTE bands CA [LTE\_CA\_R17\_xBDL\_1BUL-Core] 581

14.4 LTE inter-band Carrier Aggregation for 2 bands DL with 2 band UL [LTE\_CA\_R17\_2BDL\_2BUL] 581

14.4.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_2BDL\_2BUL-Core] 581

14.4.2 UE RF with harmonic, close proximity and isolation issues [LTE\_CA\_R17\_2BDL\_2BUL-Core] 582

14.4.3 UE RF without specific issues [LTE\_CA\_R17\_2BDL\_2BUL-Core] 582

14.5 LTE inter-band Carrier Aggregation for x bands DL (x= 3, 4, 5) with 2 band UL 582

14.5.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_xBDL\_2BUL-Core] 582

14.5.2 UE RF with MSD [LTE\_CA\_R17\_xBDL\_2BUL-Core] 583

14.5.3 UE RF without MSD [LTE\_CA\_R17\_xBDL\_2BUL-Core] 583

14.6 RRM for LTE CA basket WIs [LTE\_CA\_R17\_xxxx] 583

14.6.1 RRM Core (36.133) [LTE\_CA\_R17\_xxxx-Core] 583

14.6.2 RRM Perf (36.133) [LTE\_CA\_R17\_xxxx-Perf] 583

14.7 New WID on Additional LTE bands for UE category M1&M2 and/or NB1&NB2 in Rel-17 [LTE\_bands\_R17\_M1\_M2\_NB1\_NB2] 583

14.7.1 Rapporteur Input (WID/TR/CR) [LTE\_bands\_R17\_M1\_M2\_NB1\_NB2-Core] 583

14.7.2 RF [LTE\_bands\_R17\_M1\_M2\_NB1\_NB2-Core] 585

14.7.3 Others [LTE\_bands\_R17\_M1\_M2\_NB1\_NB2-Perf] 586

14.8 Modification of LTE Band 24 specifications to comply with updated regulatory emission limits [LTE\_B24\_mod] 586

14.8.1 General and rapporteur input [LTE\_B24\_mod-Core] 586

14.8.2 UE RF [LTE\_B24\_mod-Core] 586

14.8.3 BS RF [LTE\_B24\_mod-Core] 586

14.8.4 RRM and others [LTE\_B24\_mod-Core/Perf] 588

15 Rel-17 Study Items for LTE 590

15.1 High-power UE operation for fixed-wireless/vehicle-mounted use cases in LTE bands 5 and 12 and NR band n71 [FS\_LTE\_NR\_HPUE\_FWVM] 590

15.1.1 General 590

15.1.2 Coexistence study 590

15.1.3 UE RF 590

16 Liaison and output to other groups 591

16.1 R17 related 591

16.2 Others 591

17 Revision of the Work Plan 591

17.1 Simplification of band combinations in RAN4 specifications 591

17.2 R17 new proposals 594

17.2.1 Spectrum related 594

17.2.2 Non-spectrum related 594

17.3 Others 596

18 Any other business 596

19 Close of the E-meeting 597

## 1 Opening of the E-meeting

The Chairman Steven Chen (Apple) opened the meeting on RAN4 reflector on /11/2020.

**Intellectual Property Rights Policy**

The attention of the delegates to the meeting of this Technical Specification Group was drawn to the fact that 3GPP Individual Members have the obligation under the IPR Policies of their respective Organizational Partners to inform their respective Organizational Partners of Essential IPRs they become aware of.

The delegates were asked to take note that they were thereby invited:

- to investigate whether their organization or any other organization owns IPRs which were, or were likely to become Essential in respect of the work of 3GPP.

- to notify their respective Organizational Partners of all potential IPRs, e.g., for ETSI, by means of the IPR Information Statement and the Licensing declaration forms.

**Statement regarding competition law**

The attention of the delegates to the meeting was drawn to the fact that 3GPP activities were subject to all applicable antitrust and competition laws and that compliance with said laws was therefore required by any participant of the meeting, including the Chairman and Vice-Chairmen and were invited to seek any clarification needed with their legal counsel. The leadership would conduct the present meeting with impartiality and in the interests of 3GPP. Delegates were reminded that timely submission of work items in advance of TSG/WG meetings was important to allow for full and fair consideration of such matters.

**Meeting Arrangements**

The meeting was conducted on three parallel sessions; Main session, RRM session and BS RF Test Demod session. The Main session was chaired by RAN4 Chairman Steven Chen (Apple), RRM session was chaired by RAN4 Vice Chairman Andrey Chervyakov (Intel) and BS RF Test Demod session was chaired by RAN4 ViceChairman Haijie Qiu (Samsung). The sessions were further broken down into separate email threads to address specific technical topics lead by assigned discussion moderators. Webinar sessions were used to summarize progress, resolve controversial issues and decide way forward.

## 2 Approval of the agenda

## 3 Letters / reports from other groups / meetings

## 4 Rel-15 New radio access technology

### 4.7 RRM core requirements maintenance (38.133/36.133) [NR\_newRAT-Core]

================================================================================

**Email discussion: [97e][201] NR\_NewRAT\_RRM\_Core**

**R4-2017000 Email discussion summary for [97e][201] NR\_NewRAT\_RRM\_Core***Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017271 (from R4-2017000).**

**R4-2017271 Email discussion summary for [97e][201] NR\_NewRAT\_RRM\_Core***Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Topic #1: RRM measurement**  Tdoc decisions   |  |  | | --- | --- | | **Tdoc** | **Decision** | | R4-2015445 | Revised | | R4-2015446 | Return to | | R4-2014274 | Merged (into revised R4-2015445) | | R4-2014765 | Return to | | R4-2015210 | Return to |   **Topic #2: Scell activation**  Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI  Agreement   * In Rel-15, clarify that if ssb-PositionInBurst indicates multiple SSBs but no TCI indication is provided, the requirement for unknown SCell activation is not applied.   + FFS whether TCI indication is provided in the same MAC PDU with SCell activation for unknown or before CSI-RS reception   New tdocs   |  |  |  | | --- | --- | --- | | R4-2017035 | WF on SSB-less SCell activation delay requirement | Qualcomm |   Tdoc decisions   |  |  | | --- | --- | | **Tdoc** | **Decision** | | R4-2015736 | Revised | | R4-2015737 | Return to | | R4-2016580 | Merged (into revised R4-2015736) | | R4-2015306 | Merged (into revised R4-2015736) | | R4-2016581 | Return to | | R4-2015570 | Return to | | R4-2015571 | Return to |   **Topic #3: Beam management**  Issue 3-1: CSI-RS bandwidth condition for beam management  Agreement   * Add the condition that CSI-RS bandwidth ≥24 PRBs for BFD and CBD requirements.   Tdoc decisions   |  |  | | --- | --- | | **Tdoc** | **Decision** | | R4-2014268 | Revised | | R4-2014269 | Return to. | | R4-2015527 | Merged (into revised R4-2014268). | | R4-2015528 | Withdrawn. | | R4-2014271 | Revised | | R4-2014272 | Return to. | |  |  |   **Topic #4: BWP switching**  Issue 4-2: Clarification on BWP configuration(s) for active BWP switch  Agreement   * Update applicability of current RRC based BWP switch to only PCell or PScell in Rel-15.   New tdocs   |  |  |  | | --- | --- | --- | | R4-2017039 | WF on RRC based BWP switching for SCell | Apple | | R4-2017040 | LS on RRC based BWP switching for SCell | Apple | |  |  |  |   Tdoc decisions   |  |  | | --- | --- | | **Tdoc** | **Decision** | | R4-2016373 | Return to. | | R4-2016374 | Return to. | | R4-2014238 | Merged (into R4-2014761). | | R4-2014239 | Withdrawn. | | R4-2015529 | Return to. | | R4-2015530 | Return to. | | R4-2014761 | Return to. | | R4-2015208 | Return to. | | R4-2015572 | Return to. | | R4-2015573 | Return to. | | R4-2015300 | Return to. |   Chair: Not allocated Cat A for R4-2015300. The Cat A CR will be allocated in case the original CR is will be agreed.  **Topic #5: TCI switching**  Tdoc decisions   |  |  | | --- | --- | | **Tdoc** | **Decision** | | R4-2014763 | Return to | | R4-2015209 | Return to | | R4-2015672 | Return to | | R4-2015673 | Return to |   **Topic #6: Others**   |  |  | | --- | --- | | **Tdoc** | **Decision** | | R4-2014693 | Agreed. | | R4-2014694 | Agreed. | | R4-2015876 | Return to | | R4-2015877 | Return to | | R4-2016022 | Agreed | | R4-2016023 | Agreed | | R4-2015731 | Return to | | R4-2015732 | Return to | | R4-2015733 | Return to | | R4-2015734 | Return to | | R4-2015159 | Agreed | | R4-2015160 | Agreed | |

2nd round email discussion conclusions

================================================================================

**R4-2017035 WF on SSB-less SCell activation delay requirement**

*Type: other For: Approval  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017039 WF on RRC based BWP switching for SCell**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017040 LS on RRC based BWP switching for SCell**

*Type: LS out For: Approval  
 to RAN2   
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014237 Discussion on RRC based BWP switch for Scell**

*Type: discussion For: Discussion  
 Source: Apple*

**Abstract:**

Observation #1: RRC based BWP switch by RRC re-configuration of firstActiveUplinkBWP-Id is not allowed for Scell.

Proposal #1: Update applicability of current RRC based BWP switch to only PCell or PScell.

Proposal #2: Discuss further on how to extend RRC based switching delay requirement to be applicable to SCell

Proposal#3: Send LS to RAN2 to clarify how RRC based BWP switch can be applicable to SCell.

**Decision: Noted.**

**R4-2014238 CR on Applicability of RRC based BWP switch requirements - Rel15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1141 Cat: F (Rel-15)  
  
 Source: Apple*

**Abstract:**

RRC based BWP switch is not allowed for SCell with change to firstActiveDownlinkBWP-Id via RRC configuration. The current requirements for RRC based TCI state switch are only applicable to PCell and PScell. We need to capture that current requirements are only applicable to PCell and PSCell. More details are captured in

R4-2014237.

Remove Editor’s note.

**Decision: Merged.**

**R4-2014239 CR on Applicability of RRC based BWP switch requirements - Rel16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1142 Cat: A (Rel-16)  
  
 Source: Apple*

**Decision: Withdrawn.**

**R4-2014268 CR on CSI-RS BW condition for BFD/CBD R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1145 Cat: F (Rel-15)  
  
 Source: Apple*

**Abstract:**

In Previous RAN4 discussion, the CSI-RS based CBD/BFD requirement applies when CSI-RS BW≥24 PRBs, however, this side condition has not been captured explicitly in the TS38.133. Some companies thought it’s not necessary to capture this condition because the minimum configurable BW for CSI-RS BW is 24PRBs. However, it’s not correct since RAN2 has clarification in the CSI-RS configuration IE, as duplicated below,

RAN2 agreed that if the configured CSI-RS BW is larger than UE corresponding BWP size, UE shall assume the actual CSI-RS BW is same as the width of the that BWP; here the “corresponding BWP” in CBD/BFD scenario is the active BWP.

Based on the above defintion, if we don’t specify it explicitly in the spec, it would mislead engineers to assume that CSI-RS BW can be smaller than 24PRB for BFD/CBD requirement in case the UE active BWP size is smaller than 24 PRBs. We need to solve this ambiguity in the spec.

**Decision: Revised to R4-2017037 (from R4-2014268).**

**R4-2017037 CR on CSI-RS BW condition for BFD/CBD R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1145 Cat: F (Rel-15)  
  
 Source: Apple*

**Abstract:**

In Previous RAN4 discussion, the CSI-RS based CBD/BFD requirement applies when CSI-RS BW≥24 PRBs, however, this side condition has not been captured explicitly in the TS38.133. Some companies thought it’s not necessary to capture this condition because the minimum configurable BW for CSI-RS BW is 24PRBs. However, it’s not correct since RAN2 has clarification in the CSI-RS configuration IE, as duplicated below,

RAN2 agreed that if the configured CSI-RS BW is larger than UE corresponding BWP size, UE shall assume the actual CSI-RS BW is same as the width of the that BWP; here the “corresponding BWP” in CBD/BFD scenario is the active BWP.

Based on the above defintion, if we don’t specify it explicitly in the spec, it would mislead engineers to assume that CSI-RS BW can be smaller than 24PRB for BFD/CBD requirement in case the UE active BWP size is smaller than 24 PRBs. We need to solve this ambiguity in the spec.

**Decision: Return to.**

**R4-2014269 CR on CSI-RS BW condition for BFD/CBD R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1146 Cat: A (Rel-16)  
  
 Source: Apple*

**Decision: Return to.**

**R4-2014270 On AP-CSI-RS based L1-RSRP measurement**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Apple, Huawei, HiSilicon*

**Abstract:**

Proposal 1: AP CSI-RS based L1-RSRP measurement shall not be performed within MG duration. But outside MG, if this AP CSI-RS for L1-RSRP measurement is overlapped with L3 RRM measurement RS, the AP CSI-RS based L1-RSRP measurement shall be prioritized.

Proposal 2:

- in TS38.133, RAN4 clarifies that scaling factor P=1 for AP CSI-RS based L1-RSRP measurement outside MG regardless of whether this AP CSI-RS is overlapped with L3 measurement RS or not.

- in TS38.133, RAN4 clarifies that longer SSB based L3 measurement period would be expected if SSB symbols for L3 measurement are colliding with AP CSI-RS for L1-RSRP.

- in TS38.133, RAN4 clarifies that AP CSI-RS based L1-RSRP measurement requirement is not applied for the case that AP CSI-RS is overlapped with MG.

**Decision: Noted.**

**R4-2014271 CR on AP-CSI-RS based L1-RSRP measurement R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1147 Cat: F (Rel-15)  
  
 Source: Apple, Huawei, HiSilicon*

**Abstract:**

The AP CSI-RS based L1-RSRP measurement delay requirement is not accurate, as discussed in

R4-2014270.

**Decision: Revised to R4-2017038 (from R4-2014271).**

**R4-2017038 CR on AP-CSI-RS based L1-RSRP measurement R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1147 Cat: F (Rel-15)  
  
 Source: Apple, Huawei, HiSilicon*

**Abstract:**

The AP CSI-RS based L1-RSRP measurement delay requirement is not accurate, as discussed in

R4-2014270.

**Decision: Return to.**

**R4-2014272 CR on AP-CSI-RS based L1-RSRP measurement R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1148 Cat: A (Rel-16)  
  
 Source: Apple, Huawei, HiSilicon*

**Decision: Return to.**

**R4-2014273 On CSSF for R15 EN-DC**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Apple*

**Abstract:**

Proposal 1: the NR inter-RAT MO on NR serving CC configured by LTE MN shall be captured into CSSF outside MG:

Proposal 2: RAN4 CSSF outside MG design uses option 3, i.e., in EN-DC the CSSF without MG is determined by the number of MOs without MG configured from both LTE MN and NR SN, and if any two MOs from LTE MN and NR SN meet MO merging rule, they shall be counted as one single MO in MO number counting.

Proposal 3: the CSSF outside MG shall be updated as in this contribution.

Proposal 4: the NR inter-RAT MO configured by LTE MN shall be further divided into following types for CSSF inside MG,

Proposal 5: RAN4 CSSF inside MG design uses option 3, i.e., Mtot,i,j = Mintra,i,j + Minter,i,j : Total number of intra-frequency, inter-frequency and inter-RAT measurement objects which are candidates to be measured in gap j where the measurement object i is also a candidate. If any two MOs from LTE MN and NR SN meet MO merging rule, they shall be counted as one single MO in MO number counting. Otherwise Mtot,i,j equals 0.

**Decision: Noted.**

**R4-2014274 CR on CSSF for R15 EN-DC**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1149 Cat: F (Rel-15)  
  
 Source: Apple*

**Abstract:**

The CSSF design for EN-DC shall consider the MOs configured from both LTE MN and NR SN in EN-DC.

**Decision: Merged.**

**R4-2014565 Discussion of RRC based BWP switching on single CC**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Abstract:**

Proposal 1: Current single RRC based BWP switch delay requirement in Rel-15 is only applied for PCell or PScell.

Proposal 2: RRC based single BWP switch delay for SCell needs more discussion.

**Decision: Noted.**

**R4-2014693 CR on carrier frequency range of PCell/PSCell for the maximum number of RLM-RS resources**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1195 Cat: F (Rel-15)  
  
 Source: CMCC*

**Abstract:**

In RAN#89-e meeting, CR (RP-201715, RP-201716) to TS 38.213 has been approved to extend 8 SSB support to the unpaired spectrum with carrier frequencies within FR1 larger than 1.88GHz.

In current TS 38.133, carrier frequency range of PCell/PSCell for the maximum number of RLM-RS resources (Table 8.1.1-2) is not aligned with RAN/RAN1 agreements.

**Decision: Agreed.**

**R4-2014694 CR on carrier frequency range of PCell/PSCell for the maximum number of RLM-RS resources**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1196 Cat: A (Rel-16)  
  
 Source: CMCC*

**Decision: Agreed.**

**R4-2014760 Remaining issues on RRM in R15**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014761 CR on active BWP switch in R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1197 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

RRC-based BWP switch cannot apply for SCell.

**Decision: Return to.**

**R4-2014762 CR on active BWP switch in R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1198 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

RRC-based BWP switch cannot apply for SCell.

**Decision: Noted.**

**R4-2014763 CR on active TCI state switching delay in R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1199 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

On 8.10.3,

The requirement doesn’t specify for L1-RSRP measurement once NW configures both SSB and CSI-RS for measurement.

On 8.10.6,

For active TCI state list update, TOk is redundant and equals to 1, because the new target TCI state should not be in the old active TCI state list. Otherwise, this update is not necessary.

**Decision: Return to.**

**R4-2014764 CR on active TCI state switching delay in R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1200 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

On 8.10.3,

The requirement doesn’t specify for L1-RSRP measurement once NW configures both SSB and CSI-RS for measurement.

On 8.10.6,

For active TCI state list update, TOk is redundant and equals to 1, because the new target TCI state should not be in the old active TCI state list. Otherwise, this update is not necessary.

**Decision:** The document was **withdrawn**.

**R4-2014765 CR on MO merge in R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1201 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

When both MN and SN configures MOs and the configured NR frequency layers shall be counted only once, UE will be confused on the Klayer1\_measurement with different SSB-ToMeasure indications.

**Decision: Return to.**

**R4-2014766 CR on MO merge in R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1202 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

When both MN and SN configures MOs and the configured NR frequency layers shall be counted only once, UE will be confused on the Klayer1\_measurement with different SSB-ToMeasure indications.

**Decision: Return to.**

**R4-2015159 Addition of symbol definitions**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1231 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Symbols have not been defineded in section 3.2 of 38.133 even though they are used in the other parts of the spec.

**Decision: Agreed.**

**R4-2015160 Addition of symbol definitions**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1232 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

There are very few of the symbols used in 38.133 which are defined in section 3.1 (only Tc and Ts are specified). This CR aligns with symbols in 36.133 while taking into account NR differences

**Decision: Agreed.**

**R4-2015208 CR on BWP switch**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1248 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2015209 CR on TCI state**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1249 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2015210 CR on MO merge**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1250 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2015300 CR to TS 38.133 on DCI based BWP switch requirements applicability**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1251 Cat: F (Rel-15)  
  
 Source: NEC*

**Abstract:**

DCI based BWP switch requirements are not applicable for DCI received through cross-carrier scheduling. This is not reflected in current specification.

**Decision: Return to.**

**R4-2015306 CR to TS 38.133 on clarification of applicability of SCell activation requirements for unknown FR1 cell**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1253 Cat: F (Rel-15)  
  
 Source: NEC*

**Abstract:**

Applicability of SCell activation requirements for unknown FR1 cell are not clear in the specification as time for L1-RSRP measurement and report is NOT included in SCell activation requirements

**Decision: Merged.**

**R4-2015445 Correction to CSSF calculation R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1256 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In TS 36.133 clause 8.17.4.1 it is specified that the when UE is configured with EN-DC the intra-RAT NR measurement on NR serving carrier should obey requirements for NR intra-frequency measurements. On the other hand. Intra-frequency measurement shall be performed without MG if SSB is completely contained by active BWP. As a result, it implies that intra-RAT measurement on NR serving carrier shall also be performed without MG in some cases.

However, It conflicts with the calculation of CSSFoutside\_gap given in 38.133. cl. 9.1.5.1. One can observe that in RAN4’s understanding only intra-frequency meansurements are considered in CSSFoutside\_gap in Rel-15. Then UE don’t know how to calculate CSSF for inter-RAT NR measurments on serving carriers. Measurement delay requirement for inter-RAT measurement on serving carrier is unclear.

The carrier-specific scaling factor CSSFoutside\_gap,i for measurement object i derived in this chapter is applied to following measurement types:

-Intra-frequency measurement with no measurement gap in clause 9.2.5, when none of the SMTC occasions of this intra-frequency measurement object are overlapped by the measurement gap.

-Intra-frequency measurement with no measurement gap in clause 9.2.5, when part of the SMTC occasions of this intra-frequency measurement object are overlapped by the measurement gap.

UE is expected to conduct the measurement of this measurement object i only outside the measurement gaps.

For UE configured with the E-UTRA-NR dual connectivity operation, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurements performed outside measurements gaps will be as specified in Table 9.1.5.1.1-1.

Table 9.1.5.1.1-1: CSSFoutside\_gap,i scaling factor for EN-DC mode

Scenario

CSSFoutside\_gap,i for FR1 PSCC

CSSFoutside\_gap,i for FR1 SCC

CSSFoutside\_gap,i for FR2 PSCC

CSSFoutside\_gap,i for FR2 SCC where neighbour cell measurement is required Note 2

CSSFoutside\_gap,i for FR2 SCC where neighbour cell measurement is not required

EN-DC with FR1 only CA

1

Number of configured FR1 SCell(s)

N/A

N/A

N/A

EN-DC with

FR2 only intra band CA

N/A

N/A

1

N/A

Number of configured FR2 SCells

EN-DC with

FR1 +FR2 CA (FR1 PSCell) Note 1

1

2×(Number of configured SCell(s)-1)

N/A

2

2×(Number of configured SCell(s)-1)

EN-DC with

FR1 +FR2 CA (FR2 PSCell) Note 1

N/A

Number of configured SCell(s)

1

N/A

Number of configured SCell(s)

Note 1:Only one NR FR1 operating band and one NR FR2 operating band are included for FR1+FR2 inter-band EN-DC.

Note 2:Selection of FR2 SCC where neighbour cell measurement is required follows clause 9.2.3.2.

So we purpose to take inter-RAT measurement on serving carrier into account in the calculation of CSSFoutside\_gap. To be more specific, the baseline assumption for CSSFoutside\_gap calculation is changed to:

UE equips two searchers;

One searcher is dedicated for intra-frequency measurement on PSCC if no inter-RAT measurement is configured on PSCC. If both inter-frequency and inter-RAT measurement on PSCC are configured, searcher is equally shared between intra-frequency and inter-RAT measurement on PSCC;

If a FR2 SCC is configured to UE and it is the first activated serving carrier in that band, it will use half the measurement capability of the second searcher.

All the intra-frequency measurements on other SCells and inter-RAT measurements on SCCs equally share the rest measurement capability of the second searcher.

In EN-DC, inter-frequency measurement and inter-RAT measurement on the same frequencies are always counted as two candidates when calculating CSSF\_within\_gap. However, when MO merging condition are satisfied they shall only be counted once. CSSF\_within\_gap is unneccessarily relexed. Same issue also exists in NR-DC when PCell and PSCell both configure inter-frequency measurements on the same frequency.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017034 (from R4-2015445).**

**R4-2017034 Correction to CSSF calculation R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1256 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

Chair: Cover sheet needs to be corrected before the CR is agreed

**Decision: Return to.**

**R4-2015446 Correction to CSSF calculation R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1257 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In TS 36.133 clause 8.17.4.1 it is specified that the when UE is configured with EN-DC the intra-RAT NR measurement on NR serving carrier should obey requirements for NR intra-frequency measurements. On the other hand. Intra-frequency measurement shall be performed without MG if SSB Is completely contained by active BWP. As a result, it implies that intra-RAT measurement on NR serving carrier shall also be performed without MG in some cases.

However, It conflicts with the calculation of CSSFoutside\_gap given in 38.133. cl. 9.1.5.1. One can observe that in RAN4’s understanding only intra-frequency meansurements are considered in CSSFoutside\_gap in Rel-15. Then UE don’t know how to calculate CSSF for inter-RAT NR measurments on serving carriers. Measurement delay requirement for inter-RAT measurement on serving carrier is unclear.

The carrier-specific scaling factor CSSFoutside\_gap,i for measurement object i derived in this chapter is applied to following measurement types:

-Intra-frequency measurement with no measurement gap in clause 9.2.5, when none of the SMTC occasions of this intra-frequency measurement object are overlapped by the measurement gap.

-Intra-frequency measurement with no measurement gap in clause 9.2.5, when part of the SMTC occasions of this intra-frequency measurement object are overlapped by the measurement gap.

UE is expected to conduct the measurement of this measurement object i only outside the measurement gaps.

For UE configured with the E-UTRA-NR dual connectivity operation, the carrier-specific scaling factor CSSFoutside\_gap,i for intra-frequency SSB-based measurements performed outside measurements gaps will be as specified in Table 9.1.5.1.1-1.

Table 9.1.5.1.1-1: CSSFoutside\_gap,i scaling factor for EN-DC mode

Scenario

CSSFoutside\_gap,i for FR1 PSCC

CSSFoutside\_gap,i for FR1 SCC

CSSFoutside\_gap,i for FR2 PSCC

CSSFoutside\_gap,i for FR2 SCC where neighbour cell measurement is required Note 2

CSSFoutside\_gap,i for FR2 SCC where neighbour cell measurement is not required

EN-DC with FR1 only CA

1

Number of configured FR1 SCell(s)

N/A

N/A

N/A

EN-DC with

FR2 only intra band CA

N/A

N/A

1

N/A

Number of configured FR2 SCells

EN-DC with

FR1 +FR2 CA (FR1 PSCell) Note 1

1

2×(Number of configured SCell(s)-1)

N/A

2

2×(Number of configured SCell(s)-1)

EN-DC with

FR1 +FR2 CA (FR2 PSCell) Note 1

N/A

Number of configured SCell(s)

1

N/A

Number of configured SCell(s)

Note 1:Only one NR FR1 operating band and one NR FR2 operating band are included for FR1+FR2 inter-band EN-DC.

Note 2:Selection of FR2 SCC where neighbour cell measurement is required follows clause 9.2.3.2.

So we purpose to take inter-RAT measurement on serving carrier into account in the calculation of CSSFoutside\_gap. To be more specific, the baseline assumption for CSSFoutside\_gap calculation is changed to:

UE equips two searchers;

One searcher is dedicated for intra-frequency measurement on PSCC if no inter-RAT measurement is configured on PSCC. If both inter-frequency and inter-RAT measurement on PSCC are configured, searcher is equally shared between intra-frequency and inter-RAT measurement on PSCC;

If a FR2 SCC is configured to UE and it is the first activated serving carrier in that band, it will use half the measurement capability of the second searcher.

All the intra-frequency measurements on other SCells and inter-RAT measurements on SCCs equally share the rest measurement capability of the second searcher.

In EN-DC, inter-frequency measurement and inter-RAT measurement on the same frequencies are always counted as two candidates when calculating CSSF\_within\_gap. However, when MO merging condition are satisfied they shall only be counted once. CSSF\_within\_gap is unneccessarily relexed. Same issue also exists in NR-DC when PCell and PSCell both configure inter-frequency measurements on the same frequency.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

Chair: Cover sheet needs to be corrected before the CR is agreed

Chair: Please provide more details on why Cat F CR is used (not Cat A).

**Decision: Return to.**

**R4-2015527 CR on BFD and CBD requirements**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1293 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Compared with the CSI-RS based RLM requirements, the condition that the CSI-RS resources are over the bandwidth ≥ 24 PRBs is missing. We had submitted corresponding CRs in RAN4#94-e-bis meeting, and some companies pointed that the minimum configurable BW of CSI-RS resource is 24 PRBs. In RAN4#95e meeting, the similar discussion was triggered and companies argued that the condition was needed to guaranteed that the CSI-RS resource for BFD and CBD within the active BWP is at least over 24 PRBs not only the configured CSI-RS BW. Thus, we propose the changes for CSI-RS based BFD and CBD to clarify the condtion.

**Decision: Merged.**

**R4-2015528 CR on BFD and CBD requirements\_R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1294 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Withdrawn.**

**R4-2015529 CR on RRC-based BWP switch requirements**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1295 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

One of the remaining issues in the RAN4#96-e about BWP switching requirements is whether it is applicable for RRC-based BWP switch on SCell with more than one BWP configurations. After check the TS 38.133, it is only possible for an sPCell to change the active BWP by the firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id via the RRC reconfiguration. For a actived SCell, the active BWP could be changed by RRC reconfiguration by reconfiguring the parameters of the active BWP without changing the ID. Thus, it is also applicable for an SCell to change the acitve BWP through RRC with more than one BWP configurations.

**Decision: Return to.**

**R4-2015530 CR on RRC-based BWP switch requirements\_R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1296 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015570 CR to 38.133: Correction to SCell activation delay requirements**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1301 Cat: F (Rel-15)  
  
 Source: ZTE*

**Abstract:**

It is based on mandatory UE capability whether UE supports configuration of SCell without SSB.

scellWithoutSSB

Defines whether the UE supports configuration of SCell that does not transmit SS/PBCH block. This is conditionally mandatory with capability signalling for intra-band CA but not supported for inter-band CA.

The UE capability has no differentiation of FR1 and FR2. However in TS38.133, the requirements for SCell activation without SSB are only specified for FR2 intra-band CA. So the corresponding requirements for FR1 intra-band CA should be added either.

**Decision: Return to.**

**R4-2015571 CR to 38.133 correction to SCell activation delay requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1302 Cat: A (Rel-16)  
  
 Source: ZTE*

**Decision: Return to.**

**R4-2015572 CR to 38.133: Correction to RRC based BWP switch requirements**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1303 Cat: F (Rel-15)  
  
 Source: ZTE*

**Abstract:**

In TS38.133 the requirements for RRC based BWP switch delay are specified for BWP switch triggered by RRC reconfiguration. However, according to TS38.331, the BWP switch can be triggered by RRC reconfiguration and RRC configuration (including RRCsetup message and RRCresume message).

The BWP switch delay, excluding RRC processing time, should be the same for both RRC configuration and RRC reconfiguration. So the current requirements are applicable to BWP switch triggered RRC configuration.

**Decision: Return to.**

**R4-2015573 CR to 38.133 correction to RRC based BWP switch requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1304 Cat: A (Rel-16)  
  
 Source: ZTE*

**Decision: Return to.**

**R4-2015672 [CR] Specify RRC processing delay in TCI state switching delay**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1310 Cat: F (Rel-15)  
  
 Source: ZTE Corporation*

**Abstract:**

In clause 8.10.5, the value of TRRC\_processing is not given nor defined.

**Decision: Return to.**

**R4-2015673 [CR] Specify RRC processing delay in TCI state switching delay (Cat A)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1311 Cat: A (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Return to.**

**R4-2015731 CR to remove intra-frequency ECID requirements for NE-DC 36133 R15**

*Type: CR For: Agreement  
 36.133 v15.11.0 CR-6974 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In current 36.133 measurement requirements are defined for Intra-frequency E-CID when UE is under NE-DC. However, in NE-DC NGC is connected to NR MN, and there is no LPP or NRPPa between NGC and LTE SN. In addition, in clause 5.5.3 of 36.331 it is specified that LTE UE Rx-Tx time difference measurement is only measured for PCell. Therefore, the Intra-frequency E-CID measurement requirements for NE-DC should be removed.

**Decision: Return to.**

**R4-2015732 CR to remove intra-frequency ECID requirements for NE-DC 36133 R16**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6975 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015733 CR to remove inter-RAT ECID requirements for NE-DC 38133 R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1314 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In clause 9.4.1 of 38.133, the applicabalbe requirements for NR – LTE inter-RAT ECID measurement are defined. For measurements performed on LTE serving frequency, the intra-frequency requirements defined in 8.19.5 of 36.133 apply. However, there is no intra-frequency E-CID measurement that can be configured by LTE SN in NE-DC. Therefore, applicable requirements should be updated.

**Decision: Return to.**

**R4-2015734 CR to remove inter-RAT ECID requirements for NE-DC 38133 R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1315 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015735 Discussion on remaining issues in Rel-15 SCell activation requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: The current FR1 SCell activation requirements apply provided that

- ‘ssb-PositionInBurst’ indicates only one SSB is being actually transmitted, or

- ‘ssb-PositionInBurst’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation, or

- the SCell is known and UE has reported the SCell with SSB index before the activation, or

- the Es/Iot for at least one CSI-RS for CSI that UE is configured to measure is >= -2dB.

Proposal 2: The current SCell activation requirements apply provided that the SSB of the to-be-activated SCell is within the first active DL BWP of the SCell.

**Decision: Noted.**

**R4-2015736 CR on SCell activation requirements R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1316 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

As agreed in R4-2012240, RAN4 needs to capture the applicability of FR1 SCell activation requirements. In addition, the scenario where Scell SSB is outside SCell first active BWP needs to be addressed.

**Decision: Revised to R4-2017036 (from R4-2015736).**

**R4-2017036 CR on SCell activation requirements R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1316 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

As agreed in R4-2012240, RAN4 needs to capture the applicability of FR1 SCell activation requirements. In addition, the scenario where Scell SSB is outside SCell first active BWP needs to be addressed.

**Decision: Return to.**

**R4-2015737 CR on SCell activation requirements R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1317 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015876 Introducing reference to the source of the Lmax and NRLM.**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1335 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The number of RLM-RS resources UE is required to be able to monitor is specified in TS38.213. Also the Lmax value for different frequency ranges is specified in 38.213. These numbers have been copied to RAN4 specification in Table 8.1.1-2. Currently there is no reference to the source of these numbers resulting risk of ambiquity on the requirement.. As defined in TR21.801, Annex C.1.4, duplication of concepts is not preferred and if cannot be avoided, reference should be provided. .

This change is not changing any UE requirement or behaviour.

**Decision: Return to.**

**R4-2015877 Introducing reference to the source of the Lmax and NRLM.**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1336 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Return to.**

**R4-2016022 CR 36.133 Removal of brackets for SFTD measurements**

*Type: CR For: Agreement  
 36.133 v15.11.0 CR-6989 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The measurement period for SFTD measurements between E-UTRA PCell and NR PSCell in non-DRX has already been agreed to be Tmeasure\_SFTD1 = max(200,5 x SMTC period) ms since many meetings back. In the specification text there is however stray brackets, [5] x SMTC period, which signals that the measurement period would only be tentatively agreed.

**Decision: Agreed.**

**R4-2016023 CR 36.133 Removal of brackets for SFTD measurements (Rel-16)**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6990 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The measurement period for SFTD measurements between E-UTRA PCell and NR PSCell in non-DRX has already been agreed to be Tmeasure\_SFTD1 = max(200,5 x SMTC period) ms since many meetings back. In the specification text there is however stray brackets, [5]

**Decision: Agreed.**

**R4-2016162 HARQ delay during RRC based BWP, CBW and TCI switching procedures**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper discussed impact of ACK delay on RRC based switching delay requirements (BWP, CBW and TCI state change).

Observation 1: RRC based BWP switching and UE specific CBW are serving cell procedure performed typically under higher SNR. Therefore, HARQ ACK may be delayed in rare circumstances.

Proposal 1: Clarify in the core requirement that if the ACK transmission for the received RRC takes longer than the RRC procedure delay for a procedure then the overall switching delay for that procedure may be extended.

Proposal 2: Proposal 1 is applicable for the following requirements:

- RRC based BWP switching delay

-UE specific CBW change delay and

- RRC based active TCI state switching delay.

**Decision: Noted.**

**R4-2016373 CR to 38.133 on Active BWP switch and Active TCI State Switching requirements - Rel15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1371 Cat: F (Rel-15)  
  
 Source: Apple*

**Abstract:**

Currently during RRC based active BWP switch and TCI state switch UE behavior for case when THARQ > TRRCProcessing is not captured. When THARQ > TRRCProcessing , UE might need additional time to send ACK/NACK and network might wait to switch BWP or TCI state after ACK is received. A longer switching delay is expected in this case.

**Decision: Revised to R4-2017041 (from R4-2016373).**

**R4-2017041 CR to 38.133 on Active BWP switch and Active TCI State Switching requirements - Rel15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1371 Cat: F (Rel-15)  
  
 Source: Apple*

**Abstract:**

Currently during RRC based active BWP switch and TCI state switch UE behavior for case when THARQ > TRRCProcessing is not captured. When THARQ > TRRCProcessing , UE might need additional time to send ACK/NACK and network might wait to switch BWP or TCI state after ACK is received. A longer switching delay is expected in this case.

**Decision: Return to.**

**R4-2016374 CR to 38.133 on Active BWP switch and Active TCI State Switching requirements - Rel16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1372 Cat: A (Rel-16)  
  
 Source: Apple*

**Decision: Return to.**

**R4-2016580 CR to TCI activation in FR1**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1398 Cat: F (Rel-15)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

‘TCI indication’ is not included in FR1 SCell activation procedure and time for ‘L1-RSRP measurement and report’ is not include in unknown FR1 SCell activation requirement in the current version 38.133 spec.

**Decision: Merged.**

**R4-2016581 CR to SSB-less SCell activation delay requirement for deactivated FR1 SCell**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1399 Cat: F (Rel-15)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

SSB-less SCell activation delay requirement for deactivated FR1 SCell is not defined in the current version 38.133 spec, whereas FR2 SCell activation requirements include SSB-less SCell activation latency.

**Discussion:**

Chair: Proper explanations should be provided why Cat A CR is not needed or tdoc request should be provided.

**Decision: Return to.**

**R4-2017307 CR to SSB-less SCell activation delay requirement for deactivated FR1 SCell**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-TBA Cat: A (Rel-16)  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

### 4.8 RRM perf. requirements maintenance (38.133/36.133) [NR\_newRAT-Perf]

================================================================================

**Email discussion: [97e][202] NR\_NewRAT\_RRM\_Perf**

**R4-2017001 Email discussion summary for [97e][202] NR\_NewRAT\_RRM\_Perf***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017272 (from R4-2017001).**

**R4-2017272 Email discussion summary for [97e][202] NR\_NewRAT\_RRM\_Perf***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: Correction to RRM test configuration**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014025 | Noted (discussion) |
| R4-2014026 (cat F) | Revised |
| R4-2015152 (cat F) | Agreed |
| R4-2015153 (cat A) | Agreed |
| R4-2015447 (cat F) | Revised (correct cover sheet error) |
| R4-2015457 (cat F) | Noted |
| R4-2015458 (cat A) | Withdrawn |

**Topic #2: Correction to RRM tests**

Agreement: TRS configurations in test cases listed in R4-2016582 will be added in Release 15 in one big CR (one cat F CR and one cat A CR)

Chair: Qualcomm volunteered to provide CR in RAN4#98-e

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014017 (cat F) | Revised (include also R4-2015161 changes) |
| R4-2014019 (cat F) | Agreed |
| R4-2014020 (cat A) | Agreed |
| R4-2014021 (cat F) | Agreed |
| R4-2014022 (cat A) | Agreed |
| R4-2014023 (cat F) | Revised (correct cover sheet errors and include also R4-2015148 changes) |
| R4-2014028 (cat F) | Agreed |
| R4-2014029 (cat A) | Agreed |
| R4-2014046 (cat F) | Agreed |
| R4-2014047 (cat A) | Agreed |
| R4-2014048 (cat F) | Agreed |
| R4-2014049 (cat A) | Agreed |
| R4-2014181 (cat F) | Withdrawn |
| R4-2014182 (cat A) | Withdrawn |
| R4-2014231 (cat F) | Return to |
| R4-2014372 (cat F) | Agreed |
| R4-2014373 (cat A) | Agreed |
| R4-2014374 (cat F) | Revised |
| R4-2014376 (cat F) | Revised |
| R4-2014406 (cat F) | Agreed |
| R4-2014407 (cat A) | Agreed |
| R4-2014591 (cat F) | Revised |
| R4-2014601 (cat F) | Return to |
| R4-2014865 (cat F) | Revised |
| R4-2014947 (cat F) | Agreed |
| R4-2014948 (cat A) | Agreed |
| R4-2015148 (cat F) | Noted (to be merged with R4-2014023) |
| R4-2015149 (cat A) | Withdrawn |
| R4-2015150 (cat F) | Revised |
| R4-2015154 (cat F) | Revised (correct cover sheet errors) |
| R4-2015157 (cat F) | Agreed |
| R4-2015158 (cat A) | Agreed |
| R4-2015161 (cat F) | Noted (to be merged with R4-2014017) |
| R4-2015162 (cat A) | Withdrawn |
| R4-2015163 (cat F) | Revised |
| R4-2015165 (cat F) | Revised (correct cover sheet errors) |
| R4-2015449 (cat F) | Revised (correct cover sheet errors) |
| R4-2015451 (cat F) | Revised (correct cover sheet errors) |
| R4-2015453 (cat F) | Revised (correct cover sheet errors) |
| R4-2015455 (cat F) | Revised (correct cover sheet errors) |
| R4-2015459 (cat F) | Return to |
| R4-2015503 (cat F) | ~~Agreed~~ Return to |
| R4-2015531 (cat F) | Revised |
| R4-2015674 (cat F) | Revised |
| R4-2015738 (cat F) | Return to |
| R4-2015740 (cat F) | Agreed |
| R4-2015741 (cat A) | Agreed |
| R4-2015823 (cat F) | Agreed |
| R4-2015993 (cat F) | Revised |
| R4-2015995 (cat F) | Revised |
| R4-2016024 (cat F) | Agreed |
| R4-2016025 (cat A) | Agreed |
| R4-2016160 (cat F) | Revised (correct cover sheet errors) |
| R4-2016163 (cat F) | Agreed |
| R4-2016164 (cat F) | Agreed |
| R4-2016582 | Noted (discussion) |

2nd round email discussion conclusions

================================================================================

**R4-2014017 RB allocation and Noc level in RLM Test cases**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1118 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) RLM test cases that use AoA Setup 3 and Spherical Coverage directions require a total power Io above the capability of current test equipment.

b) Test cases A.5.5.1.5, A.5.5.1.6, A.7.5.1.5, and A.7.5.1.6 with CSI-RS-based RLM in non-DRX mode do not specify the Noc level.

c) Some table note references are wrong and some [ ] remain.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017044 (from R4-2014017).**

**R4-2017044 RB allocation and Noc level in RLM Test cases**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1118 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) RLM test cases that use AoA Setup 3 and Spherical Coverage directions require a total power Io above the capability of current test equipment.

b) Test cases A.5.5.1.5, A.5.5.1.6, A.7.5.1.5, and A.7.5.1.6 with CSI-RS-based RLM in non-DRX mode do not specify the Noc level.

c) Some table note references are wrong and some [ ] remain.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Return to.**

**R4-2014018 RB allocation and Noc level in RLM Test cases**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1119 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) Change RLM test cases that use AoA Setup 3 and Spherical Coverage directions to use 24RBs to reduce the Io, and define a new OCNG pattern OP.5.

b) Specify missing Noc -92.1dBm/15kHz for Test cases A.5.5.1.5, A.5.5.1.6, A.7.5.1.5, and A.7.5.1.6.

c) Corr

**Decision: Return to.**

**R4-2014019 Update FR2 event-triggered reporting Test cases in A.5.6, A.7.6**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1120 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) FR2 Intra-frequency Event-triggered reporting Test cases do not specify the subcarrier spacing for the PDSCH and PDCCH Data channels.

b) The test configuration is missing from Io for A.5.6.1.2, A.5.6.1.4, A.7.6.1.2 and A.7.6.1.4.

**Decision: Agreed.**

**R4-2014020 Update FR2 event-triggered reporting Test cases in A.5.6, A.7.6**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1121 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Specify the subcarrier spacing as 120kHz for the PDSCH and PDCCH Data channels in Intra-frequency Event-triggered reporting Test cases.

Add test configurations to Io for A.5.6.1.2, A.5.6.1.4, A.7.6.1.2 and A.7.6.1.4.

**Decision: Agreed.**

**R4-2014021 240kHz SSB SCS Configuration for FR2 SS-RSRP Test cases**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1122 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) The FR2 Inter-frequency SS-RSRP RRM Test cases are missing parameters for configurations with 240 kHz SSB SCS.

b) The FR2 Inter-frequency SS-RSRP RRM Test cases do not specify the subcarrier spacing for the PDSCH and PDCCH Data channels.

c) The UE Beam assumption is wrongly stated in Table A.7.7.1.1.2-3.

**Decision: Agreed.**

**R4-2014022 240kHz SSB SCS Configuration for FR2 SS-RSRP Test cases**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1123 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) Add parameters for configurations with 240 kHz SSB SCS in Tables A.5.7.1.2.2-2 and A.7.7.1.2.2-2.

b) Specify the subcarrier spacing as 120kHz for the PDSCH and PDCCH Data channels.

**Decision: Agreed.**

**R4-2014023 Correct UE beam assumption for Test Cases in A.5.6**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1124 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) For some test cases in A.5.6 the Cell 2 UE beam assumption is stated to be “Rough”, but Cell 2 is FR1 and the UE beam assumption is not applicable.

b) Some test cases in A.5.6 state that two FR1 NR carrier frequencies are used, but one of the NR carriers is FR2.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017045 (from R4-2014023).**

**R4-2017045 Correct UE beam assumption for Test Cases in A.5.6**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1124 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) For some test cases in A.5.6 the Cell 2 UE beam assumption is stated to be “Rough”, but Cell 2 is FR1 and the UE beam assumption is not applicable.

b) Some test cases in A.5.6 state that two FR1 NR carrier frequencies are used, but one of the NR carriers is FR2.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

Chair: Cover sheet needs to be corrected before the CR is agreed

**Decision: Return to.**

**R4-2014024 Correct UE beam assumption for Test Cases in A.5.6**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1125 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) Correct the FR1 Cell 2 UE beam assumption from "Rough" to N/A (not applicable).

b) As one NR cell is in FR2, update the misleading statement that both NR cells are FR1, and align with equivalent A.7.6 test cases.

**Decision: Return to.**

**R4-2014025 Modification of AG level in CORESET for RMC scheduling**

*Type: discussion For: Approval  
 Source: ANRITSU LTD*

**Abstract:**

In this contribution we report an identified issue with the CORESET for RMC scheduling in TS 38.133 clause A.3.1.3. With the current definitions in these RMC tables for both FDD and TDD, there is an issue with transmission of PUSCH (e.g. measurement report).

Proposal 1: Adjust the AG level of CORESET for RMC scheduling to enable transmitting 2 DCIs per slot.

Proposal 2: Keep the definitions of CORESET for RMC scheduling in A.3.1.3 in a same form from the current ones and do not separate them for SA and NSA.

**Decision: Noted.**

**R4-2014026 Aggregation level of CORESET for RMC scheduling**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1126 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Under the current definitions of RMC tables for both FDD and TDD in clause A.3.1.3, there is an issue with a transmission of PUSCH (e.g. measurement report) from a UE due to a lack of resources for PDCCH (DCI format 0-1, UL grant) from a test equipment.

Following conditions are causing the issue above.

DL RMC is allocated to all the DL slot.

Based on the aggregation level/ CORESET, only 1 grant per 1 slot can be transmitted. Thus simultaneous scheduling of PDSCH/PUSCH is unviable.

In a case that the standalone UE needs to transmit PUSCH (such as measurement report), simultaneous scheduling of PDSCH/ PUSCH is mandatory. Thus there is a need to correct AG level which enables sending 2 grants in 1 slot.

**Decision: Revised to R4-2017042 (from R4-2014026).**

**R4-2017042 Aggregation level of CORESET for RMC scheduling**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1126 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Under the current definitions of RMC tables for both FDD and TDD in clause A.3.1.3, there is an issue with a transmission of PUSCH (e.g. measurement report) from a UE due to a lack of resources for PDCCH (DCI format 0-1, UL grant) from a test equipment.

Following conditions are causing the issue above.

DL RMC is allocated to all the DL slot.

Based on the aggregation level/ CORESET, only 1 grant per 1 slot can be transmitted. Thus simultaneous scheduling of PDSCH/PUSCH is unviable.

In a case that the standalone UE needs to transmit PUSCH (such as measurement report), simultaneous scheduling of PDSCH/ PUSCH is mandatory. Thus there is a need to correct AG level which enables sending 2 grants in 1 slot.

**Decision: Return to.**

**R4-2014027 Aggregation level of CORESET for RMC scheduling**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1127 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

We propose to reduce the Aggregation level of CORESET for RMC scheduling to enable transmission of 2 DCIs per slot. The reasoning is provided in

R4-2014025.

**Decision: Return to.**

**R4-2014028 Clarify FR1 NSA SS-SINR measurement TCs**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1128 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Test Parameters table format is misleading, and is inconsistent with SS-RSRP, SS-RSRQ TCs.

Clause A.4.7.3.2.2 states that measurement gap is provided, but Table A.4.7.3.2.2-1 is missing gap configuration

**Decision: Agreed.**

**R4-2014029 Claify FR1 NSA SS-SINR measurement TCs**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1129 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Update the Test Parameters table format to show that:

- TRS config is only for Cell 2

- Time offset with Cell 2 is only for Cell 3

**Decision: Agreed.**

**R4-2014046 FR1 Inter-frequency Event triggered Reporting tests in DRX**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1130 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Incorrect Test Requirements:

-Test Purpose and Environment states that test 1&2 use per-UE gap, and test 3&4 use per-FR gap. However, in Test Requiments, it states that test 2 is with per-FR gap, and test 3 is with per-UE gap.

Format of Table A.4.6.2.6.1-3 is misleading:

-It seems that TRS is configured in both Cell 2 and Cell 3

**Decision: Agreed.**

**R4-2014047 FR1 Inter-frequency Event triggered Reporting tests in DRX**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1131 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Update Test Requirements:

- Test 2: change per-FR gap to per-UE gap

- Test 3: change per-UE gap to per-FR gap

- Update Table A.4.6.2.6.1-3 format to show that TRS config is only for Cell 2

**Decision: Agreed.**

**R4-2014048 E-UTRAN – NR FR1 interruptions at transitions between active and non-active during DRX EN-DC**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1132 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

DRX configuration for E-UTRAN – NR Interruptions asynchronous test case is incorrect. Current spec setting is for NR DRX (DRX.6) instead of LTE DRX, but purpose of test states that LTE is in DRX. Similar to synchronous test equivalent (DRX.4). RAN5 test case 4.5.2.2 is already updated with correct setting.

In Table A.4.5.2.1.1-3 and A.4.5.2.2.1-3, Initial BWP Configurations are mistakenly defined as DLBWP.0 and there is no corresponding configuration.

Similar configurations for FR2 such as in Table A.5.5.2.1.1-3 should be applied to Table A.4.5.2.1.1-3 and A.4.5.2.2.1-3.

**Decision: Agreed.**

**R4-2014049 E-UTRAN – NR FR1 interruptions at transitions between active and non-active during DRX EN-DC**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1133 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Corrects DRX config parameter in Table A.4.5.2.2.1-2: DRX.6 -> DRX.4 (applicable to LTE)

Specifies BWP configurations fully

**Decision: Agreed.**

**R4-2014181 [CR] NR Perf Maintenance R15 Cat F**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1134 Cat: F (Rel-15)  
  
 Source: ZTE Corporation*

**Abstract:**

The following errors exist in the current test cases which mislead readers:

- In multiple tables, such as Table A.6.6.4.1.2-1, the Note shall be for Cell 1 not both cells.

- In clause A.7.5.8.1.1.1 and A.7.5.8.2.1.1, the configuration mentioned a second cell in EN-DC. However, the test is for NR SA and only one cell is configured.

- In Table A.7.6.2.1.1-3, the configurations should be for Cell 1 and Cell 2, separately.

- In Clause A.7.5.3.2.2, [TBD] exists.

**Discussion:**

The secretary asked what is the correct Release? It reads Rel-16 on the coversheet but the CR is allocated for Rel-15.

**Decision: Withdrawn.**

**R4-2014182 [CR] NR Perf Maintenance R16 Cat A**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1135 Cat: A (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Withdrawn.**

**R4-2014183 [CR] NR Perf Maintenance R16 Cat F**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1136 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

The following errors exist in the current test cases which mislead readers:

- In Table A.6.5.6.1.2.1-3, the configuration is for Cell 1 not Cell 2. The note should be for Cell 1 only since there is only one cell in the test.

Note that those errors are not in the R15 specifications, thus a separate R16 Category F CR is submitted to correct them.

**Decision: Withdrawn.**

**R4-2014231 Maintenance CR on SA inter-frequency event triggered reporting tests for FR1 – R16 (A.6.6.2)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1139 Cat: F (Rel-16)  
  
 Source: Apple*

**Abstract:**

There are some typos in FR1 SA inter-frequency event triggered reporting test cases.

**Discussion:**

**Decision: Return to.**

**R4-2014372 CR on TS38.133 for cell activation and deactivation test case**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1159 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

For the SCell activation and deactivation, in current specificaiton, the UE can only report the CSI report in slot (m+k) or slot ( However, the interruption would not impact other serving cell all the time between slot (m+k) and slot (. Thus, the UE shall be allowed to report the first CSI report in slot (m+k) or in the next available uplink resource for CSI reporting if slot (m+k) was subject to interruption. On the other hand, the similar problem is fixed in A.6.5.3.1.

According to TS 38.331 as follows, for SCS 15kHz, the shortest of CSI report periodicity is 4 slots, i.e. 2ms or 4 subframes.

CSI-ReportPeriodicityAndOffset ::= CHOICE {

slots4 INTEGER(0..3),

slots5 INTEGER(0..4),

slots8 INTEGER(0..7),

slots10 INTEGER(0..9),

slots16 INTEGER(0..15),

slots20 INTEGER(0..19),

slots40 INTEGER(0..39),

slots80 INTEGER(0..79),

slots160 INTEGER(0..159),

slots320 INTEGER(0..319)

}

However, the CSI report periodicity in Table A.4.5.3.1.1-2 and Table A.6.5.3.1.1-2 is 2 subframes for 15 kHz. Thus, it is corrected in this CR.

**Decision: Agreed.**

**R4-2014373 CR on TS38.133 for cell activation and deactivation test case**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1160 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Agreed.**

**R4-2014374 CR on TS38.133 for cell reselection test case**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1161 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

In order to UE can measure the intra-frequency cell, the value of SintrasearchP in Table A.6.1.1.1.2-3 shall be set to 60.

The parameter names, e.g. Sintrasearch, Threshx, high, Threshserving, low, Threshx, low, shall align with TS 38.304 and TS 36.304.

In NR SA, the terminology “Tracking area update procedure” is replaced by “Registration procedure for mobility and periodic registration update” and the wording is corrected in clause A.6.1.1.1, A.6.1.1.2, A.7.1.1.1 and A.7.1.1.2 in this CR.

**Decision: Revised to R4-2017046 (from R4-2014374).**

**R4-2017046 CR on TS38.133 for cell reselection test case**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1161 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

In order to UE can measure the intra-frequency cell, the value of SintrasearchP in Table A.6.1.1.1.2-3 shall be set to 60.

The parameter names, e.g. Sintrasearch, Threshx, high, Threshserving, low, Threshx, low, shall align with TS 38.304 and TS 36.304.

In NR SA, the terminology “Tracking area update procedure” is replaced by “Registration procedure for mobility and periodic registration update” and the wording is corrected in clause A.6.1.1.1, A.6.1.1.2, A.7.1.1.1 and A.7.1.1.2 in this CR.

**Decision: Return to.**

**R4-2014375 CR on TS38.133 for cell reselection test case**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1162 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2014376 Correction of active BWP switch test case**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1163 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

In active BWP switching test case, i.e. A.7.5.6.1.1 and A.7.5.6.1.2, PCell is configured with two BWPs (BWP-1 and BWP-2). However, in current specification, the sentence “UE shall be continuously scheduled on PSCell’s BWP-1 during T3” is incorrect. It is fixed in this CR.

**Decision: Revised to R4-2017047 (from R4-2014376).**

**R4-2017047 Correction of active BWP switch test case**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1163 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

In active BWP switching test case, i.e. A.7.5.6.1.1 and A.7.5.6.1.2, PCell is configured with two BWPs (BWP-1 and BWP-2). However, in current specification, the sentence “UE shall be continuously scheduled on PSCell’s BWP-1 during T3” is incorrect. It is fixed in this CR.

**Discussion:**

**Decision: Return to.**

**R4-2014377 CR on TS38.133 for active BWP switch test cases**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1164 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2014406 CR for TS38.133 Rel-15, Correction for RRM core and test cases**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1167 Cat: F (Rel-15)  
  
 Source: CATT*

**Abstract:**

In A.6.1.2.2, second time duration is marked as “T2T3”, in A.6.1.2.2.2, the number of time periods is incorrect.

In A.7.1.1.2, the Io for 240kHz SSB SCS are incorrect.

In Table A.6.1.2.1.2-3, Initial DL BWP configuration and Initial UL BWP configuration are incorrect.

**Decision: Agreed.**

**R4-2014407 CR for TS38.133 Rel-16, Correction for RRM core and test cases**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1168 Cat: A (Rel-16)  
  
 Source: CATT*

**Decision: Agreed.**

**R4-2014591 Draft CR on correcting SSB and RACH configuration in CSI-RS based beam failure detection and link recovery tests**

*Type: draftCR For: Endorsement  
 38.133 v15.11.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The tables for some of FR2 PRACH configurations are not indexed.

The existing sections of CSI-RS based BFD/CBD tests do not mention RACH configurations.

The configured CSI-RS resources in test follow CSI-RS.1.2/CSI-RS.2.2/CSI-RS.3.2 resource configurations. Those CSI-RS resources are QCLed to TCI state 0 (SSB 0) and TCI state 1 (SSB 1). But, SSB config only allows one SSB in the SS burst set (SSB.3 FR1, SSB.1 FR2).

**Decision: Revised to R4-2017048 (from R4-2014591).**

**R4-2017048 CR on correcting SSB and RACH configuration in CSI-RS based beam failure detection and link recovery tests**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-TBA Cat: F (Rel-15)  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The tables for some of FR2 PRACH configurations are not indexed.

The existing sections of CSI-RS based BFD/CBD tests do not mention RACH configurations.

The configured CSI-RS resources in test follow CSI-RS.1.2/CSI-RS.2.2/CSI-RS.3.2 resource configurations. Those CSI-RS resources are QCLed to TCI state 0 (SSB 0) and TCI state 1 (SSB 1). But, SSB config only allows one SSB in the SS burst set (SSB.3 FR1, SSB.1 FR2).

**Decision: Return to.**

**R4-2014592 Draft CR on correcting SSB and RACH configuration in CSI-RS based beam failure detection and link recovery tests**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The tables for some of FR2 PRACH configurations are not indexed.

The existing sections of CSI-RS based BFD/CBD tests do not mention RACH configurations.

The configured CSI-RS resources in test follow CSI-RS.1.2/CSI-RS.2.2/CSI-RS.3.2 resource configurations. Those CSI-RS resources are QCLed to TCI state 0 (SSB 0) and TCI state 1 (SSB 1). But, SSB config only allows one SSB in the SS burst set (SSB.3 FR1, SSB.1 FR2).

**Decision: Revised to R4-2017162 (from R4-2014592).**

**R4-2017162 CR on correcting SSB and RACH configuration in CSI-RS based beam failure detection and link recovery tests**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-TBA Cat: A (Rel-16)  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The tables for some of FR2 PRACH configurations are not indexed.

The existing sections of CSI-RS based BFD/CBD tests do not mention RACH configurations.

The configured CSI-RS resources in test follow CSI-RS.1.2/CSI-RS.2.2/CSI-RS.3.2 resource configurations. Those CSI-RS resources are QCLed to TCI state 0 (SSB 0) and TCI state 1 (SSB 1). But, SSB config only allows one SSB in the SS burst set (SSB.3 FR1, SSB.1 FR2).

**Decision: Return to.**

**R4-2014601 CR on TS 38.133 for radio link monitoring test case R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1188 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

In radio link monitor test case, test equipment may check the CSI report from UE to identify whether radio link is failure or not. However, in the test case A.4.5.1.8, A.5.5.1.8, A.6.5.1.8 and A.7.5.1.8, the measure gap pattern is fully overlapped with on duration period of the DRX cycle. Thus, it may cause UE cannot transmit the CSI report to test equipment during duration ON. As a result, we propose a new DRX configuration to guarantee the CSI report can be received by test equipment.

**Decision: Return to.**

**R4-2014602 CR on TS 38.133 for radio link monitoring test case R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1189 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2014865 Correction on beamFailureInstanceMaxCount for test case of availability restriction during FR2 BFR in R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1208 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

The beamFailureInstanceMaxCount = n1 in all other cases but not in 5.5.5.5/7.5.5.5. However, the T2 and T3 in 5.5.5.5/7.5.5.5 are based on the beamFailureInstanceMaxCount = n1, as in 5.5.5.1/7.5.5.1. Therefore the T2/T3 are incorrect.

However, the correct T2/T3 should be long enough to accomdate the 2nd indication and need more testing time. Thus, to save test time, it proposes to align beamFailureInstanceMaxCount with other cases, instead of introduce long T2/T3.

**Decision: Revised to R4-2017049 (from R4-2014865).**

**R4-2017049 Correction on beamFailureInstanceMaxCount for test case of availability restriction during FR2 BFR in R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1208 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Abstract:**

The beamFailureInstanceMaxCount = n1 in all other cases but not in 5.5.5.5/7.5.5.5. However, the T2 and T3 in 5.5.5.5/7.5.5.5 are based on the beamFailureInstanceMaxCount = n1, as in 5.5.5.1/7.5.5.1. Therefore the T2/T3 are incorrect.

However, the correct T2/T3 should be long enough to accomdate the 2nd indication and need more testing time. Thus, to save test time, it proposes to align beamFailureInstanceMaxCount with other cases, instead of introduce long T2/T3.

**Decision: Return to.**

**R4-2014866 Correction on beamFailureInstanceMaxCount for test cases of availability restriction during FR2 BFR in R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1209 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2014947 Correction of RRM tests**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1215 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

After V15.03 Table 7.1.2-3 was removed, and a new Table 7.1.2.1-1 with the same content was created. After this modification the RRM tests did not update the reference to the table containing Autonomous Time Adjustment requirements.

**Decision: Agreed.**

**R4-2014948 Correction of RRM tests**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1216 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

After V15.03 Table 7.1.2-3 was removed, and a new Table 7.1.2.1-1 with the same content was created. After this modification the RRM tests did not update the reference to the table containing Autonomous Time Adjustment requirements.

**Decision: Agreed.**

**R4-2015148 Correction of beam assumptions in interfrequency EN-DC FR1+FR2 tests**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1220 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

In some tests UE beam assumption is incorrectly stated for an FR1 PSCell as rough. FR1 cell should not have a beam assumption.

**Decision: Merged.**

**R4-2015149 Correction of beam assumptions in interfrequency EN-DC FR1+FR2 tests**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1221 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In some tests UE beam assumption is incorrectly stated for an FR1 PSCell as rough. FR1 cell should not have a beam assumption.

**Decision: Withdrawn.**

**R4-2015150 Correction of TBD values in EN-DC PSCell addition and release delay test**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1222 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

TBDs remain in PSCell addition and release delay test

**Decision: Revised to R4-2017050 (from R4-2015150).**

**R4-2017050 Correction of TBD values in EN-DC PSCell addition and release delay test**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1222 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

TBDs remain in PSCell addition and release delay test

**Decision: Return to.**

**R4-2015151 Correction of TBD values in EN-DC PSCell addition and release delay test**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1223 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correcting TBDs which remain in PSCell addition and release delay test

**Decision: Return to.**

**R4-2015152 Correction to types of requirements in annex A**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1224 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

R4-2013035 (CR 1112) removed a sentence “In RRC\_IDLE state mobility (clause A.4.x, A.5.x, A.6.x and A.7.x) there is cell re-selection delay”. The purpose of this CR was to replace all .x references with the proper section numbering. It was stated on the cover page of R4-2013035 that “Test cases for cell re-selection delays are not defined so the statement is deleted.”. It is true that there are no reselection tests for EN-DC (A.4.x and A.5.x) however reselection delay tests and test requirements exist for SA NR and should be described in section A.2.1.1 to avoid a mistunderstanding that only RRC connected and RRC connection control delays are tested

Also the example given later in the text of section A.2.1.1 All have in common that the UE is required to perform an action observable in higher layers (e.g. camp on the correct cell) within a certain time after a specific event (e.g. when a new strong pilot or reference signal appears).” is explicitly an idle mode reselection example, so it is better not to delete this sentence

**Decision: Agreed.**

**R4-2015153 Correction to types of requirements in annex A**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1225 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

R4-2013035 (CR 1112) removed a sentence “ In RRC\_IDLE state mobility (clause A.4.x, A.5.x, A.6.x and A.7.x) there is cell re-selection delay”. The purpose of this CR was to replace all .x references with the proper section numbering. It was stated on the

**Decision: Agreed.**

**R4-2015154 Corrections to frequency range in interfrequency measurement procedures tests**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1226 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Some EN-DC FR2 interfrequency measurement procedure testcases incorrectly state that two FR1 cells are used. Depending on case, either 2 FR2 cells are used, or one FR1 and one FR2 cell are used.

**Discussion:**

The secretary commented that the CR coversheet is missing 'Reason for change', 'Summary of change and Consequences if not approved' fields. The CR coversheet should be written by using the CR template.

**Decision: Revised to R4-2017051 (from R4-2015154).**

**R4-2017051 Corrections to frequency range in interfrequency measurement procedures tests**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1226 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Some EN-DC FR2 interfrequency measurement procedure testcases incorrectly state that two FR1 cells are used. Depending on case, either 2 FR2 cells are used, or one FR1 and one FR2 cell are used.

**Discussion:**

The secretary commented that the CR coversheet is missing 'Reason for change', 'Summary of change and Consequences if not approved' fields. The CR coversheet should be written by using the CR template.

Chair: Cover sheet needs to be corrected before the CR is agreed

**Decision: Return to.**

**R4-2015155 Corrections to frequency range in interfrequency measurement procedures tests**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1227 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Some EN-DC FR2 interfrequency measurement procedure testcases incorrectly state that two FR1 cells are used. Depending on case, either 2 FR2 cells are used, or one FR1 and one FR2 cell are used.

**Decision: Return to.**

**R4-2015157 Correction on TBD values in FR1+FR2 interfrequency RSRP accuracy tests**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1229 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

All OTA parameters and levels in interfrequency RSRP accuracy tests for the FR2 cell are TBD

**Decision: Agreed.**

**R4-2015158 Correction on TBD values in FR1+FR2 interfrequency RSRP accuracy tests**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1230 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Interfrequency OTA test cases still have TBDs for some cell specific parameters. CR proposes values for TBDs

**Decision: Agreed.**

**R4-2015161 Correction of TBD value in Radio Link Monitoring Out-of-sync Tests for FR2 configured with CSI-RS-based RLM**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1233 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Replace TBD Noc in OTA CSI-RS test cases for RLM OOS with proposed values

**Discussion:**

The secretary commented that the CR coversheet is missing 'Reason for change', 'Summary of change and Consequences if not approved' fields. The CR coversheet should be written by using the CR template.

**Decision: Merged.**

**R4-2015162 Correction of TBD value in Radio Link Monitoring Out-of-sync Tests for FR2 configured with CSI-RS-based RLM**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1234 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Replace TBD Noc in OTA CSI-RS test cases for RLM OOS with proposed values

**Decision: Withdrawn.**

**R4-2015163 Square bracket removal in 38.133 section A.1 to A.5**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1235 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Square bracket values in specifications should be confirmed

**Decision: Revised to R4-2017052 (from R4-2015163).**

**R4-2017052 Square bracket removal in 38.133 section A.1 to A.5**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1235 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Square bracket values in specifications should be confirmed

**Decision: Return to.**

**R4-2015164 Square bracket removal in 38.133 section A.1 to A.5**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1236 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Removal of square brackets

**Decision: Return to.**

**R4-2015165 Square bracket removal in 38.133 section A.6 to A.8**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1237 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Removal of square brackets

**Discussion:**

The secretary commented that the CR coversheet is missing 'Reason for change', 'Summary of change and Consequences if not approved' fields. The CR coversheet should be written by using the CR template. If neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017163 (from R4-2015165).**

**R4-2017163 Square bracket removal in 38.133 section A.6 to A.8**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1237 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Removal of square brackets

**Discussion:**

The secretary commented that the CR coversheet is missing 'Reason for change', 'Summary of change and Consequences if not approved' fields. The CR coversheet should be written by using the CR template. If neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Return to.**

**R4-2015166 Square bracket removal in 38.133 section A.6 to A.8**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1238 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Removal of square brackets

**Decision: Withdrawn.**

**R4-2015447 Correction to CSI-RS RMC configuration R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1258 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

CSI-RS of density 3 is used in CSI-RS RMC configuration CSI-RS.X.2/3/4 TDD and CSI-RS.X.2/3/4 FDD. So the length of bitmap configured in frequencyDomainAllocation can only be 4 according to 38.211 Table 7.4.1.5.3-1. It is unable to set frequencyDomainAllocation = 000001.

We purpose to change frequencyDomainAllocation = 0001 for CSI-RS.X.2/3/4.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017043 (from R4-2015447).**

**R4-2017043 Correction to CSI-RS RMC configuration R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1258 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

CSI-RS of density 3 is used in CSI-RS RMC configuration CSI-RS.X.2/3/4 TDD and CSI-RS.X.2/3/4 FDD. So the length of bitmap configured in frequencyDomainAllocation can only be 4 according to 38.211 Table 7.4.1.5.3-1. It is unable to set frequencyDomainAllocation = 000001.

We purpose to change frequencyDomainAllocation = 0001 for CSI-RS.X.2/3/4.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

Chair: Cover sheet needs to be corrected before the CR is agreed

**Decision: Return to.**

**R4-2015448 Correction to CSI-RS RMC configuration R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1259 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015449 Correction to cell reselection test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1260 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

1. Cell power level settings in intra-frequency reselection TCs don't take measurement restriction rule into account. For example, In 6.1.1.1.UE is supposed to reselect to better ranked neighbour cell. However, S-value for UE's serving cell = RSRP measurement value(-85 dBm) - Qrxlevmin(-140dBm) - QrxlevminOffset (0dB) -Pcompensation (0dB) - Qoffsettemp (0dB) = 55 dB > intraSearchP(50dB). As a result, UE may choose not to perform intra-frequency measurement according to 38.304. Then it will fail the test.

So we propose to change Qrxlevmin to ensure: S value of serving cell < intraSearchP - margin.

2. intraSearchP and non-intraSearchP are mandatory fields in NR according to 38.331. They can't be set to "not sent".

3. Qhysts and Qoffsets, n in Table A.6.1.1.2.2-3 are redundant since A.6.1.1.2 isn't a rank-based cell reselection TC.

4. Cell power setting in A.7.1.1.2 doesn't take 7.5dB margin into account.

5. Comments of initial condition in A.8.2.1.1 is wrong. It should be "UE camps on Cell 2" rather than "UE camps on Cell 1", Otherwise TC can't be looped.

6. Io calculation in A.8.2.1.1 is wrong.

7. Typos.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017053 (from R4-2015449).**

**R4-2017053 Correction to cell reselection test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1260 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

1. Cell power level settings in intra-frequency reselection TCs don't take measurement restriction rule into account. For example, In 6.1.1.1.UE is supposed to reselect to better ranked neighbour cell. However, S-value for UE's serving cell = RSRP measurement value(-85 dBm) - Qrxlevmin(-140dBm) - QrxlevminOffset (0dB) -Pcompensation (0dB) - Qoffsettemp (0dB) = 55 dB > intraSearchP(50dB). As a result, UE may choose not to perform intra-frequency measurement according to 38.304. Then it will fail the test.

So we propose to change Qrxlevmin to ensure: S value of serving cell < intraSearchP - margin.

2. intraSearchP and non-intraSearchP are mandatory fields in NR according to 38.331. They can't be set to "not sent".

3. Qhysts and Qoffsets, n in Table A.6.1.1.2.2-3 are redundant since A.6.1.1.2 isn't a rank-based cell reselection TC.

4. Cell power setting in A.7.1.1.2 doesn't take 7.5dB margin into account.

5. Comments of initial condition in A.8.2.1.1 is wrong. It should be "UE camps on Cell 2" rather than "UE camps on Cell 1", Otherwise TC can't be looped.

6. Io calculation in A.8.2.1.1 is wrong.

7. Typos.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

Chair: Cover sheet needs to be corrected before the CR is agreed

**Decision: Return to.**

**R4-2015450 Correction to cell reselection test cases R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1261 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015451 Correction to inter-RAT handover test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1262 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

1. B2 thresholds used in A.8.3.1.1 don't leave enough margin for absolute accuracy.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017054 (from R4-2015451).**

**R4-2017054 Correction to inter-RAT handover test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1262 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

1. B2 thresholds used in A.8.3.1.1 don't leave enough margin for absolute accuracy.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

Chair: Cover sheet needs to be corrected before the CR is agreed

**Decision: Return to.**

**R4-2015452 Correction to inter-RAT handover test cases R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1263 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015453 Correction to NR measurement under LTE SA test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1264 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

LTE serving cell is wrongly powered off in T1.

Fading channel is used as propagation condition in TCs. However, no margin are reserved for channel fading. As a result, measurement reporting may not be correctly triggered. According analysis in RAN5 2dB margin are needed as depicted below:

Io calculation is wrong.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017055 (from R4-2015453).**

**R4-2017055 Correction to NR measurement under LTE SA test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1264 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

LTE serving cell is wrongly powered off in T1.

Fading channel is used as propagation condition in TCs. However, no margin are reserved for channel fading. As a result, measurement reporting may not be correctly triggered. According analysis in RAN5 2dB margin are needed as depicted below:

Io calculation is wrong.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

Chair: Cover sheet needs to be corrected before the CR is agreed

**Decision: Return to.**

**R4-2015454 Correction to NR measurement under LTE SA test cases R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1265 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015455 Correction to inter-RAT SFTD measurement test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1266 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

To correct wrong Io calculations

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017056 (from R4-2015455).**

**R4-2017056 Correction to inter-RAT SFTD measurement test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1266 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

To correct wrong Io calculations

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

Chair: Cover sheet needs to be corrected before the CR is agreed

**Decision: Return to.**

**R4-2015456 Correction to inter-RAT SFTD measurement test cases R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1267 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015457 CR on maintaining antenna configurations in TS38.133**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1268 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

According to the agreements in [RF-172788], UE equiped with 4 Rx ports is allowed to fall back to 2Rx for the purpose of power saving, which means that UE equiped with 4Rx ports supports using both 2Rx and 4Rx for these bands. For the tests specified in clause A.4.7 or A.6.7, based on the current description in A.3.6.1, the UE equiped with 4 Rx needs to be tested using both 2Rx and 4Rx. However, the UE shall be required to be tested using one of them.

**Decision: Not pursued.**

**R4-2015458 CR on maintaining Antenna configurations in TS38.133 R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1269 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Withdrawn.**

**R4-2015459 CR on maintaining BFD/CBD measurements test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1270 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For BFD and link recovery tests in FR2, the SNR and RSRP values of q1 are still TBD.

**Decision: Return to.**

**R4-2015460 CR on maintaining BFD/CBD measurements test cases in TS38.133 R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1271 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015503 Correction on SA inter-RAT measurement FR1 test case**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1282 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The values for Ês/Noc, SS-RSRP and Io are not correct in SA inter-RAT measurement FR1 test case.

**Decision: Return to.**

**R4-2015531 CR on RRC-based active TCI state switch test case Rel-15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1297 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In the RRC-based active TCI state switch test cases, UE is configured to perform L1-RSRP within T2 of the target TCI state, and then the requirements for known case is tested. However, the test configuration for L1-RSRP is not provided and the T2 period configuration is not correct.

There is error is the test procedure that at the beginning of T2, the SSB corresponding to TCI-state1 should starts transmitting instead of TCI-state 0 in the current spec.

There is no need to configure Cell2 in A.7.5.8.2 which is for EN-DC

There are some typos need to be fixed.

**Decision: Revised to R4-2017057 (from R4-2015531).**

**R4-2017057 CR on RRC-based active TCI state switch test case Rel-15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1297 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In the RRC-based active TCI state switch test cases, UE is configured to perform L1-RSRP within T2 of the target TCI state, and then the requirements for known case is tested. However, the test configuration for L1-RSRP is not provided and the T2 period configuration is not correct.

There is error is the test procedure that at the beginning of T2, the SSB corresponding to TCI-state1 should starts transmitting instead of TCI-state 0 in the current spec.

There is no need to configure Cell2 in A.7.5.8.2 which is for EN-DC

There are some typos need to be fixed.

**Decision: Return to.**

**R4-2015532 CR on RRC-based active TCI state switch test case Rel-16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1298 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015674 [CR] NR Perf Maintenance R15 Cat F**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1312 Cat: F (Rel-15)  
  
 Source: ZTE Corporation*

**Abstract:**

The following errors exist in the current test cases which mislead readers:

- In multiple tables, such as Table A.6.6.4.1.2-1, the Note shall be for Cell 1 not both cells.

- In clause A.7.5.8.1.1.1 and A.7.5.8.2.1.1, the configuration mentioned a second cell in EN-DC. However, the test is for NR SA and only one cell is configured.

- In Table A.7.6.2.1.1-3, the configurations should be for Cell 1 and Cell 2, separately.

- In Clause A.7.5.3.2.2, [TBD] exists.

**Decision: Revised to R4-2017058 (from R4-2015674).**

**R4-2017058 [CR] NR Perf Maintenance R15 Cat F**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1312 Cat: F (Rel-15)  
  
 Source: ZTE Corporation*

**Abstract:**

The following errors exist in the current test cases which mislead readers:

- In multiple tables, such as Table A.6.6.4.1.2-1, the Note shall be for Cell 1 not both cells.

- In clause A.7.5.8.1.1.1 and A.7.5.8.2.1.1, the configuration mentioned a second cell in EN-DC. However, the test is for NR SA and only one cell is configured.

- In Table A.7.6.2.1.1-3, the configurations should be for Cell 1 and Cell 2, separately.

- In Clause A.7.5.3.2.2, [TBD] exists.

**Discussion:**

Chair: What is the Rel-16 CR?

**Decision: Return to.**

**R4-2015738 CR on FR2 unkown SCell activation test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1318 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The current test case for FR2 unknown SCell activation are incomplete.

The test procedure related to L1-RSRP reporting, TCI activation and CSI-RS for CSI configuration are missing, which makes the test impossible to be implemented.

The test requirements are missing, e.g. when UE is expected to report valid L1-RSRP and CSI.

**Decision: Return to.**

**R4-2015739 CR on FR2 unkown SCell activation test cases R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1319 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015740 CR on BWP in L1-RSRP delay and accuracy test cases R15**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1320 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In current test case for FR2 CSI-RS based L1-RSRP delay, the BWP configuration is DLBWP.1.3, which is 32 RB. However, the CSI-RS based L1-RSRP measurement requirements are defined based on 48 RB.

**Decision: Agreed.**

**R4-2015741 CR on BWP in L1-RSRP delay and accuracy test cases R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1321 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Agreed.**

**R4-2015823 CR: Correction of CFRA test in FR2 SA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1333 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The number of preamble receptions by TE to transmit RAR is missing.

**Decision: Agreed.**

**R4-2015993 CR to TS 38.133: Corrections to inter-RAT FR1 test cases (Rel-15)**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1341 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Abstract:**

TC A.6.7.6.1 (Table A.6.7.6.1.2-2)

There are two sets of Es/Noc, RSRP and SSB\_RP parameters for the configuration of the NR Cell. However, there is no reference to different subtests and no clear indication when to use the second set of parameters. Furthermore, the NR Cell is just the serving cell in these tests, the target cell is the E-UTRA cell.

Row RSRQ is wrongly named, since the value is in dBm/SCS, and RSRQ is a quantity in dB.

TC A.6.7.7.1 (Table A.6.7.7.1.2-3)

The CRS Es/Noc for Test 2 is incorrect.

The Noc values for subcarriers with and without CRS are different. The RS-SINR, according to the definition in TS 36.214, is measured only in the CRS subcarriers. The configuration of the Noc in the non-CRS subcarriers should not influence the RS-SINR according to the measurement definition. In addition subcarrier specific Noc greatly complicates the test case implementation in RAN5 unnecessarily.

**Decision: Revised to R4-2017059 (from R4-2015993).**

**R4-2017059 CR to TS 38.133: Corrections to inter-RAT FR1 test cases (Rel-15)**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1341 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Abstract:**

TC A.6.7.6.1 (Table A.6.7.6.1.2-2)

There are two sets of Es/Noc, RSRP and SSB\_RP parameters for the configuration of the NR Cell. However, there is no reference to different subtests and no clear indication when to use the second set of parameters. Furthermore, the NR Cell is just the serving cell in these tests, the target cell is the E-UTRA cell.

Row RSRQ is wrongly named, since the value is in dBm/SCS, and RSRQ is a quantity in dB.

TC A.6.7.7.1 (Table A.6.7.7.1.2-3)

The CRS Es/Noc for Test 2 is incorrect.

The Noc values for subcarriers with and without CRS are different. The RS-SINR, according to the definition in TS 36.214, is measured only in the CRS subcarriers. The configuration of the Noc in the non-CRS subcarriers should not influence the RS-SINR according to the measurement definition. In addition subcarrier specific Noc greatly complicates the test case implementation in RAN5 unnecessarily.

**Decision: Return to.**

**R4-2015994 CR to TS 38.133: Corrections to inter-RAT FR1 test cases (Rel-16)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1342 Cat: A (Rel-16)  
  
 Source: Rohde & Schwarz*

**Decision: Return to.**

**R4-2015995 CR to TS 38.133: Corrections to inter-RAT FR2 test cases (Rel-15)**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1343 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Abstract:**

In TCs for FR2 inter-RAT measurement accurycy there are several inconsistencies:

SSB Configuration is missing.

UE beam assumption is missing.

OTA parameters (Noc, Es, Es/Noc) not given explicitely in the table, but through Notes, which are also not consistent since they refer to spherical coverage and do not account for 1dB band relaxation or UE internal noice when close to Refsens .

Bandgroups are redundant since test parameters are defined band agnostic.

Redundant / missleading table Notes.

Relative accuracy mentioned in the test purpose, though only one cell is measured in the test.

Editorial inconsistencies

**Decision: Revised to R4-2017060 (from R4-2015995).**

**R4-2017060 CR to TS 38.133: Corrections to inter-RAT FR2 test cases (Rel-15)**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1343 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Abstract:**

In TCs for FR2 inter-RAT measurement accurycy there are several inconsistencies:

SSB Configuration is missing.

UE beam assumption is missing.

OTA parameters (Noc, Es, Es/Noc) not given explicitely in the table, but through Notes, which are also not consistent since they refer to spherical coverage and do not account for 1dB band relaxation or UE internal noice when close to Refsens .

Bandgroups are redundant since test parameters are defined band agnostic.

Redundant / missleading table Notes.

Relative accuracy mentioned in the test purpose, though only one cell is measured in the test.

Editorial inconsistencies

**Decision: Return to.**

**R4-2015996 CR to TS 38.133: Corrections to inter-RAT FR2 test cases (Rel-16)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1344 Cat: A (Rel-16)  
  
 Source: Rohde & Schwarz*

**Decision: Return to.**

**R4-2016024 CR 38.133 Corrections to test cases for TCI state switching**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1349 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Stray references to a non-existing cell 2. The test cases are based on single cell, but parameters for a second cell, timing offset between Cell2 and Cell1, are provided in the tables for general test parameters. Moreover, despite being based on only a single cell, the NR cell specific test parameter tables mention that "OCNG shall be used suchs that both cells [...]". This causes confusion. This CR removes the incorrect references to a second cell.

**Decision: Agreed.**

**R4-2016025 CR 38.133 Correction to test case for TCI state switching (Rel-16)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1350 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The test cases are based on single cell, but parameters for a second cell, timing offset between Cell2 and Cell1, are provided in the table for general test parameters. Moreover, despite being based on only a single cell, the NR cell specific test paramet

**Decision: Agreed.**

**R4-2016160 Removal of annex B.2.6 on one shot timing adjustment in 38.133**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1363 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

To annex B.2.6 containing side conditiions for one shot timing adjustment requirements.

**Discussion:**

The secretary wondered what is the correct Specification? It reads 36.133 on the coversheet but the CR is allocated for 38.133.

**Decision: Revised to R4-2017061 (from R4-2016160).**

**R4-2017061 Removal of annex B.2.6 on one shot timing adjustment in 38.133**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1363 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

To annex B.2.6 containing side conditiions for one shot timing adjustment requirements.

**Discussion:**

The secretary wondered what is the correct Specification? It reads 36.133 on the coversheet but the CR is allocated for 38.133.

**Decision: Return to.**

**R4-2016161 Removal of annex B.2.6 on one shot timing adjustment in 38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1364 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The side conditions are related to one shot timing adjustment, which was removed. The annex is no more applicable and is removed.

**Decision: Return to.**

**R4-2016163 Correction to NR FR1 DL active BWP switch of Cell with non-DRX in SA (A.6.5.6.2.1)**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1365 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

To correct parameters in in the test case NR FR1 DL active BWP switch of Cell with non-DRX in SA

Chair: The CR status was changed to Return to (instead of proposed Agreed in the summary document). R4-2016164 is the Rel-16 Cat F CR. It seems that the changes in Rel-15 and Rel-16 CRs are not aligned and further clarifications are needed. At least the titles of Table A.6.5.6.2.1.1-1 in Rel-15 and Rel-16 are different.

**Decision: Revised to R4-2017309 (from R4-2016163).**

**R4-2017309 Correction to NR FR1 DL active BWP switch of Cell with non-DRX in SA (A.6.5.6.2.1)**

*Type: CR For: Agreement  
 38.133 v15.11.0 CR-1365 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

To correct parameters in in the test case NR FR1 DL active BWP switch of Cell with non-DRX in SA

**Decision: Return to.**

**R4-2016164 Correction to NR FR1 DL active BWP switch of Cell with non-DRX in SA (A.6.5.6.2.1)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1366 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To correct parameters in in the test case NR FR1 DL active BWP switch of Cell with non-DRX in SA

**Decision: Return to.**

**R4-2016582 Missing TRS Configurations in Test Cases**

*Type: discussion For: Agreement  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Abstract:**

Proposal 1: In principle, RAN4 agrees that TRS configuration should be added to the following test cases. And the correction for each test case will be made by one big CR.

**Decision: Noted.**

### 4.10 Positioning specs maintenance (36.171, 37.171 and 38.171) [NR\_newRAT-Perf or TEI]

## 5 LTE maintenance (up to Rel15) [WI code or TEI]

### 5.3 RRM requirements [WI code or TEI]

================================================================================

**Email discussion: [97e][203] LTE\_RRM\_maintenance**

**R4-2017002 Email discussion summary for [97e][203] LTE\_RRM\_maintenance***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017273 (from R4-2017002).**

**R4-2017273 Email discussion summary for [97e][203] LTE\_RRM\_maintenance***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015879 (R16 cat F CR) | Revised |
| R4-2015461 (R14 cat F) | Revised |
| R4-2015462 (R15 shadow of R4-201541) | Return to |
| R4-2015463 (R16 shadow of R4-201541) | Return to |
| R4-2015838 (R14 cat F) | Revised |
| R4-2015839 (R15 cat F) | Revised |
| R4-2015840 (R16 shadow of R4-2015839) | Return to |
| R4-2016012 (Rel15 cat F) | Agreed |
| R4-2016013 (R16 shadow of R4-2016012 | Agreed |
| R4-2016548 (R13 cat F) | Revised |
| R4-2016549 (R14 shadow of R4-2016548) | Return to |
| R4-2016550 (R15 shadow of R4-2016548) | Return to |
| R4-2016551 (R16 shadow of R4-2016548) | Return to |

2nd round email discussion conclusions

================================================================================

**R4-2015461 CR on maintaining V2X test cases in TS36.133 R14**

*Type: CR For: Agreement  
 36.133 v14.16.0 CR-6965 Cat: F (Rel-14)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In V2X synchronization reference Selection/Reselection tests, there are some errors in refering section number. In congestion control test, the value of PSSCH-RSRP is not correct.

**Decision: Revised to R4-2017063 (from R4-2015461).**

**R4-2017063 CR on maintaining V2X test cases in TS36.133 R14**

*Type: CR For: Agreement  
 36.133 v14.16.0 CR-6965 Cat: F (Rel-14)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In V2X synchronization reference Selection/Reselection tests, there are some errors in refering section number. In congestion control test, the value of PSSCH-RSRP is not correct.

**Decision: Return to.**

**R4-2015462 CR on maintaining V2X test cases in TS36.133 R15**

*Type: CR For: Agreement  
 36.133 v15.11.0 CR-6966 Cat: A (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015463 CR on maintaining V2X test cases in TS36.133 R16**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6967 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015838 CR: Correction of eMTC early-OOS/early-IS tests (Rel-14)**

*Type: CR For: Agreement  
 36.133 v14.16.0 CR-6981 Cat: F (Rel-14)  
  
 Source: Ericsson*

**Abstract:**

Correction of eMTC early-OOS/early-IS tests

**Decision: Revised to R4-2017064 (from R4-2015838).**

**R4-2017064 CR: Correction of eMTC early-OOS/early-IS tests (Rel-14)**

*Type: CR For: Agreement  
 36.133 v14.16.0 CR-6981 Cat: F (Rel-14)  
  
 Source: Ericsson*

**Abstract:**

Correction of eMTC early-OOS/early-IS tests

**Decision: Return to.**

**R4-2015839 CR: Correction of eMTC early-OOS/early-IS tests**

*Type: CR For: Agreement  
 36.133 v15.11.0 CR-6982 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correction of eMTC early-OOS/early-IS tests

**Decision: Revised to R4-2017065 (from R4-2015839).**

**R4-2017065 CR: Correction of eMTC early-OOS/early-IS tests**

*Type: CR For: Agreement  
 36.133 v15.11.0 CR-6982 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correction of eMTC early-OOS/early-IS tests

**Decision: Return to.**

**R4-2015840 CR: Correction of eMTC early-OOS/early-IS tests**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6983 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR corrects TBD and removes [] from Rel-14 eMTC early-OOS/early-IS tests.

**Decision: Return to.**

**R4-2016012 CR 36.133 Corrections to test cases for SCell Hibernation**

*Type: CR For: Agreement  
 36.133 v15.11.0 CR-6986 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

References to tables for test case parameters are incorrect and pointing at tables for another test case.

**Decision: Agreed.**

**R4-2016013 CR 36.133 Correction to test cases for SCell Hibernation (Rel-16)**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6987 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correction of references that currently are incorrect and pointing at tables for another test case.

**Decision: Agreed.**

**R4-2016548 Correction to test parameters for FDD and TDD intra-frequency RSRP for Cat-M1 UE in CEModeA**

*Type: CR For: Agreement  
 36.133 v13.20.0 CR-7002 Cat: F (Rel-13)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Correct inconsistency of Es/Iot requirement for target cell in RSRP intra-frequecy tests for UE Cat M1 in CE ModeA vs UE Cat 1bis. For intra-frequency cell re-selection, the Es/Iot condition for UE Cat 1bis specified in TS 36.133 Table B.1.6-1 is Es/Iot ≥ -5 dB. In contrast, the equivalent requirement for UE Cat M1 is specified in TS 36.133 Table B.1.3-1 as Es/Iot ≥ -6 dB. Since both UE Cat M1 and Cat 1bis feature 1 Rx the two requirements should be reconciled.

In addition, we have added cell 2 timing offset information for consistency with other similar tests.

**Decision: Revised to R4-2017066 (from R4-2016548).**

**R4-2017066 Correction to test parameters for FDD and TDD intra-frequency RSRP for Cat-M1 UE in CEModeA**

*Type: CR For: Agreement  
 36.133 v13.20.0 CR-7002 Cat: F (Rel-13)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Correct inconsistency of Es/Iot requirement for target cell in RSRP intra-frequecy tests for UE Cat M1 in CE ModeA vs UE Cat 1bis. For intra-frequency cell re-selection, the Es/Iot condition for UE Cat 1bis specified in TS 36.133 Table B.1.6-1 is Es/Iot ≥ -5 dB. In contrast, the equivalent requirement for UE Cat M1 is specified in TS 36.133 Table B.1.3-1 as Es/Iot ≥ -6 dB. Since both UE Cat M1 and Cat 1bis feature 1 Rx the two requirements should be reconciled.

In addition, we have added cell 2 timing offset information for consistency with other similar tests.

**Decision: Return to.**

**R4-2016549 Correction to test parameters for FDD and TDD intra-frequency RSRP for Cat-M1 UE in CEModeA**

*Type: CR For: Agreement  
 36.133 v14.16.0 CR-7003 Cat: A (Rel-14)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Correct inconsistency of Es/Iot requirement for target cell in RSRP intra-frequecy tests for UE Cat M1 in CE ModeA vs UE Cat 1bis.

**Decision: Return to.**

**R4-2016550 Correction to test parameters for FDD and TDD intra-frequency RSRP for Cat-M1 UE in CEModeA**

*Type: CR For: Agreement  
 36.133 v15.11.0 CR-7004 Cat: A (Rel-15)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Correct inconsistency of Es/Iot requirement for target cell in RSRP intra-frequecy tests for UE Cat M1 in CE ModeA vs UE Cat 1bis.

**Decision: Return to.**

**R4-2016551 Correction to test parameters for FDD and TDD intra-frequency RSRP for Cat-M1 UE in CEModeA**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-7005 Cat: A (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Chair: moved from AI 6.1.3.2**

**Abstract:**

Correct inconsistency of Es/Iot requirement for target cell in RSRP intra-frequecy tests for UE Cat M1 in CE ModeA vs UE Cat 1bis.

**Decision: Return to.**

## 6 Rel-16 Work Items for LTE

### 6.1 Additional MTC enhancements for LTE [LTE\_eMTC5]

#### 6.1.2 RRM core requirements maintenance [LTE\_eMTC5-Core]

================================================================================

**Email discussion: [97e][225] LTE\_eMTC5\_RRM**

**R4-2017024 Email discussion summary for [97e][225] LTE\_eMTC5\_RRM**

*Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017295 (from R4-2017024).**

**R4-2017295 Email discussion summary for [97e][225] LTE\_eMTC5\_RRM**

*Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: RRM Core requirements maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015779 (Huawei, HiSilicon) | Revised  Capture the conclusion in sub-topic 1-1. |
| R4-2015780 (Huawei, HiSilicon) | Revised.  Moderator recommend this CR to merge R4-2016142 and R4-2016547. |
| R4-2016142 (Ericsson) | Merged |
| R4-2016143 (Ericsson) | Merged |
| R4-2016547 (Qualcomm) | Merged |
| R4-2016587 (Nokia, Nokia Shanghai Bell) | Revised  Moderator recommend this CR to merge R4-2016143. |

**Topic #2: RRM Performance requirements**

Issue 2-1-1: Test scope of RLM with MPDCCH performance improvement

* Agreements:
  + Introduce new Out-of-synch test cases for MPDDCH performance improvement with FD-FDD/HD-FDD/TDD for BL UE CE Mode A
  + Introduce new Early out-of-synch test cases for MPDDCH performance improvement with FD-FDD/HD-FDD/TDD for BL UE CE Mode B

Issue 2-1-3: Serving cell measurement relaxation test

* Agreements:
  + Serving cell measurement relaxation test is introduced only for normal coverage

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017071 | Big CR: Introduction of Rel-16 eMTC RRM performance requirements | Ericsson |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015781 | Endorsed |
| R4-2015842 | Revised |
| R4-2016145 | Endorsed |
| R4-2016552 | Endorsed |
|  |  |
|  |  |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2015778 [LS] Discussion on remaining issues in RSS measurement and eMTC in RRC\_Inactive state**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015779 CR on RSS measurement requirements**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6979 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

There are several issues in current RSS measurement requirements

1. rmax\*G is not considered in measurement period for Connected mode

2. Time relation between MG and RSS is unclear

3.RSRQ measurement may be required but it is not defined for RSS

4.Determination of time location of neighbour cell RSS is unclear

**Decision: Revised to R4-2017068 (from R4-2015779).**

**R4-2017068 CR on RSS measurement requirements**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6979 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

There are several issues in current RSS measurement requirements

1. rmax\*G is not considered in measurement period for Connected mode

2. Time relation between MG and RSS is unclear

3.RSRQ measurement may be required but it is not defined for RSS

4.Determination of time location of neighbour cell RSS is unclear

**Decision: Return to.**

**R4-2015780 CR to introduce measurement requirements for eMTC in RRC\_Inactive**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6980 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN2 has introduced support of Inactive state for eMTC in Rel-16, and asks RAN4 to define correpsonding measurement requirements.

**Decision: Revised to R4-2017069 (from R4-2015780).**

**R4-2017069 CR to introduce measurement requirements for eMTC in RRC\_Inactive**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6980 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN2 has introduced support of Inactive state for eMTC in Rel-16, and asks RAN4 to define correpsonding measurement requirements.

**Decision: Return to.**

**R4-2016141 Discussions on measurement requirement for eMTC UE in RRC\_INACTIVE**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

RAN4 has received a LS from RAN2 regarding the measurement requirements for eMTC UE in RRC\_INACTIVE state, and this LS is discussed in this contribution.

**Decision: Noted.**

**R4-2016142 Measurement requirement for eMTC UE in RRC\_INACTIVE**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6991 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RAN4 has received a LS [R2-2008234] stating that RRC\_INACTIVE state is supported for eMTC UE (BL UE and UE in CE) connected to 5GC. This CR contains changes to define the requirements that apply in RRC\_INACTIVE state.

**Decision: Merged.**

**R4-2016143 Corrections to RSS based measurement requirements**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6992 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The conditions for RSS based intra-frequency neighbour cell requirements are currently specified as function of MPDCCH bandwidth. Since these requirements apply to IDLE mode UEs, the use of “MPDCCH bandwidth” shall be avoided since the UE is not configured with MPDCCH in IDLE mode.

**Decision: Merged.**

**R4-2016547 RRM requirements for eMTC UE in RRC\_INACTIVE state**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-7001 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Rel-16 adds support of RRC\_INACTIVE state for eMTC UE connected to 5GC. Corresponding measurement requirements in RRC\_INACTIVE state have not been specified.

**Decision: Merged.**

**R4-2016587 Correction to RSS based measurement requirements**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-7009 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

CR 6949 was agreed at RAN4 #96-e in R4-2012187 on the matter of finalizing RSS based measurement requirements for LTE-MTC.

One error and few ambiguities were discovered in the review of these sections.

**Decision: Revised to R4-2017070 (from R4-2016587).**

**R4-2017070 Correction to RSS based measurement requirements**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-7009 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

CR 6949 was agreed at RAN4 #96-e in R4-2012187 on the matter of finalizing RSS based measurement requirements for LTE-MTC.

One error and few ambiguities were discovered in the review of these sections.

**Decision: Return to.**

#### 6.1.3 RRM perf. requirements [LTE\_eMTC5-Perf]

**R4-2017071 Big CR: Introduction of Rel-16 eMTC RRM performance requirements (TS 36.133)**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-TBA Cat: F (Rel-16)  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: For e-mail approval.**

##### 6.1.3.1 General [LTE\_eMTC5-Perf]

##### 6.1.3.2 Test cases [LTE\_eMTC5-Perf]

**R4-2015781 draftCR to introduce RSS related test cases**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on R4-2012192, RRM test cases are to be introduced to 1) Verify the cell reselection requirements when UE performs measurements based on RSS based RSRP, and to 2) Verify RSS based RSRP measurement accuracy requirements.

**Decision: Endorsed.**

**R4-2015841 Test cases of RLM for MPDCCH performance improvement**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the test cases of RLM for MPDCCH performance improvement.

Proposal 1: Introduce new Out-of-synch test cases for MPDDCH performance improvement with FD-FDD/HD-FDD/TDD for BL UE CE Mode A.

Proposal 2: Introduce new Early out-of-synch test cases for MPDDCH performance improvement with FD-FDD/HD-FDD/TDD for BL UE CE Mode B.

Proposal 3: Set SNR2/SNR3 1dB lower compared with the existing out-of-synch/early out-of-synch test cases.

**Decision: Noted.**

**R4-2015842 Draft CR: Test cases of RLM for MPDCCH performance improvement**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Ericsson*

**Abstract:**

Addition of test cases of RLM for MPDCCH performance improvement

**Decision: Revised to R4-2017072 (from R4-2015842).**

**R4-2017072 Draft CR: Test cases of RLM for MPDCCH performance improvement**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Ericsson*

**Abstract:**

Addition of test cases of RLM for MPDCCH performance improvement

**Decision: Return to.**

**R4-2016144 Discussions on testing serving cell measurement relaxation requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss the methods for testing serving cell measurement relaxation requirements, further discuss the coverage level impact on the test delay.

Proposal: Serving cell measurement relaxation test is introduced only for normal coverage.

**Decision: Noted.**

**Test case on serving cell relaxation for eMTC**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6993 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Relaxed serving cell measurement requirements are introduced in release 16 for eMTC, and test case is needed to veirfy thhose requirements.

**Decision: Endorsed.**

**R4-2016552 Test cases for DL channel quality report accuracy for eMTC UE**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-7006 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Rel-16 adds support for DL channel quality report for eMTC UE. Test cases to verify DL channel quality report accuracy requirements need to be defined.

**Decision: Endorsed.**

### 6.2 Additional enhancements for NB-IoT [NB\_IOTenh3]

#### 6.2.2 RRM core requirements maintenance [NB\_IOTenh3-Core]

================================================================================

**Email discussion: [97e][226] NB\_IOTenh3\_RRM**

**R4-2017025 Email discussion summary for [97e][226] NB\_IOTenh3\_RRM**

*Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017296 (from R4-2017025).**

**R4-2017296 Email discussion summary for [97e][226] NB\_IOTenh3\_RRM**

*Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: RRM Core requirements maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015512 | Agreed |
| R4-2015513 | Revised. |
|  |  |

**Topic #2: RRM Performance requirements**

Issue 2-1: MSG3-based channel quality report test on non-anchor carrier

* Agreements:
  + Reuse the Rel-14 MSG3-based channel quality report test on anchor for Rel-16 MSG3-based channel quality report test on non-anchor.
  + Configure NPDCCH carrier index (ndpcch-CarrierIndex-r14) for Rel-16 MSG3-based channel quality report test on non-anchor.

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017073 | Big CR: Introduction of Rel-16 NB-IoT RRM RRM performance requirements | Huawei |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015514 | Revised |
| R4-2015817 | Revised |
| R4-2016553 | Revised |
|  |  |
|  |  |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2015512 CR on PUR requirements for NB-IoT**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6970 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The CR is the resubmitted CR of R4-2012193, which is not implemented due to some changes without change mark.

There are some issues with requirements in 4.6.3 related to PUR:

timing alignment validation and NRSRP changed validation are two independent mechanisms, so when only NRSRP-ChangeThresh-NB-r16 is configured, the TA validation should not depend on timing alignment validation

TA validation with NRSRP1 and NRSRP2 are also defined in clause 5.3.3.19 of 36.331, instead of RAN4 36.133.

N value is not defined for the case when relaxed serving cell monitoring is not in use.

**Decision: Agreed.**

**R4-2015513 CR on RRM requirements for short DRX with eDRX configured for Rel-16 NB-IoT**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6971 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon, Mediatek Inc.*

**Abstract:**

In the current requirements for the new introduced short DRX cycle length 320 ms and 640 ms, the measurement requirement Tmeasure for neighbor cell measurement and ECID is scaled, which means UE does not need to perform measurement too frequently with the short DRX cycles. However, when eDRX is configured, the corresponding requirements are not relaxed in order to let UE complete the measurement within the same PTW as possible. It could be observed that the minimum configurable PTW length is 2.56 s, which allows multiple measurement occasions when DRX is 320 ms. It is proposed in this paper to also scale the requirements when eDRX is configured, as the benefit to let UE perform measurement every short DRX when eDRX is configured is not significant but it will lead to unnecessary power consumption and UE’s efforts. The same changes are made in ECID.

There are some typos and misalignments in the spec need to be fixed.

**Decision: Revised to R4-2017074 (from R4-2015513).**

**R4-2017074 CR on RRM requirements for short DRX with eDRX configured for Rel-16 NB-IoT**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6971 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon, Mediatek Inc.*

**Abstract:**

**Decision: Return to.**

#### 6.2.3 RRM perf. requirements [NB\_IOTenh3-Perf]

**R4-2017073 Big CR: Introduction of Rel-16 Nb-IoT RRM RRM performance requirements (TS 36.133)**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-TBA Cat: F (Rel-16)  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: For e-mail approval.**

##### 6.2.3.1 General [NB\_IOTenh3-Perf]

##### 6.2.3.2 Test cases [NB\_IOTenh3-Perf]

**R4-2015514 Draft CR on test cases for UE specific DRX cycles for Rel-16 NB-IoT**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The test cases for UE specifc DRX cycle length is missing.

**Decision: Revised to R4-2017075 (from R4-2015514).**

**R4-2017075 Draft CR on test cases for UE specific DRX cycles for Rel-16 NB-IoT**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The test cases for UE specifc DRX cycle length is missing.

**Decision: Return to.**

**R4-2015816 Test cases of MSG3 channel quality report on non-anchor carrier**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the test cases of MSG3 channel quality report on non-anchor carrier.

Proposal 1: Reuse the Rel-14 MSG3-based channel quality report test on anchor for Rel-16 MSG3-based channel quality report test on non-anchor.

Proposal 2: Configure NPDCCH carrier index (ndpcch-CarrierIndex-r14) for Rel-16 MSG3-based channel quality report test on non-anchor.

**Decision: Noted.**

**R4-2015817 Draft CR: MSG3 based channel quality reporting on non-anchor carrier**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Ericsson*

**Abstract:**

Introduction of test case of MSG3-based channel quality reporting on non-anchor carrier

**Decision: Revised to R4-2017076 (from R4-2015817).**

**R4-2017076 Draft CR: MSG3 based channel quality reporting on non-anchor carrier**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Ericsson*

**Abstract:**

Introduction of test case of MSG3-based channel quality reporting on non-anchor carrier

**Decision: Return to.**

**R4-2016553 Test cases for DLchannel quality report accuracy in RRC\_CONNECTED for UE Cat-NB1 Standalone mode**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-7007 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Rel-16 adds support for DLchannel quality report in RRC\_CONNECTED for UE Cat-NB1. Test cases to verify DL channel quality report accuracy requirements in RRC\_CONNECTED need to be defined.

**Decision: Revised to R4-2017077 (from R4-2016553).**

**R4-2017077 Test cases for DLchannel quality report accuracy in RRC\_CONNECTED for UE Cat-NB1 Standalone mode**

*Type: DraftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Qualcomm Incorporated*

**Abstract:**

Rel-16 adds support for DLchannel quality report in RRC\_CONNECTED for UE Cat-NB1. Test cases to verify DL channel quality report accuracy requirements in RRC\_CONNECTED need to be defined.

**Discussion:**

Chair: Changed the tdoc type to DraftCR instead of CR.

**Decision: Return to.**

### 6.3 Even further Mobility enhancement in E-UTRAN [LTE\_feMob]

================================================================================

**Email discussion: [97e][227] LTE\_feMob\_RRM**

**R4-2017026 Email discussion summary for [97e][227] LTE\_feMob\_RRM**

*Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017297 (from R4-2017026).**

**R4-2017297 Email discussion summary for [97e][227] LTE\_feMob\_RRM**

*Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: RRM Core requirements maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015502 | Return to |
| R4-2016385 | Revised |
|  |  |

**Topic #2: RRM Performance requirements**

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017078 | WF on further test cases for LTE feMob | Nokia, Nokia Shanghai Bell |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015501 | Agreed |
| R4-2016384 | Endorsed |
| R4-2016554 | Agreed |
|  |  |

2nd round email discussion conclusions

================================================================================

#### 6.3.1 RRM core requirements maintenance [LTE\_feMob-Core]

**R4-2015502 Correction on the synchronous condition for DAPS handover**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6969 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Aligning with the agreement for NR mobility enhancement [R4-2012265], the synchronous condition are revised

In current specification, Notes 2/3 clairfies to leave enough time for UE performing DL-to-UL and UL-to-DL switching only from single cell perspective. However, the UE shall be allowed to switching time between both source cell and target cell.

**Decision: Return to.**

**R4-2016385 Correction on LTE conditional handover**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6997 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The equation of conditional handover delay in LTE is not readable and not aligned with NR conditional handover.

**Decision: Revised to R4-2017079 (from R4-2016385).**

**R4-2017079 Correction on LTE conditional handover**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6997 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The equation of conditional handover delay in LTE is not readable and not aligned with NR conditional handover.

**Decision: Return to.**

#### 6.3.2 RRM perf. requirements [LTE\_feMob-Perf]

**R4-2017078 WF on further test cases for LTE feMob**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 6.3.2.1 General [LTE\_feMob-Perf]

##### 6.3.2.2 Test cases [LTE\_feMob-Perf]

**R4-2015501 Test cases for inter-frequency DAPS handover**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6968 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Define the test cases for inter-frequency DAPS

**Decision: Agreed.**

**R4-2016384 Test cases for LTE conditional handover**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Add test cases for LTE conditional handover

**Decision: Revised to R4-2017308 (from R4-2016384).**

**R4-2017308 Test cases for LTE conditional handover**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-TBA Cat: B (Rel-16)  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Add test cases for LTE conditional handover

**Decision: Return to.**

**R4-2016554 Introduction of intra-frequency sync and async LTE DAPS HO test cases**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-7008 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Per work split agreement in RAN4#95-e meeting, the test cases for intra-frequency LTE DAPS HO are introduced in this CR. To avoid having multiple test cases, FDD-FDD test case is specified in async mode and TDD-TDD test case is specified in sync mode. Per agreements in RAN4#96-e for NR mobility WI, the tests consist of 5 intervals and the last interval is used to verify the CSI reporting to source cell is stopped.

**Decision: Agreed.**

### 6.4 R16 LTE maintenance [WI code]

#### 6.4.3 RRM requirements [WI code]

**R4-2015879 CR on performance requirements tests for euCA.**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6984 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Missing accuracy requirements for the euCA RSRP and RSRQ measurements.

**Decision: Revised to R4-2017062 (from R4-2015879).**

**R4-2017062 CR on performance requirements tests for euCA.**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6984 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Missing accuracy requirements for the euCA RSRP and RSRQ measurements.

**Decision: Return to.**

## 7 Rel-16 non-spectrum related work items for NR

### 7.1 NR-based access to unlicensed spectrum [NR\_unlic]

#### 7.1.6 RRM core requirements maintenance (38.133) [NR\_unlic-Core]

================================================================================

**Email discussion: [97e][205] NR\_unlic\_RRM\_1**

**R4-2017004 Email discussion summary for [97e][205] NR\_unlic\_RRM\_1***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017275 (from R4-2017004).**

**R4-2017275 Email discussion summary for [97e][205] NR\_unlic\_RRM\_1***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 03, 2020)

|  |
| --- |
| Topic #1: General (AI 7.1.6.1)   * Sub-topic 1-2: Number of candidate SSBs for cell detection   + Issue 1-2-1: Number of candidate SSBs for cell detection     - Option 1 (Nokia, R4-2015387 in AI 7.1.6.10): For cell detection, UE is required to monitor at least the same number of candidate SSB positions as in other RRM measurements.     - Option 2 (Huawei/HiSilicon, Apple [R4-2014283 in AI 7.1.6.11], Qualcomm [R4-2016564 in AI 7.1.6.10]): For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.   Discussion:  E///: We can agree with Option 2. Need to add a clarification “One candidate position for detection should not be impacted by what UE is already monitoring”  Nokia: can compromise to Option 2.  Chair: please further discuss how to capture the agreement in the CR.  Agreement:   * + For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.     - Note: 1 candidate SSB position for detection should not be impacted by what UE is already monitoring * Sub-topic 1-3: Exact candidate SSB positions   + Issue 1-3-1: Exact candidate SSB positions     - Option 1: no need to fix     - Option 2 (Huawei/HiSilicon): The exact candidate SSB positions that UE is required to monitor shall be further clarified.   Discussion:  HW: last meeting we agreed that UE to monitor 2 SSB positions. In case UE does not read PBCH then how does UE know which exactly positions to monitor?  Nokia: UE needs to know the index only and does not need to read PBCH. Do not see the need to fix it.  E///: agree with Nokia. UE can know the time separation between SSBs  QC: agree with Nokia and E///. UE has information.  HW: is PBCH reading considered?  Nokia: No need to read PBCH to derive SSB index. By knowing Q the UE can derive the SSB candidate position corresponding to SSB index.  HW: there is some difference for NR-U which has 10 SSB positions and 1 bit is included in PBCH. Without PBCH decoding UE may not differentiate SSB positions since DMRS sequences are same for 0 and 8. Sometimes UE needs to monitor only 1 position.  E///: No need to decode PBCH. UE knows the separation between the two (e.g. 0 and 4 or 1 and 5).  Apple: agree with HW. Sometimes PBCH reading is needed. There may be ambiguity on the SSB index.  MTK: PBCH reading is not required. Why is UE required to know the exact position?  Apple: it depends on SMTC window configuration as well. SMTC window may not cover the whole SSB burst  Nokia: this is a corner case. We can add a clarification that SMTC covers the entire SSB burst  Apple: fine with us  E///: do not see the need  HW: example – UE detects SSB 8. Is UE required to measure 0 and 4 or can keep measuring 8?  E///: If UE is already measuring 4 then UE needs to measure 4 and 8. If it is already measuring 0 then it exceeds UE capabilities and it is up to UE what to do.  HW: what about newly detectable cell with SSB 8?  E///: UE will keep measuring 8. Keep detecting other positions. Once a QCL’ed SSB beam is detected on the other position then it is up to UE capabilities.  Agreement: Do not fix exact SSB positions for cell detection   * Sub-topic 1-4: Set of candidate SSB positions in RRM requirements   + Issue 1-4-1: Further clarification on the set of candidate SSB positions     - Option 1 (Apple, R4-2014283 in AI 7.1.6.11): Except cell detection, RRM core requirements are defined under assumption what UE monitors the first 2 successive QCL’ed candidate SSB positions (i.e. N1 = N2 = 2). For a certain SSB index which has only one single candidate SSB position in the SSB burst, UE monitors 1 candidate SSB position for this SSB in one SSB burst.     - Option 2: no need to further clarify   Discussion:  QC: this clarification is redundant. UE already knows that.  Apple: current requirements say that UE needs to monitor the first two QCL’ed positions. Technically it does not work for some SSBs.  QC: suggest to revise as follows “For a certain SSB index which has only one ~~single~~ configured candidate SSB position in the SSB burst, UE monitors 1 candidate SSB position for this SSB in one SSB burst.”  Agreement: Except cell detection, RRM core requirements are defined under assumption what UE monitors the first 2 successive QCL’ed candidate SSB positions (i.e. N1 = N2 = 2). For a certain SSB index which has only one configured candidate SSB position in the SSB burst, UE monitors 1 candidate SSB position for this SSB in one SSB burst.  Topic #4: RRC connection mobility control (AI 7.1.6.4)   * Sub-topic 4-2: Random Access requirements   + Issue 4-2-1: RA requirements in TS 38.133 – general     - Proposal 1 (Nokia): RAN4 to create a new clause in TS 38.133, 6.2.2A, which is based on 6.2.2, but has adapted content in clauses that describe the correct behaviour when transmitting signals, clarifying that transmissions are only possible if the UL CCA is successful.   Discussion:  E///: We are fine. We can wait till the next meeting. In this meeting we can identify all possible impacts first.  QC: Agree with E///.  Nokia: We are fine to wait. The impact on other sections was already considered.   * + Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type     - Proposal 1 (Nokia): For the 4-step RA type, agree on the clauses and proposed modifications considering the NR random access requirements baseline as described in Table 1.   + Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type     - Proposal 1 (Nokia): For the 2-step RA type, agree on the clauses and proposed modifications considering the NR random access requirements baseline as described in Table 2.   Discussion:  Apple: 2step RA is Rel-16 feature and should not be mixed with NR-U  Nokia: RAN2 agreed 2-step RACH is supported for NR-U  Topic #5: SCell activation/deactivation (delay and interruption) (AI 7.1.6.5)   * Sub-topic 5-1: Interruptions for inter-band CA   + Issue 5-1-1: Interruption for inter-band CA     - Proposal 1 (ZTE, Ericsson, Qualcomm): For inter-band CA, the interruption is not the same as for intra-band case and a single interruption applies.     - Proposal 2 (Huawei/HiSilicon): For inter-band CA when there is at least one active serving Cell in the band where the SCell is being activated, it will cause two interruption windows for each AGC failure.   Discussion:  MTK: see the benefit of proposal 2 to save power but it will cause more interruptions. No strong preference.  HW: It depends whether there is already activated SCell  Agreement:  For inter-band CA,   * + - For the case when there is no already activated SCell, a single interruption applies.     - For the case when there is already activated SCell, interruption is FFS. * Sub-topic 5-2: Interruptions for intra-band CA   + Issue 5-2-1: Interruption length for intra-band CA     - Proposal 1 (Huawei/HiSilicon): For the interruptions to the serving cells in the same band, whether to include the addition RF tuning should be further discussed.   Discussion:  QC: RF retuning should be done only once  HW: we already agreed on the total number of interruptions. We are talking about the length of the interruption. Should UE always keep the RF open?  QC: it is up to UE and this is a trade-off between power saving and throughput. Prefer to minimize the impact on throughput.   * Sub-topic 5-4: Measuring CSI-RS during SCell activation   + Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation     - Proposal 1 (Apple): UE always attempts to measure P/SP CSI-RS for CSI reporting during the activation period regardless of the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16. No need to consider the requirement applicability associated with the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16.   Discussion:  MTK: We cannot simply remove the sentence and need some clarifications. What is UE behavior in case of LBT failure?  HW: Generally, agree with Apple. The requirements shall not depend on configuration of CO duration. Meantime we share MTK concerns.  Apple: UE will directly measure without any detection. In case of LBT failure the UE will report out of range.  MTK: do not see the problem with DCI decoding.  Apple: we have different understanding. UE is not required to monitor the DCI for the de-activated SCell. All RAN1 mechanisms for validation are applied for activated carriers.  MTK: UE is not required to make DCI decoding on de-activated SCell. However after fine time tracking has completed UE should be able to decode DCI and make CSI report. UE can do DCI decoding before it sends the CSI report.  Apple: the ending point of SCell activation is the moment when UE sends the CSI report. The network shall know that UE has been activated before it can send DCI (hand-shake procedure). We can also send LS to RAN1 to clarify.  MTK: will need to check internally.  Chair: continue discussion. Send LS to RAN1 if further clarifications on RAN1 assumptions are needed.   * Sub-topic 5-5: SCell activation/deactivation when *sCellDeactivationTimer* is NOT configured   + Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured     - Option 1 (Qualcomm, Ericsson): The SCell activation requirements for NR-U do not apply when the *sCellDeactivationTimer* is not configured.       * Observation (Ericsson): When sCellDeactivationTimer is not configured, the UE may get stuck in one of the phases (in DL or UL) of the sCell activation procedure until the network realizes this, without being able to stop the procedure or to move to another phase of the SCell activation procedure. Smarter UEs may not be able meet the current requirements.     - Option 2 (Nokia): In NR-U, the SCell activation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. Remove the editor’s notes in clause 8.3A.2 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured.   Discussion:  E///: requirements shall not apply. Otherwise UE may get stuck in DL or UL.  HW: Agree with E///.  Nokia: The timer is optional. When the timer is not configured the requirements shall be considered.  E///: the proposal does not mandate the timer  Nokia: the problem of LBT failures is already addressed in the requirements. The problem of LBT is not relevant to timer/no timer issue.  HW: LBT is considered in SCell activation only partially. It is not considered for HARQ. UE may not be able to terminate the procedure itself.  Nokia: If there are some issues with procedures then we should ask RAN2 to fix it. There are multiple scenarios and the issues are relevant to some of them only.  Chair: continue discussion. Aim to identify scenario where “no timer” requirements may work. Consider to send LS to RAN2 if needed in case issues with procedure are identified.   * Sub-topic 5-6: SCell activation/deactivation when *sCellDeactivationTimer* IS configured   + Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured     - Option 1 (Huawei/HiSilicon): If RAN4 is to define requirements only when *sCellDeactivationTimer* is configured, necessary clarification is needed that UE shall not stop *sCellDeactivationTimer* before UE successfully transmits the HARQ feedback for the deactivation command when *sCellDeactivationTimer* has not expired.     - Option 2 (Qualcomm): No such clarification is needed, even if the requirements apply only when *sCellDeactivationTimer* is configured   Discussion:  E///: support Option 2.  Nokia: No such clarification is needed. This is already described in RAN2 specs.  HW: we are fine to send LS to RAN2. RAN2 is not aware on the issue.  Apple: we agree with Huawei observation.  Chair: further discuss the technical issue raised by Huawei. Consider to send LS to RAN2 to fix the issue if there is consensus  Topic #6: Active TCI state switching (AI 7.1.6.6)   * Sub-topic 6-1: Enhancements in Rel-17   + Issue 6-1-1: TCI state switching enhancements in Rel-17     - Proposal 1 (ZTE): Do not introduce enhancement into R16 specifications. Further study how to handle TCI state switching failures in R17.   Discussion:  E///: this should be discussed separately. Further enhancements should be discussed separately (not in this WI).  ZTE: we are ok to have a separate discussion in the plenary/  Topic #9: Beam management (AI 7.1.6.9)   * Sub-topic 9-1: L1-RSRP   + Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting     - Proposal 1 (Nokia): RAN4 to wait for the reply LS from RAN1 on the UE behaviour when the transmission of HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting is blocked by UL LBT failure.     - Proposal 2 (Ericsson): RAN4 should wait for LS response from RAN1 on the UE behavior when UE cannot transmit HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting. Once RAN4 receives the LS response from RAN1, RAN4 should restart the discussion and capture the UE behavior in TS38.133 if necessary.     - Proposal 3 (ZTE, R4-2014012 in AI 7.1.6.10): If UE cannot transmit HARQ-ACK on MAC-CE deactivation due to UL CCA failure, UE continues to be in its previous state, i.e., it should measure and report L1-RSRP until it successfully transmits HARQ-ACK.     - Proposal 4 (Qualcomm, R4-2016564 in AI 7.1.6.10): At least from MAC (RAN2) layer perspective, UE follows the actions related to MAC-CE activation/deactivation command immediately after decoding the MAC-CE command regardless of whether UE is able to send HARQ-ACK feedback or not.   Discussion:  E///: wait for RAN1 LS response  Chair: wait for RAN1 LS response |

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017080 | WF on NR-U RRM core requirements | Ericsson |
| R4-2017083 | LS on measuring CSI-RS during SCell activation | Apple |

**Topic #1: General (AI 7.1.6.1)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014868 | Noted |
| R4-2016409 | Revised. |
| R4-2016410 | Revised |

**Topic #4: RRC connection mobility control (AI 7.1.6.4)**

Issue 4-1-1: Cell search delay for unknown intra-frequency cell

Agreement

* The cell search delay for unknown intra-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K1).

Issue 4-1-2: Cell search delay for unknown inter-frequency cell

Agreement

* The cell search delay for unknown inter-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K2,i).

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015202 | Noted |
| R4-2016176 | Agreed |
|  |  |

**Topic #5: SCell activation/deactivation (delay and interruption) (AI 7.1.6.5)**

Issue 5-2-3: The interruption window location for intra-band CA

Agreement

* + For intra-band CA, the starting point of an interruption window on SpCell or any activated SCell as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:
  + TFirstSSB , for known SCell activation when SCell measurement cycle is equal to, or smaller than, 160ms
  + TFirstSSB\_MAX + L2,1\* TSMTC-MAX , for known SCell activation when SCell measurement cycle is greater than 160ms
  + TFirstSSB\_MAX + L3,1\* TSMTC-MAX , for unknown SCell activation.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014285 | Withdrawn |
| R4-2015203 | Merged |
| R4-2015516 | Merged |
| R4-2016412 | Merged |
| R4-2016591 | Revised. |
|  |  |

**Topic #6: Active TCI state switching (AI 7.1.6.6)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015518 | Revised. |
| R4-2016585 | Merged |

**Topic #8: RLM (AI 7.1.6.8)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015519 | Merged |
| R4-2016413 | Revised |

**Topic #9: Beam management (AI 7.1.6.9)**

Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133

Agreement:Introduce new clause 9.5A in TS38.133 for L1-RSRP reporting under CCA.

Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting

Agreement:

* RAN4 should wait for LS response from RAN1 on the UE behavior when UE cannot transmit HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting due to UL LBT failure.
* Once RAN4 receives the LS response from RAN1, RAN4 should resume the discussion and capture the UE behavior in TS 38.133 if necessary.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015520 | Merged |
| R4-2015819 | Revised |

**Topic #10: Measurement requirements (AI 7.1.6.10)**

Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133

Agreement:

* Add clarification for UL scheduling restriction as “The UE is not expected to transmit PUCCH/PUSCH/SRS on the UL symbols which are overlapping in time with the RSSI measurement symbols configured by RMTC”.

Issue 10-2-2: Scheduling restrictions for inter-band CA

Agreement:

* In FR1 inter-band CA, the scheduling restriction due to one CC shall not apply to other CCs on the other bands.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014870 | Postponed |
| R4-2015205 | Merged |
| R4-2015521 | Return to |
| R4-2016419 | Return to |

**Topic #11: Measurement capability and reporting criteria (AI 7.1.6.11)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015523 | Noted |
| R4-2016414 | Agreed |

**Topic #12: Timing (AI 7.1.6.12)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015204 | Merged |
| R4-2016177 | Revised |

**Topic #13: Other requirements (AI 7.1.6.13)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015170 | Agreed |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2017080 WF on NR-U RRM core requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017083 LS on measuring CSI-RS during SCell activation.**

*Type: LS out For: Approval  
 To: RAN1   
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.1.6.1 General [NR\_unlic-Core]

**R4-2014867 Discussion on clarification for NR-U RRM requirements with DRX in use**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: For the requirements with DRX in use, to add notes “X is the number of DRX cycles with at least one SMTC where there are no SSBs available at the UE during … period when DRX is used”, where

• X shall be replaced depending on the requirement with:

• RLM-RS SSB in RLM requirements,

• CBD-RS SSB in CBD requirements,

• SSB in L1-RSRP measurement requirements,

• SMTC in measurement requirements other than RSSI requirements and L1-RSRP,

• and … shall be replaced with what is appropriate:

• evaluation,

• detection,

• identification,

**Decision: Noted.**

**R4-2014868 Clarification for NR-U RRM requirements with DRX in use**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1210 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

If DRX is in use, NR-U RRM requirements are unclear when LBT failures occur. The current clarification notes are for no DRX scenarios but not for the cases with DRX in use.

**Decision: Not pursued.**

**R4-2015515 Discussion on monitoring capability in cell detection for NR-U**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.

Proposal 2: The exact candidate SSB positions that UE is required to monitor shall be further clarified.

**Decision: Noted.**

**R4-2016408 On the terminology and SSB monitoring in NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On the terminology and SSB monitoring in NR-U.

**Decision: Noted.**

**R4-2016409 Terminology updates for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1384 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RAN4 agreed on the definition of SMTC/SSB not available at the UE and the signal/channel occasion unavailable for UE transmission, which need to be captured in the specification

**Decision: Revised to R4-2017081 (from R4-2016409).**

**R4-2017081 Terminology updates for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1384 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RAN4 agreed on the definition of SMTC/SSB not available at the UE and the signal/channel occasion unavailable for UE transmission, which need to be captured in the specification

**Decision: Return to.**

**R4-2016410 Terminology updates for NR-U**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6999 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RAN4 agreed on the definition of SMTC/SSB not available at the UE and the signal/channel occasion unavailable for UE transmission, which need to be captured in the specification

**Decision: Revised to R4-2017082 (from R4-2016410).**

**R4-2017082 Terminology updates for NR-U**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6999 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RAN4 agreed on the definition of SMTC/SSB not available at the UE and the signal/channel occasion unavailable for UE transmission, which need to be captured in the specification

**Decision: Return to.**

##### 7.1.6.2 Cell re-selection [NR\_unlic-Core]

##### 7.1.6.3 Handover [NR\_unlic-Core]

##### 7.1.6.4 RRC connection mobility control [NR\_unlic-Core]

**R4-2015202 CR to 38.133 - Introducing NR-U random access requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1244 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of NR-U random access requirements in TS 38.133.

**Decision: Postponed.**

**R4-2015386 NR-U Random access**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discusses the random access requirements in NR-U, both with 4 step RA and 2 step RA types.

Proposal 1: RAN4 to create a new clause in TS 38.133, 6.2.2A, which is based on 6.2.2, but has adapted content in clauses that describe the correct behaviour when transmitting signals, clarifying that transmissions are only possible if the UL CCA is successful.

Proposal 2: For the 4-step RA type, agree on the clauses and proposed modifications considering the NR random access requirements baseline as described in Table 1.

Proposal 3: For the 2-step RA type, agree on the clauses and proposed modifications considering the NR random access requirements baseline as described in Table 2.

**Decision: Noted.**

**R4-2016175 Analysis of requirements for known cell in RRC re-establishment with CCA**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The cell search requirement when Es/Iot < -8 dB is still TBD for unknown cell.

Observation 1: When the serving cell SSB Ês/Iot < -8 dB, the UE typically searches unknown cell once every 20 ms.

Proposal 1: The cell search delay for unknown intra-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K1 )

Proposal 2: The cell search delay for unknown inter-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K2,i)

**Decision: Noted.**

**R4-2016176 Requirements for known cell in RRC re-establishment with CCA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1369 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Cell identification delay for unknown cell with CCA when serving cell Es/Iot < -8 dB is TBD

**Decision: Agreed.**

##### 7.1.6.5 SCell activation/deactivation (delay and interruption) [NR\_unlic-Core]

**R4-2014013 Remaining issues on SCell activation in NR-U**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Abstract:**

Proposal 1: For inter-band CA, the interruption is not the same as for intra-band case and a single interruption applies.

**Decision: Noted.**

**R4-2014284 On SCell activation requirement for NR-U**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Apple*

**Abstract:**

Proposal: UE always attempts to measure P/SP CSI-RS for CSI reporting during the activation period regardless of the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16. No need to consider the requirement applicability associated with the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16.

**Decision: Noted.**

**R4-2014285 Draft CR on SCell activation requirement for NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Decision: Withdrawn.**

**R4-2015203 CR to 38.133 - NR-U SCell activation and deactivation requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1245 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Remove editor notes related to applicability of requirements when the sCellDeactivationTimer is not configured in NR-U, clarifying that the requirements are also applicable when the timer is not configured.

**Decision: Merged.**

**R4-2015385 Scell activation and deactivation delay requirements in NR-U**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discusses the FFS points in the scell activation and deactivation delay requirements in NR-U.

Proposal 1: In NR-U, the sCell activation delay requirement applies regardless of the sCellDeactivationTimer being configured or not.

Proposal 2: Remove the editor’s notes in clause 8.3A.2 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the sCellDeactivationTimer is not configured.

Proposal 3: In NR-U, the sCell deactivation delay requirement applies regardless of the sCellDeactivationTimer being configured or not.

Proposal 4: Remove the editor’s notes in clause 8.3A.3 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the sCellDeactivationTimer is not configured.

**Decision: Noted.**

**R4-2015516 CR on SCell activation and deactivation requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1287 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The interruption windows cased by SCell activation for an unknown SCell shall be 2+L3,1, which is not correctly defined in the existing requirements.

**Decision: Merged.**

**R4-2015517 Discussion on SCell activation and deactivation requirements for NR-U**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: For inter-band CA when there is at least one active serving Cell in the band where the SCell is being activated, it will cause two interruption windows for each AGC failure.

Proposal 2: For the interruptions to the serving cells in the same band, whether to include the addition RF tuning should be further discussed.

Proposal 3: When there is no active serving Cell in the band where the SCell is being activated, whether to consider the additional RF tuning should be further discussed.

Proposal 4: If RAN4 is to define requirements only when sCellDeactivationTimer is configured, necessary clarification is needed that UE shall not stop sCellDeactivationTimer before UE successfully transmits the HARQ feedback for the deactivation command when sCellDeactivationTimer has not expired.

Proposal 5: For intra-band CA, while the SCell being activated is known or unknown with measurement cycle greater than 160ms, up to 1+L interruption windows are allowed during SCell activation, where L = L2,1 for known SCell and L = 1+L3,1 for unknown SCell. For a single interruption (L=0), interruption window length at SCell activation does not depend on DL CCA failures.

**Decision: Noted.**

**R4-2016411 On remaining issues for SCell activation in NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On remaining issues for SCell activation in NR-U.

Proposal 1: For inter-band CA, the interruption is not the same as for intra-band case and a single interruption applies.

Proposal 2: The SCell activation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured.

Proposal 3: The SCell deactivation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured.

**Decision: Noted.**

**R4-2016412 Updates in SCell activation in NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1385 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Editor’s notes are remaining in SCell activation requirements

**Decision: Merged.**

**R4-2016565 Remaining Issues On SCell activation and deactivation requirements in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this paper, we discuss the remaining issues on Scell activation and deactivation requirements in NR-U.

Proposal 1. For inter-band CA, a single interruption window is allowed during the Scell activation

Proposal 2. For intra-band CA, while the SCell being activated is known with measurement cycle <160ms, a single interruption window is allowed during SCell activation

Proposal 5. The SCell activation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured.

Proposal 6a. No new specification is needed for SCell deactivation requirements when SCellDeactivationTimer is not configured.

Proposal 6b. The SCell deactivation requirements for NR-U do not apply when the SCellDeactivationTimer is not configured.

Proposal 7. No such clarification is needed, even if the requirements apply only when sCellDeactivationTimer is configured

**Decision: Noted.**

**R4-2016591 Interruption windows and applicability of Scell activation/deactivation requirements for SCells operating with CCA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1403 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

The CR updates clause 8.3A based on agreements related to interruption windows and applicability of Scell activation/deactivation requirements.

**Decision: Revised to R4-2017084 (from R4-2016591).**

**R4-2017084 Interruption windows and applicability of Scell activation/deactivation requirements for SCells operating with CCA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1403 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

The CR updates clause 8.3A based on agreements related to interruption windows and applicability of Scell activation/deactivation requirements.

**Decision: Return to.**

##### 7.1.6.6 Active TCI state switching [NR\_unlic-Core]

**R4-2014190 On TCI state switching failure in NR-U**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Abstract:**

Proposal 1: Do not introduce enhancement into R16 specifications. Further study how to handle TCI state switching failures in R17.

**Decision: Noted.**

**R4-2015518 CR on TCI state switching requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1288 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

According to the agreed CR R4-2012239, the L1-RSRP is not needed in FR1 which is for Rx beam refinement. Therefore, the corresponding requirements related to L1-RSRP is not needed for NR-U.

**Decision: Revised to R4-2017085 (from R4-2015518).**

**R4-2017085 CR on TCI state switching requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1288 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

According to the agreed CR R4-2012239, the L1-RSRP is not needed in FR1 which is for Rx beam refinement. Therefore, the corresponding requirements related to L1-RSRP is not needed for NR-U.

**Decision: Return to.**

**R4-2016585 CR to MAC-CE based TCI State Switching requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1402 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

In the current version of MAC-CE based TCI state switch requirement, there is a discrepancy between RAN1 spec and RAN4 requirement. Additional delay introduced by RAN4 should be removed so that it can be consistent with UE behaviour specified in RAN1 spec.

**Decision: Merged.**

##### 7.1.6.7 Active BWP switching [NR\_unlic-Core]

##### 7.1.6.8 RLM [NR\_unlic-Core]

**R4-2015519 CR on RLM requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1289 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

1. The agreement when Lin exceeds Lin,max is not captured that UE shall not indicate IS to higher layer for this evalaution period.

2. The CSI-RS based RLM descriptions shall be removed.

3. It is stated in the spec that the UE shall not perform CCA procedure on any of the serving carrier frequencies with CCA after the expiry of T310. However, after the T310 expiries, UE will initiate RRC re-establishment procedure or go to IDLE mode, and UE may trigger UL transmission with CCA for re-establishment or random access. Thus, the description here is not needed and which is conflict with the potential UE behavior.

**Decision: Merged.**

**R4-2016413 Updates in RLM requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1386 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Misaligned notation.

The agreement “For both LBE and FBE, RLM requirements shall not rely on COT” (WF in R4-2005367) is not captured in RLM requirements for NR-U in 38.133.

The agreement “UE behaviour when Lin,max is exceeded: For this evaluation period, UE layer 1 shall not send any in-sync indication to higher layers.” (WF in R4-1912851) is not captured.

**Decision: Revised to R4-2017086 (from R4-2016413).**

**R4-2017086 Updates in RLM requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1386 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Misaligned notation.

The agreement “For both LBE and FBE, RLM requirements shall not rely on COT” (WF in R4-2005367) is not captured in RLM requirements for NR-U in 38.133.

The agreement “UE behaviour when Lin,max is exceeded: For this evaluation period, UE layer 1 shall not send any in-sync indication to higher layers.” (WF in R4-1912851) is not captured.

**Decision: Return to.**

##### 7.1.6.9 Beam management [NR\_unlic-Core]

**R4-2015389 Remaining issues in beam management in NR-U**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discusses the issue with CSI reporting when the HARQ ACK for the MAC-CE with the deactivation command is blocked by UL LBT failure.

Proposal 1: RAN4 to wait for the reply LS from RAN1 on the UE behaviour when the transmission of HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting is blocked by UL LBT failure.

**Decision: Noted.**

**R4-2015520 CR on Beam mangement requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1290 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

1. The condition for BFD and CBD is that the SSB configured for beam failure is actually transmitted within the UE active DL BWP during the entire evaluation period, where the CCA operation is not considered.

2. It is stated in the current spec that If LCBD>LCBD,max, UE assumes no new candidate beams found. Similar clarification in RLM is needed that UE should assume no new candidate beam found only for this evaluation period. UE shall keep measurement on the configured CBD-RS until the beamFailureRecoveryTimer expires.

3.There are some typos need to be fixed.

**Decision: Merged.**

**R4-2015818 Open issues on beam management for NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the open issues on BM for NR-U.

Proposal 1: Introduce new clause 9.5A in TS38.133 for L1-RSRP reporting under CCA.

Proposal 2: RAN4 should wait for LS response from RAN1 on the UE behavior when UE cannot transmit HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting. Once RAN4 receives the LS response from RAN1, RAN4 should restart the discussion and capture the UE behavior in TS38.133 if necessary.

**Decision: Noted.**

**R4-2015819 CR: Beam management requirements with CCA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1332 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Clarification of applicability of link recovery requirements with CCA

Clean up of link recovery requirements.

Restrucuring the spec structure of L1-RSRP reporting with CCA

**Decision: Revised to R4-2017087 (from R4-2015819).**

**R4-2017087 CR: Beam management requirements with CCA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1332 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Clarification of applicability of link recovery requirements with CCA

Clean up of link recovery requirements.

Restrucuring the spec structure of L1-RSRP reporting with CCA

**Decision: Return to.**

##### 7.1.6.10 Measurement requirements [NR\_unlic-Core]

**R4-2014012 Remaining issues in intra and inter-frequency measurements**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Abstract:**

Proposal 1: Confirm the definition that a reference cell is available at the UE provided at least one SSB is available at the UE during the last 160 ms; otherwise it is unavailable at the UE.

Proposal 2: The RSSI measurement bandwidth shall be the LBT bandwidth.

Proposal 3: If UE cannot transmit HARQ-ACK on MAC-CE deactivation due to UL CCA failure, UE continues to be in its previous state, i.e., it should measure and report L1-RSRP until it successfully transmits HARQ-ACK.

**Decision: Noted.**

**R4-2014869 Discussion on measurement requirements for NR-U**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: For the UEs which supporting NR-U SCell but not NR-U PCell/PSCell, the requirements of NR intra-/inter- frequency measurements with CCA are not applicable if the measurement target NR-U cells are asynchronized to the UE’s NR PCell/PSCell.

Proposal 2: Add an optional UE capability for supporting SFTD measurement for NR neighbor cell in unlicensed band.

Proposal 3: CSSF outside gaps (CSSFoutside\_gap,i ) should be additionally increased if one MO configured both for RSSI measurement with gap and SSB-based measurement gap.

Proposal 4: CSSF within measurement gaps (CSSFwithin\_gap,i ) needs also to be adapted to account for inter-frequency RSSI/CO measurements and intra-frequency RSSI/CO measurements with gaps.

Proposal 5: Regarding the CSSF within measurement gaps (CSSFwithin\_gap,i ), a MO should be counted twice, if the MO with both SSB based measurerment and RSSI/CO measurement which are candidates to be measured in gap j where the measurement object i is also a candidate

Proposal 6: It is not necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC.

Proposal 7: Add clarification for UL scheduling restriction as “The UE is not expected to transmit PUCCH/PUSCH/SRS on the UL symbols which are overlapping in time with the RSSI measurement symbols configured by RMTC”.

**Decision: Noted.**

**R4-2014870 CR on intra-frequency and inter-frequency measurement with CCA and RSSI measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1211 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

This CR includes 3 parts:

(change #1) Carrier-specific scaling factor for RSSI measurements need to be defined.

(change #2 &#4) For the UEs which supporting NR-U SCell (Scenario A) but not NR-U PCell/PSCell (Scenario B, C), the requirement should not applicable when the measurement target NR-U cells are asynchronized to NR PCell/PSCell.

(change #3) Regarding the UL scheduling restriction due to RSSI measurement, it needs to clarify the exact UL symbols that UE is not expected to transmit. As illustrated below, there would be 2 UL symbols will be impacted by the RSSI symbols.

**Decision: Postponed.**

**R4-2015205 CR to 38.133 on NR-U intra-frequency measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1247 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Remove editor notes related to scheduling restriction during RSSI and channel occupancy measurements in NR-U

**Decision: Merged.**

**R4-2015387 Remaining aspects in measurement requirements in NR-U**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discusses remaining aspects in measurement requirements in NR-U.

Proposal 1: For cell detection, UE is required to monitor at least the same number of candidate SSB positions as in other RRM measurements.

Observation 3: In intra-frequency RSSI measurements, the UE performs the measurement using the numerology of the active DL bandwidth part.

Proposal 2: For RSSI measurements, it is not necessary to extend the scheduling restriction for 1 data symbol before the RMTC, and for 1 data symbol after the RMTC.

**Decision: Noted.**

**R4-2015521 CR on intra-frequency measurement requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1291 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

There is an editor’s note about whether to intorduce additional 1 symbol before and after RMTC.Based on analysis in our accompanied paper, there is no need to introduce additional 1 symbol before and after RMTC.

There is a typo need to be fixed.

**Decision: Return to.**

**R4-2015522 Discussion on measurement requirements for NR-U**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: In FR1 inter-band CA, the scheduling restriction due to one CC shall not apply to other CCs on the other bands.

Proposal 2: It is suggested not to include the scheduling restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC

**Decision: Noted.**

**R4-2016419 Measurementequirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1390 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In R4-1915777 (RAN4#93), it was agreed that Rel-15 accuracy apply for RSRP/RSRQ/SINR/L1-RSRP measurements in NR-U.

**Decision: Revised to R4-2017305 (from R4-2016419).**

**R4-2017305 Measurement requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1390 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In R4-1915777 (RAN4#93), it was agreed that Rel-15 accuracy apply for RSRP/RSRQ/SINR/L1-RSRP measurements in NR-U.

**Decision: Return to.**

**R4-2016564 Remaining issues on measurement requirements in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this paper, we discuss the remaining issues on measurement requirements in NR-U.

Proposal 1. For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.

Proposal 2. In FR1 inter-band CA, the scheduling restriction due to one CC shall not apply to other CCs on the other bands.

Proposal 3. At least from MAC (RAN2) layer perspective, UE follows the actions related to MAC-CE activation/deactivation command immediately after decoding the MAC-CE command regardless of whether UE is able to send HARQ-ACK feedback or not.

Proposal 4a. It is necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC.

Proposal 4b. It is not necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC if the reference timing for intra-frequency RSSI/CO measurements in unlicensed spectrum is based on UE serving cell’s timing.

**Decision: Noted.**

##### 7.1.6.11 Measurement capability and reporting criteria [NR\_unlic-Core]

**R4-2014283 On measurement capability of NR-U**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Apple*

**Abstract:**

Observation: for a certain SSB index which has only one single candidate SSB position in the SSB burst, UE cannot monitor 2 candidate SSB position for this SSB in one SSB burst.

Proposal 1: Except cell detection, RRM core requirements are defined under assumption what UE monitors the first 2 successive QCL’ed candidate SSB positions (i.e. N1 = N2 = 2). For a certain SSB index which has only one single candidate SSB position in the SSB burst, UE monitors 1 candidate SSB position for this SSB in one SSB burst.

Proposal 2: For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.

**Decision: Noted.**

**R4-2015523 CR on CSSF RSSI/CO measurement for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1292 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The CSSF for RSSI/CO measurement on a carrier frequency with CCA is missing. The CSSF for intra-frequency RSSI/CO measurement without gap when SMTC and RMTC are overlapping shall be considered. The CSSF for measurement within gap shall be consiered for RSSI/CO measurement with measurement gaps.

It should be noticed that there are also changes on the CSSF part in other parallel discussions for other features. So the changes for NR-U is proposed based on our CR for CSI-RS measurement [

R4-2015491]. The changes for NR-U only is with the change mark of “Huawei-NR-U”

**Decision: Postponed.**

**R4-2016414 Clause numbering correction**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1387 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The clause numbering for two new NR-U clauses is according to the earlier agreed specification structure in R4-1914628, but is currently missing the corresonding necessary top-level and preceding clauses in TS 38.133. Namely: we have 9.1A.3.2 and 9.1A.3.2a but there are no top-level clauses for them, e.g., 9.1A.3 or even 9.1A and we have no 9.1A.3.1 either. Introducing these missing top-level sections (approach 1) is not optimal and will result in a lot of redundancy, therefore we propose (approach 2) to just change to 9.1.3A.1 and 9.1.3A.1A and introduce 9.1.3A.

**Decision: Agreed.**

##### 7.1.6.12 Timing [NR\_unlic-Core]

**R4-2014014 Definition of an available reference cell**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Abstract:**

Proposal 1: Confirm the definition that a reference cell is available at the UE provided at least one SSB is available at the UE during the last 160 ms; otherwise it is unavailable at the UE.

**Decision: Noted.**

**R4-2015204 CR to 38.133 - Clarification of NR-U timing requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1246 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Clarify the definition of an available timing reference cell in NR-U

**Decision: Merged.**

**R4-2015388 On NR-U Timing requirements**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discusses the clarification of the definition of an available timing reference cell in carrier frequencies with CCA.

Proposal 1: For NR-U, as in NR, a reference cell is available at the UE provided at least one SSB is available at the UE during the last 160 ms; otherwise it is unavailable at the UE.

Proposal 2: Clarify in the specification the definition of an available reference timing cell in carrier frequencies with CCA.

Proposal 3: If the proposed clarification is agreed, remove the Editor Note in clause 7.1.2 in TS 38.133.

**Decision: Noted.**

**R4-2015524 Discussion on Timing requirements for NR-U**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: The available reference cell shall be defined based on the same conclusion for RLM/RRM.

**Decision: Noted.**

**R4-2016177 Correction to timing requirements in NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Ericsson*

**Abstract:**

To clarify gradual timing adjustment also applied to CCA

**Decision: Revised to R4-2017088 (from R4-2016177).**

**R4-2017088 Correction to timing requirements in NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-TBA Cat: F (Rel-16)  
 Source: Ericsson*

**Abstract:**

To clarify gradual timing adjustment also applied to CCA

**Decision: Return to.**

**R4-2016563 Definition of Available Reference Cell for Timing Requirements in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this paper, we discuss remaining open issues for Timing requirements in NR-U.

Proposal 1. The availability/unavailability of a reference cell for timing purposes should be treated similar to the availability/unavailability of ‘X’s as in other RRM/RLM cases.

**Decision: Noted.**

##### 7.1.6.13 Other requirements [NR\_unlic-Core]

**R4-2015170 Updates to general section for NR-U in 38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1241 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

NR-U bands not included for band grouping table

**Decision: Agreed.**

#### 7.1.7 RRM perf. requirements (38.133) [NR\_unlic-Perf]

================================================================================

**Email discussion: [97e][206] NR\_unlic\_RRM\_2**

**R4-2017005 Email discussion summary for [97e][206] NR\_unlic\_RRM\_2***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017276 (from R4-2017005).**

**R4-2017276 Email discussion summary for [97e][206] NR\_unlic\_RRM\_2***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 03, 2020)

Sub-topic 1-1: Measurement accuracy

* Issue 1-1-1: RSSI Measurement Bandwidth
  + Option 1: The RSSI measurement shall be performed over unified measurement BW.
    - (Huawei, HiSilicon, R4-2015526):
  + Option 2: The RSSI measurement bandwidth shall be the LBT bandwidth.
    - (Nokia, Nokia Shanghai Bell, R4-2015391, ZTE Corp, R4-2014012):
  + Option 3 There is no need to specify RSSI measurement bandwidth for the UE.
    - (Qualcomm, R4-2016566)

Discussion:

MTK: Option 3

Apple: Option 2. Follow RAN1 spec definition

Nokia: Need to follow RAN1 spec. Measurement should not be scaled. There should be same understanding between UEs and gNB

E///: Agree with Option 2.

QC: the only requirement on the UE side is measurement accuracy. No need to repeat it once again in RAN4.

ZTE: Option 2.

QC: UE may not be required to do normalization

Nokia: we have the requirement not to do normalization in the frequency and linear average applies for different OFDM symbols

ZTE: there may be non-uniform RSSI for different LBT CBWs. In this case UE cannot do wideband averaging. UE should do wideband measurement.

Agreement: RSSI Measurement Bandwidth is the bandwidth defined in TS 38.215 RSSI measurement definition (i.e. “the measurement bandwidth corresponding to the channel bandwidth defined in Clause 4 of TS 37.213 [17]”)

* Issue 1-1-2: RSSI Measurement Accuracy
  + Option 1: The RSSI measurement accuracy requirements shall follow the same requirements as for LAA
    - (Nokia, Nokia Shanghai Bell, R4-2015391): Define RSSI measurement accuracy requirements in NR-U to be the same as in LTE-LAA.
    - (Huawei, HiSilicon, R4-2015526): The RSSI measurement accuracy requirements shall follow the same requirements for LAA.
    - (Qualcomm, R4-2016566): The RSSI measurement accuracy requirements for NR-U are the same as for CLI-RSSI as specified in Section 10.1.22.2 in TS 38.133 (and for RSSI measurements in Section 9.1.18.5 in TS 36.133)

Agreement: Define RSSI measurement accuracy requirements in NR-U to be the same as in LTE-LAA.

Sub-topic 3-1 (Specification Structure)

* Issue 3-1-1: Specification Structure for test cases
  + Option 1 (Ericsson, R4-2016415) Create in TS 38.133 the following new top-level sections for NR-test cases:
    - A.9 NR standalone tests with SCell under CCA and PCell in FR1
    - A.10 EN-DC tests with NR PSCell under CCA
    - A.11 NR-U standalone tests with NR PCell under CCA (note: including also NR/E-UTRA measurements and including re-selection in IDLE and HO from NR-U to NR-U/NR/E-UTRA cells and from NR-U/NR to NR-U cells)
    - A.12 E-UTRA standalone tests with NR-U cells
      * Inter-RAT E-UTRA–NR-U cell re-selection with NR-U target cell
      * Inter-RAT E-UTRA–NR-U HO with NR-U target cell
      * Inter-RAT E-UTRA–NR-U measurements
      * Inter-RAT SFTD with NR-U neighbor cell
  + Option 2 (Nokia, R4-2015391) Adopt in NR-U RRM test cases, the same specification structure as in the NR-U Core requirements: include the NR-U RRM test cases immediately below the corresponding NR RRM test cases and add the suffix A to the clause number. Capture the test cases related to requirements in TS 36.133 in the same specification.

Discussion:

MTK: Both options have pros/cons. For Option 1 we need to clearly list the corresponding Core part section to avoid ambiguity.

Nokia: We are ok with Option 1 as well. Is the intention to capture all in 38.133?

E///: our preference is to keep all test cases in 38.133

MTK: agree with E/// to capture test cases in 38.133 similar to what we did in Rel-15

Nokia: fine

Agreement:

* + Create in TS 38.133 the following new top-level sections for NR-test cases:
    - A.9 NR standalone tests with SCell under CCA and PCell in FR1
    - A.10 EN-DC tests with NR PSCell under CCA
    - A.11 NR-U standalone tests with NR PCell under CCA (note: including also NR/E-UTRA measurements and including re-selection in IDLE and HO from NR-U to NR-U/NR/E-UTRA cells and from NR-U/NR to NR-U cells)
    - A.12 E-UTRA standalone tests with NR-U cells
      * Inter-RAT E-UTRA–NR-U cell re-selection with NR-U target cell
      * Inter-RAT E-UTRA–NR-U HO with NR-U target cell
      * Inter-RAT E-UTRA–NR-U measurements
      * Inter-RAT SFTD with NR-U neighbor cell

Sub-topic 3-2 (RRM test scope and applicability rules)

* Issue 3-2-1: RRM tests scope – general principle to define a test case list
  + Proposal 1 (Nokia, Nokia Shanghai Bell, R4-2015391): RAN4 to define test cases for all core requirements that were changed or created during the NR-U RRM core work.

Discussion:

E///: Need to go case by case.

Nokia: our intention is not to exclude other test cases but define the requirements at least for these requirements

* Issue 3-2-2: RRM tests scope – legacy test cases for SA NR-U
  + Proposal 1 (Ericsson, R4-2016416): Legacy test cases are to be specified for SA NR-U, even if the requirements are the same as for legacy NR
    - This applies at least for UE not supporting legacy NR.
    - FFS: for UE supporting legacy NR and SA NR-U.

Discussion:

Nokia: the list of test cases is already huge even for the new requirements. Prefer to go case by case as well

QC: share same view as Nokia

* Issue 3-2-3: RRM tests scope – NR-U scenarios to be covered by NR-U test cases
  + Proposal 1 (Ericsson, R4;2016415): RAN4 will develop test cases for all scenarios applicable for a given requirement.

Discussion:

QC: same as for other issues it should be handled on a case by case basis

MTK: UE may not be required to pass test cases for multiple scenarios if they test the same behavior.

E///: share MTK view. Need to discuss applicability rules to avoid excessive testing.

Sub-topic 2-1: NR-U RRM test configurations

* Issue 2-2-1: Differentiation between FBE and LBE
  + Option 1: RAN4 to differentiate LBE and FBE DL LBT models in RRM tests. RAN4 to design different test cases covering LBE and FBE channel access.

Discussion:

QC: need to check if we can reuse the test cases for LBE and FBE.

MTK: we can have separate test cases. If UE supports both, then it can pass the LBE test cases only.

Nokia: agree with MTK that some applicability rules should apply.

E///: we suggest to look into test cases where such differentiation is needed

Agreement: Further identify the set of requirements for which LBE and FBE test cases shall be differentiated.

* Issue 2-2-2: DL LBT model for **LBE** operation
  + Option 1: For LBE test cases: RAN4 to adopt the following DL LBT model: 1) Define a probability of P=0.75 for the transmission of the DRS in the first candidate position. 2) In case of LBT failure for transmission in the first candidate position, define a probability of P = 0.75 for the transmission in the second candidate position for a given SSB index.

Discussion:

E///: Need further discussion on the probabilities.

QC: same view as E///

HW: have some concerns on the probabilities

Chair: strive to identify model parameters and candidate values.

* Issue 2-2-5: Exceeding Lmax values during RRM tests
  + Option 1: For RRM test cases for NR-U, exceeding Lmax should be avoided.

Discussion:

E///: Do not agree. We may need to test such behavior for some of the test cases

MTK: we are fine to have a few test cases to test such behavior.

Nokia: same concern as E///.

Apple: agree with MTK

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017089 | WF on NR-U RRM Performance requirements | Nokia, Nokia Shanghai Bell |
| R4-2017090 | LS on clarification of RSSI measurement bandwidth | Huawei |

**Topic #1: Measurement Accuracy**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2016418 | Revised |
| R4-2015525 | Return to |
|  |  |

**Topic #2: NR-U RRM test configurations**

Issue 2-1-1: Whether to test wideband operation in RRM tests

Agreement

* DL wideband operation Mode 1 is used during RRM tests for NR-U.

Issue 2-2-7: UL LBT model

Agreement

* RAN4 to discuss a methodology to test UL LBT failures in RRM tests.

Issue 2-3-1: Frequency range

Agreement

* NR cells in NR-U test cases (e.g., for HO or in scenario A or for measurements) are always in FR1.

**Topic #3: NR-U RRM test cases**

Issue 3-1-2: Specification structure for common Configuration Parameters

Agreement

* Develop new sections for common test parameters in NR-U RRM test cases according to the table.

|  |  |
| --- | --- |
| **New section** | **Title** |
| A.3.1.\* | … under CCA |
| A.3.2.3 | Generic OFDMA Channel Noise Generator (OCNG) under CCA |
| A.3.7B | EN-DC test setup with PSCell under CCA |
| A..3.8.4 | PRACH configuration under CCA |
| A.3.10A | SSB configurations under CCA |
| A.3.16A | TCI state configurations under CCA |
| A.3.19 | Discovery Burst Transmission Window configuration under CCA |
| A.3.20 | Signal transmission model under CCA |
| NOTE: “\*” denotes different relevant sub sections | |

Issue 3-2-4: Applicability rules

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2016417 | Revised |
|  |  |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2017089 WF on NR-U RRM Performance requirements**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017090 LS on clarification of RSSI measurement bandwidth**

*Type: LS out For: Approval  
To: RAN1  
Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.1.7.1 General [NR\_unlic-Perf]

**R4-2014871 Discussion on general test setting for NR-U test cases**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: For RRM test cases for NR-U, exceeding Lmax should be avoided.

Proposal 2: For the cell-reselection test cases, Mp consecutive DRX cycles with LBT failures of the serving cell should be avoided.

Proposal 3: For test cases with DRX in use, the LBT can be modelled as either all SMTCs are with available SSBs or all SMTCs are with no SSBs available during one DRX cycle.

Proposal 4: It is assumed DL wideband operation Mode 1 is used during RRM tests for NR-U.

**Decision: Noted.**

**R4-2015391 On NR-U RRM performance**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discusses general topics in NR-U RRM performance.

Proposal 1: RAN4 to differentiate LBE and FBE DL LBT models.

Proposal 2: For LBE test cases: RAN4 to adopt the following DL LBT model: 1) Define a probability of P=0.75 for the transmission of the DRS in the first candidate position. 2) In case of LBT failure for transmission in the first candidate position, define a probability of P = 0.75 for the transmission in the second candidate position for a given SSB index.

Proposal 3: For FBE test cases: RAN4 to define a DL LBT model that considers a probability of P = 0.75 for the transmission of each DRS. Only the first SSB candidate position for a given SSB index shall be considered in these tests.

Proposal 4: RAN4 to discuss a methodology to test UL LBT failures in RRM tests.

Proposal 5: The RSSI measurement bandwidth is the LBT bandwidth.

Proposal 6: Define RSSI measurement accuracy requirements in NR-U to be the same as in LTE-LAA.

**Decision: Noted.**

**R4-2015525 CR on RSSI and CO performance requirements for NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The RSSI measurement report mapping and accuracy requirements are missing.

**Decision: Return to.**

**R4-2015526 Discussion on performance requirements for RSSI measurement for NR-U**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: The RSSI measurement shall be performed over unified measurement BW.

Proposal 2: The RSSI measurement accuracy requirements shall follow the same requirements for LAA.

**Decision: Noted.**

**R4-2016415 General discussion on NR-U RRM test cases**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

General discussion on NR-U RRM test cases.

Proposal 1: The work on NR-U RRM test cases is divided into at least two phases.

Proposal 2: RAN4 will develop test cases for all scenarios applicable for a given requirement.

Proposal 3: RAN4 will discuss applicability rules when test cases have sufficiently progressed, e.g.:

o FFS: for a UE capable of multiple scenarios, the UE shall pass the test to verify the same requirements on the same type of cell (e.g. UE timing accuracy) in only one scenario.

**Decision: Noted.**

**R4-2016418 Measurement accuracy requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1389 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In R4-1915777 (RAN4#93), it was agreed that Rel-15 accuracy apply for RSRP/RSRQ/SINR/L1-RSRP measurements in NR-U, but the requirements are currently missing for the NR-U bands.

**Decision: Revised to R4-2017091 (from R4-2016418).**

**R4-2017091 Measurement accuracy requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1389 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In R4-1915777 (RAN4#93), it was agreed that Rel-15 accuracy apply for RSRP/RSRQ/SINR/L1-RSRP measurements in NR-U, but the requirements are currently missing for the NR-U bands.

Chair: Big CR approach will be used for NR-U RRM Performance part. Draft CRs shall be used instead of CRs. CR can be endorsed if agreeable.

**Decision: Return to.**

**R4-2016566 RSSI Measurement Accuracy Requirements in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this paper, we discuss the RSSI measurement accuracy requirements in NR-U.

Proposal 1. There is no need to specify RSSI measurement bandwidth for the UE.

Proposal 2. The RSSI measurement accuracy requirements for NR-U are the same as for CLI-RSSI as specified in Section 10.1.22.2 in TS 38.133 (and for RSSI measurements in Section 9.1.18.5 in TS 36.133)

**Decision: Noted.**

##### 7.1.7.2 Test cases [NR\_unlic-Perf]

**R4-2014872 Discussion on RRM test cases in NR-U**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: Regarding cell reselection and handover, new TCs are not needed if the target cell is not in CCA.

Proposal 2: Regarding random access, new dedicated TCs are not necessary.

Proposal 3: Regarding interruption, new TCs are not necessary except for the scenario would have multiple interruption windows, e.g. SCell activation/deactivation and PCell addition/release.

Proposal 4: Regarding active BWP switch delay, new TCs are not necessary, but new TCs are needed for BWP switch delay on consistent UL LBT recovery.

Proposal 5: Regarding RSSI, FFS the TCs when CSSF for RSSI is concluded.

Proposal 6: Regarding measurements procedure and accuracy requirements, new TCs are not needed if the target MO is not in CCA.

Proposal 7: Regarding SS-RSRQ/SS-SINR, the new TCs are not necessary. The UE behavior in CCA can be covered by the tests for SS-RSRP with CCA.

Proposal 8: Regarding UE timing, the new TCs are not necessary for MRTD, MTTD, TA.

Proposal 9: For the RRM test cases for UE transmit timing based on a reference cell on a carrier frequency subject to CCA, a configuration of activated Scell shall be provided with the same timing as the reference cell. As the test requirement, UE transmit timing offset should stay within NTA + NTA\_offset) ×Tc ± Te of the first detected path of DL SS or UE shall not transmit any uplink signal.

**Decision: Noted.**

**R4-2015390 On NR-U RRM test cases**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Presents a list of test cases to be considered in the NR-U performance work.

Proposal 1: Adopt in NR-U RRM test cases, the same specification structure as in the NR-U Core requirements: include the NR-U RRM test cases immediately below the corresponding NR RRM test cases and add the suffix A to the clause number.

Proposal 2: RAN4 to design different test cases covering LBE and FBE channel access.

Proposal 3: To minimize the number of test cases to be performed by UEs that support both LBE and FBE, for each requirement, the test equipment should select with equal probability the mode to be used in this test cases (FBE or LBE).

Proposal 4: RAN4 to define test cases for all core requirements that were changed or created during the NR-U RRM core work.

Proposal 5: RAN4 to consider the tests defined in Table 1 as a baseline for the NR-U RRM test cases definition in Rel-16.

Proposal 6: RAN4 to discuss the needed test cases for measurement performance requirements after detailing how to capture the performance requirements in the specification.

Proposal 7: RAN4 to consider the tests for 36.133 defined in Table 2 as a baseline for the NR-U RRM test cases definition in Rel-16.

**Decision: Noted.**

**R4-2016416 NR-U RRM test case list and time plan**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

NR-U RRM test case list and time plan.

Proposal 1: RAN4 develops NR-U test cases, based on the test case list in Table 1.

Proposal 2: Legacy test cases are to be specified for SA NR-U, even if the requirements are the same as for legacy NR

o This applies at least for UE not supporting legacy NR.

o FFS: for UE supporting legacy NR and SA NR-U.

Proposal 3: Time plan for developing NR-U test cases:

o RAN4#97-e (Nov 2020):

Agree on high-level list for test cases, work split, and specification structure

o RAN4#98-e (Jan 2021):

Discuss and agree on basic common configurations and configuration details at least for Phase I test cases

RAN4#98-bis-e (April 2021):Provide first drafts for Phase I test cases

Agree on common configurations and configuration details for Phase II test cases

o RAN4#99-e (May 2021):

Provide final CRs for Phase I test cases.

Provide first drafts for Phase II test cases.

o RAN4#100(August 2021):

Provide final CRs for Phase II test cases.

**Decision: Noted.**

**R4-2016417 NR-U test cases structure**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1388 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

There are no test cases for NR-U which RAN4 plans to develop, the specification structure needs to be agreed for NR-U test cases

**Decision: Revised to R4-2017092 (from R4-2016417).**

**R4-2017092 NR-U test cases structure**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1388 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

There are no test cases for NR-U which RAN4 plans to develop, the specification structure needs to be agreed for NR-U test cases

Chair: Big CR approach will be used for NR-U RRM Performance part. Draft CRs shall be used instead of CRs. CR can be endorsed if agreeable.

**Decision: Return to.**

**R4-2016567 NR-U RRM Performance Work Plan and Work Split**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this paper, we discuss the work plan and work split for RRM performance requirements for NR-U.

**Decision: Return to.**

### 7.2 NR mobility enhancement [NR\_Mob\_enh]

================================================================================

**Email discussion: [97e][207] NR\_Mob\_enh\_RRM**

**R4-2017006 Email discussion summary for [97e][207] NR\_Mob\_enh\_RRM***Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017277 (from R4-2017006).**

**R4-2017277 Email discussion summary for [97e][207] NR\_Mob\_enh\_RRM***Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017093 | WF on NR mobility enhancement | Apple |
|  |  |  |

**Topic #1: Core requirements maintenance**

Issue 1-2: NRX-TX and NTX-RX values in Note 2 and 3 in table of sync condition

Agreement

* RAN4 is to change NRX-TX and NTX-RX to 25600 Tc in notes 2 and 3 in table of sync condition.

Issue 1-4: Tprocessing in conditional PSCell change

Agreement

* RAN4 is to specify Tprocessing as follows: Tprocessing = 20 ms when source and target cells are in the same FR, and Tprocessing = 40 ms when source and target cells are in different FRs.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014358 | Revised |
| R4-2015168 | Revised |
| R4-2015464 | Return to |
| R4-2016016 | Agreed |
|  |  |

**Topic #2: Performance part**

Issue 2-1: Test applicability for DAPS handover

Agreement

* RAN4 to further split test applicability for DAPS handover to cover intra-frequency, intra-band inter-frequency and inter-band inter-frequency respectively
  + To verify intra-frequency DAPS handover requirements
    - The UE capable of intra-frequency asynchronous DAPS handover on any band needs to be tested only in asynchronous scenario.
    - The UE not capable of intra-frequency asynchronous DAPS handover on any band but capable of synchronous DAPS handover on some band needs to be tested only in synchronous scenario.
  + To verify intra-band inter-frequency DAPS handover requirements
    - The UE capable of intra-band inter-frequency asynchronous DAPS handover on any band needs to be tested only in asynchronous scenario.
    - The UE not capable of intra-band inter-frequency asynchronous DAPS handover on any band but capable of intra-band inter-frequency synchronous DAPS handover on some band needs to be tested only in synchronous scenario.
  + To verify inter-band inter-frequency DAPS handover requirements
    - The UE capable of inter-band inter-frequency asynchronous DAPS handover on any band combination needs to be tested only in asynchronous scenario.
    - The UE not capable of inter-band inter-frequency asynchronous DAPS handover on any band combination but capable of inter-band inter-frequency synchronous DAPS handover on some band combination needs to be tested only in synchronous scenario.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014223 | Agreed |
| R4-2014580 | Revised |
| R4-2015169 | Revised |
| [R4-2015466](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015466.zip) | Revised |
| R4-2016555 | Revised |

2nd round email discussion conclusions

================================================================================

**R4-2017093 WF on NR mobility enhancement**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

#### 7.2.1 RRM core requirements maintenance (38.133) [NR\_Mob\_enh-Core]

**R4-2014357 Discussion on dual active protocol stack handover**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: For asynchronous intra-frequency DAPS handover and asynchronous intra-band inter-frequency DAPS handover, demodulation performance degradation might happen on any single symbol of the first 3 symbols of a slot. There is no UE requirement expected if MRTD is larger than 3 OFDM symbol length.

**Decision: Noted.**

**R4-2014358 CR on TS38.133 for dual active protocol stack handover**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1155 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

For asynchronous intra-frequency DAPS handover and asynchronous intra-band inter-frequency DAPS handover, demodulation performance degradation might happen on any single symbol of a slot

**Decision: Revised to R4-2017094 (from R4-2014358).**

**R4-2017094 CR on TS38.133 for dual active protocol stack handover**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1155 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

For asynchronous intra-frequency DAPS handover and asynchronous intra-band inter-frequency DAPS handover, demodulation performance degradation might happen on any single symbol of a slot

**Decision: Return to.**

**R4-2015167 AGC operation in async intra-frequency DAPS HO**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper we discuss issue 1-1 from [1].

• Issue 1-1: demodulation performance degradation for async intra-frequency DAPS handover and async intra-band inter-frequency DAPS handover

How to capture the performance degradation for asynchronous cases ne

Proposal 1: During async intra-frequency DAPS handover and async intra-band inter-frequency DAPS handover, interruptions may occur depending on UE implementation. The duration and frequency of occurrence of such interruptions is not specified

**Decision: Noted.**

**R4-2015168 Corrections to DAPS requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1239 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Editor’s note in specification needs to be addressed

Editor note: how to capture the performance degradation for asynchronous cases needs to be further studied

Typo exists in definition of sync condition for DAPS HO in FR1.

It is stated that

Note 2:For DAPS handover on a TDD band, a UE is not expected to transmit in the uplink earlier than NRX-TX after the end of the last received downlink symbol in the same cell where NRX-TX=26500Tc.

Note 3:For DAPS handover on a TDD band, a UE is not expected to receive in the downlink earlier than NTX-RX after the end of the last transmitted uplink symbol in the same cell where NTX-RX=26500Tc.

Taking these notes along with NTA,offset = 25600 Tc it is not possible to simultaneously have NRX-TX≥26500 and NTX-RX≥26500 regardless of NTA

The correct values of NRX-TX and NTX-RX should be aligned with those in 38.211

Table 4.3.2-3: Transition time and

Transition time

FR1

FR2

25600

13792

25600

13792

Thee value 26500Tc is a typo with swapped digits, and should be 25600Tc

**Decision: Revised to R4-2017095 (from R4-2015168).**

**R4-2017095 Corrections to DAPS requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1239 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

**Decision: Return to.**

**R4-2015464 CR on maintaining DAPS handover requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1272 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For FR1 DAPS hadover, the synchronous conditions are defined with adding 3 notes. In current specification, Notes 2/3 clairfies to leave enough time for UE performing DL-to-UL and UL-to-DL switching only from single cell perspective. However, the UE shall be allowed to switching time between both source cell and target cell.

**Decision: Return to.**

**R4-2016016 CR 38.133 Corrections to Conditional PSCell Change delay requirement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1346 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The delay requirement for Conditional PSCell Change does not distinguish between whether source and target PSCells are in same or different FRs. For PSCell change (clause 8.11), the following SW-related processing times are specified:

-Tprocessing = 20 ms when source and target cells are in the same FR,

-Tprocessing = 40 ms when source and target cells are in different FRs.

The purpose of this CR is to correct the misalignment.

**Decision: Agreed.**

#### 7.2.2 RRM perf. requirements (38.133) [NR\_Mob\_enh-Perf]

##### 7.2.2.1 General [NR\_Mob\_enh-Perf]

**R4-2014222 Discussion on DAPS HO test applicability**

*Type: discussion For: Discussion  
 Source: Apple*

**Abstract:**

Proposal 1: RAN4 to further split test applicability for DAPS handover to cover intra-frequency, intra-band inter-frequency and inter-band inter-frequency respectively.

Proposal 2: update the test applicability for DAPS handover.

**Decision: Noted.**

**R4-2014223 CR for DAPS HO test applicability**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1138 Cat: F (Rel-16)  
  
 Source: Apple*

**Abstract:**

RAN4 agreed to introduce many test cases to verify DAPS handover RRM requirements. The agreed test coverage covers intra-frequency, intra-band inter-frequency and inter-band inter-frequency. Both synchronous and asynchronous delployment are to be tested as well. To save testing time RAN4 aslo agreed to introduce corresponding test applicability to allow UE to skip some of the test cases.

**Decision: Agreed.**

##### 7.2.2.2 Test cases [NR\_Mob\_enh-Perf]

**R4-2014580 Intra-band Inter-frequency sync DAPS handover test in SA for FR1**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1187 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Intra-band inter-frequency sync DAPS handover test in SA for FR1 is missing.

**Decision: Revised to R4-2017096 (from R4-2014580).**

**R4-2017096 Intra-band Inter-frequency sync DAPS handover test in SA for FR1**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1187 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Intra-band inter-frequency sync DAPS handover test in SA for FR1 is missing.

**Decision: Return to.**

**R4-2015169 Conditional handover test cases for NR**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1240 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In RAN4#95e it was agreed to introduce the testcases for CHO:

7

Conditional intrafrequency handover test in SA for FR1

8

Conditional interfrequency handover test in SA for FR1

11

Conditional intrafrequency handover test in SA for FR2

12

Conditional interfrequency handover test in SA for FR2

**Decision: Revised to R4-2017097 (from R4-2015169).**

**R4-2017097 Conditional handover test cases for NR**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1240 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

**Decision: Return to.**

**R4-2015465 Discussion on DAPS handover test cases**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015466 DraftCR on inter-band DAPS handover tests**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

According to the agreements in WF [R4-2008585], four types of inter-band DAPS handover tests need to be introduced.

**Decision: Revised to R4-2017098 (from R4-2015466).**

**R4-2017098 CR on inter-band DAPS handover tests** *Type: CR For: Agreement  
 38.133 v16.5.0 CR-TBA Cat: B (Rel-16)  
 Source: Huawei, HiSilicon*

**Abstract:**

According to the agreements in WF [R4-2008585], four types of inter-band DAPS handover tests need to be introduced.

Chair: Draft CR was revised to CR. Please request the CR number.

**Decision: Return to.**

**R4-2016555 Introduction of intra-frequency sync and async DAPS HO test cases in FR1**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1393 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Per work split agreement in RAN4#95-e, intra-frequency sync and async DAPS HO test cases in FR1 are introduced in this CR. Per agreements in RAN4#96-e, the tests consist of 5 intervals and the last interval is used to verify the CSI reporting to source cell is stopped.

**Decision: Revised to R4-2017099 (from R4-2016555).**

**R4-2017099 Introduction of intra-frequency sync and async DAPS HO test cases in FR1**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1393 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Per work split agreement in RAN4#95-e, intra-frequency sync and async DAPS HO test cases in FR1 are introduced in this CR. Per agreements in RAN4#96-e, the tests consist of 5 intervals and the last interval is used to verify the CSI reporting to source cell is stopped.

**Decision: Return to.**

### 7.3 5G V2X with NR sidelink [5G\_V2X\_NRSL]

#### 7.3.5 RRM core requirements maintenance (38.133) [5G\_V2X\_NRSL-Core]

================================================================================

**Email discussion: [97e][208] 5G\_V2X\_NRSL\_RRM**

**R4-2017007 Email discussion summary for [97e][208] 5G\_V2X\_NRSL\_RRM***Type: other For: Information  
Source: Moderator (LG Electronics)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017278 (from R4-2017007).**

**R4-2017278 Email discussion summary for [97e][208] 5G\_V2X\_NRSL\_RRM***Type: other For: Information  
Source: Moderator (LG Electronics)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 04, 2020)

Topic #1: Interruption requirements

* 1-1: Interruption to WAN for switching between LTE SL and NR SL
  + Option 1: Define the interruption requirement with following table (LGE, QC, Xiaomi, MTK)

|  |  |  |
| --- | --- | --- |
|  | Slot length (ms) | Interruption length (slot) |
| 0 | 1 | 2 |
| 1 | 0.5 | 2 |
| 2 | 0.25 | 2 |
| 3 | 0.125 | 3 |

* + Option 2: No interruptions (Huawei)

Discussion:

HW: no technical reasons to have interruptions. The PLL is not shared.

QC: The PLL is not shared but some buffers and circuits may be affected. Also it is needed for future proof.

MTK: Do not agree with HW. For NR-U there are interruptions and same principles can apply for V2X.

HW: NR-U is different from V2X. In Rel-16 bands there is no need for interruptions.

LGE: we already specified some interruptions for inter-band CA and same principles should apply

HW: switching between LTE SL and NR SL can be frequent and there may be big impact on Uu performance.

QC: Interruptions exist due to shared components in RFFE. Switching between LTE SL and NR SL may not be very frequent.

MTK: the switching will not be frequent

Xiaomi: Option 1

HW: do not understand how shared buffer have impact. To Xiaomi – the oscillator is shared but it does not need interruption due to SL switching.

HW: Object to Option 1.

* 1-2: Whether to define interruption requirement on LTE SL due to NR SL sync source is changed.
  + Option 1: Not Define in Rel-16 (LGE, Xiaomi)
  + Option 2: Define the interruption to LTE SL due to NR SL sync. source change in TS38.133 (QC, MTK)
    - ~~For only NR V2X sidelink capable UE~~ For NR V2X UE not supporting gNB/eNB as synchronization reference source, UE is allowed to drop E-UTRA V2X SL transmission or reception, and NR V2X SL transmission or reception for up to 1ms when synchronization source is changed:
    - For NR V2X UE supporting gNB/eNB as synchronization reference source, UE is allowed to drop E-UTRA V2X SL transmission or reception, and NR V2X SL transmission or reception for up to 1ms when synchronization source is changed:
  + Option 3: Discuss this issue later after hearing from RAN1. (ZTE)
    - For this, send LS to RAN1 to ask about the specific UE behavior when sync source is changed for NR SL, at least to trigger the discussion there and help to form common understanding in RAN4

Discussion:

QC: in email discussion ZTE mentioned that they are fine not to send LS.

MTK: Option 2. LTE SL needs to adjust its timing in case NR SL sync source changes. Based on RAN1 agreement LTE SL timing shall follow NR SL timing.

LGE: We have different understanding. NR SL is aligned with LTE SL subframe boundary. The RAN1 specs does not force LTE SL to follow NR SL timing.

Xiaomi: Same view as LGE. We don’t need to define the interruption on LTE SL since it is broadcast.

QC: LTE SL and NR SL subframe boundaries are aligned. Whenever NR SL sync source changes both timings should be changed.

Xiaomi: if we introduce the requirement, how can we verify it?

MTK: we did not have a test case in LTE as well. So it is not a problem.

LGE: Our interpretation is that NR SL timing shall follow LTE SL timing.

QC: the interruption will be there disregards whether NR follow LTE or LTE follows NR. Prefer to keep this in RAN4.

LGE: need time to check.

Chair: Continue the discussion. Further clarify correct UE behavior in terms of TX timing.

Topic #3: Test Cases

* Issue 3-4-1: Test Set-up when GNSS is configured as the highest priority
  + Option 1: 3 SyncRef UEs (**ZTE, Huawei**)
* SyncRef UE1 (sync to gNB directly), SyncRef UE2 (sync to GNSS in-directly) and SyncRef UE3 (sync to GNSS directly).
  + Option 2: 2 SyncRef UEs (**LGE, QC, Xiaomi**)
* SyncRef UE1 (sync to GNSS in-directly) and SyncRef UE2 (sync to GNSS directly).

Discussion:

QC: functionally these are quite similar. 1 pair is enough.

HW: two types of test cases with gNB and GNSS configured as the highest priority. For GNSS with the highest priority case it is important to ensure that UE does not select SyncRefUE synchronized to gNB.

ZTE: Agree with Huawei.

LGE: Option 2.

Chair: Continue discussion. In case of no impact on UE implementation can the Option 1 be considered as a compromise?

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017100 | WF on NR V2X RRM requirements | LG Electronics |
| R4-2017105 | Draft Big CR: Introduction of Rel-16 NR V2X RRM performance requirements | LG Electronics |

**Topic #1: Interruption requirements**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014635 | Return to |
| R4-2014295 | Revised |

**Topic #2: Measurement accuracy and side condition**

Absolute accuracy of L1 SL-RSRP measurement

Agreement

* Define ±4.5dB as absolute measurement accuracy of L1 SL-RSRP at SNR=0dB when measured at UE antenna connector.

NR V2X operating bands

Agreement

* Introduce NR\_TDD\_FR1\_B for n38 and NR\_TDD\_FR1\_J for n47 for NR V2X operating bands.

Minimum NR V2X RPs related to side condition (Annex.B)

Agreement

* Define minimum NR V2X RPs for different SCSs in Annex B.4 based on the following values.
  + For NR\_TDD\_FR1\_B
    - -126.5 dBm/15kHz , -123.5dBm/30kHz, -120.5dBm/60kHz @ Es/Iot ≥ -6 dB
    - -120.5 dBm/15kHz , -117.5dBm/30kHz, -114.5dBm/60kHz @ Es/Iot ≥ 0 dB
  + For NR\_TDD\_FR1\_J
    - -122.5 dBm/15kHz , -119.5dBm/30kHz, -116.5dBm/60kHz @ Es/Iot ≥ -6 dB
    - -116.5 dBm/15kHz , -113.5dBm/30kHz, -110.5dBm/60kHz @ Es/Iot ≥ 0 dB

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014296 | Revised |
| R4-2014298 | Revised |
| R4-2015467 | Revised |
|  |  |

**Topic #3: Test Cases**

Common resource pool configuration

Agreement

* Configure one Rx resource pool and one normal Tx resource pool
* Configure subchannel size with 10RB
* Configure Sensing window with 100ms

Test for V2X UE Resource Pre-emption

Agreement

* Introduce Test for Resource Pre-emption

Test Set-up for V2X UE Resource Re-evaluation

Agreement

* Introduce Test for Resource Re-evaluation (a separated test case from pre-emption test)

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015469 | Revised |
| R4-2014299 | Revised |
| R4-2014655 | Revised |
| R4-2014639 | Revised |
| R4-2014769 | Revised |
| R4-2014770 | Revised |
| R4-2015470 | Revised |

2nd round email discussion conclusions

================================================================================

**R4-2017100 WF on NR V2X RRM requirements**

*Type: other For: Approval  
 Source: LG Electronics*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014213 On interruption requirement on LTE SL due to changing of NR SL sync source**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Abstract:**

Proposal 1: Send LS to RAN1 to ask about the specific UE behavior when sync source is changed for NR SL, at least to trigger the discussion there and help to form common understanding in RAN4.

Proposal 2: Discuss this issue later after hearing from RAN1.

**Decision: Noted.**

**R4-2014294 Discussion of maintenace issues for NR V2X**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Abstract:**

It discusses maintenance issues for NR V2X RRM requirements based on the agreed WF in last meeting.

**Decision: Noted.**

**R4-2014295 CR of NR V2X operating band group**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1152 Cat: F (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

Introduce NR V2X operating band group in 3.5.

**Decision: Revised to R4-2017101 (from R4-2014295).**

**R4-2017101 CR of NR V2X operating band group**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1152 Cat: F (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

Introduce NR V2X operating band group in 3.5.

**Decision: Return to.**

**R4-2014634 NR V2X RRM core and performance requirement remaining issues**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2014635 CR: Interruption requirement for NR V2X synchronization source chang**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1191 Cat: F (Rel-16)  
  
 Source: Qualcomm, Inc.*

**Decision: Return to.**

**R4-2014767 Remaining issues on NR V2X RRM requirement**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: The absolute accuracy of L1 SL-RSRP can be ±4.5dB at SNR=0dB unless additional cable loss is agreed to be introduced in V2X UE test.

Proposal 2: When two synchronization sources that UE switches between are not synchronized in NR sidelink, define the interruption to LTE SL due to NR SL sync. source change.

Proposal 3: Define the interruption to NR Uu link due to switching between LTE SL and NR SL. The UE is allowed an interruption on the PCell in NR as follow.

**Decision: Noted.**

#### 7.3.6 RRM perf. requirements (38.133) [5G\_V2X\_NRSL-Perf]

**R4-2017105 Draft Big CR: Introduction of Rel-16 NR V2X RRM performance requirements (TS 38.133)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: LG Electronics*

**Abstract:**

**Discussion:**

**Decision: For e-mail approval.**

##### 7.3.6.1 General [5G\_V2X\_NRSL-Perf]

**R4-2014296 CR of NR V2X measurement accuracy requirements(SL-RSSI and L1 SL-RSRP)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1153 Cat: B (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

Introduce NR V2X measurement accuracy requirements for SL-RSSI and L1 SL-RSRP

**Decision: Revised to R4-2017102 (from R4-2014296).**

**R4-2017102 CR of NR V2X measurement accuracy requirements(SL-RSSI and L1 SL-RSRP)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1153 Cat: B (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

Introduce NR V2X measurement accuracy requirements for SL-RSSI and L1 SL-RSRP

**Decision: Return to.**

**R4-2014298 CR of Annex.B for NR V2X side conditions**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1154 Cat: B (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

Introduce condtions for NR V2X in B.4

**Decision: Revised to R4-2017103 (from R4-2014298).**

**R4-2017103 CR of Annex.B for NR V2X side conditions**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1154 Cat: B (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

Introduce condtions for NR V2X in B.4

**Decision: Return to.**

**R4-2014768 Discussion on L1 SL-RSRP measurement test case**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: Both re-evaluation and pre-emption test cases shall be defined because they are critical to support aperiodic higher-priority traffic in NR V2X.

Proposal 2: Introducing a warm up duration T0. The test UE configured with resource pools only without the sidelink logical channels.

Proposal 3: RAN4 shall define the test cases related to re-evaluation and pre-emption and they can be merged into one test case.

**Decision: Noted.**

##### 7.3.6.2 L1 SL-RSRP measurement accuracy [5G\_V2X\_NRSL-Perf]

**R4-2015467 DraftCR on PSBCH-RSRP accuracy requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The PSBCH-RSRP accuracy requirements need to be introduced for NR V2X.

**Decision: Revised to R4-2017104 (from R4-2015467).**

**R4-2017104 DraftCR on PSBCH-RSRP accuracy requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The PSBCH-RSRP accuracy requirements need to be introduced for NR V2X.

**Decision: Return to.**

##### 7.3.6.3 Test cases [5G\_V2X\_NRSL-Perf]

**R4-2014640 NR V2X RRM test case discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

###### 7.3.6.3.1 UE transmit timing [5G\_V2X\_NRSL-Perf]

**R4-2015469 DraftCR on UE Transmission Timing Accuracy Tests for NR V2X**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

UE transmission timing accuracy requirements has been specified for NR V2X, and the corresponding tests shall be defined in TS 38.133.

**Decision: Revised to R4-2017106 (from R4-2015469).**

**R4-2017106 DraftCR on UE Transmission Timing Accuracy Tests for NR V2X**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

UE transmission timing accuracy requirements has been specified for NR V2X, and the corresponding tests shall be defined in TS 38.133.

**Decision: Return to.**

###### 7.3.6.3.2 Initiation/Cease of SLSS Transmission [5G\_V2X\_NRSL-Perf]

**R4-2014299 draft CR of Test for initiation and cease of SLSS Transmission with V2X Sidelink Communication**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: LG Electronics Inc.*

**Abstract:**

Introduce test case for initiation/cease of SLSS Transmission with V2X Sidelink Communication.

**Decision: Revised to R4-2017107 (from R4-2014299).**

**R4-2017107 draft CR of Test for initiation and cease of SLSS Transmission with V2X Sidelink Communication**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: LG Electronics Inc.*

**Abstract:**

Introduce test case for initiation/cease of SLSS Transmission with V2X Sidelink Communication.

**Decision: Return to.**

**R4-2014655 RRM test cases for NR V2X Synchronization Reference Selection/Reselection**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

Add the Rel-16 NR V2X Synchronization Reference Selection/Reselection test case

**Decision: Revised to R4-2017108 (from R4-2014655).**

**R4-2017108 RRM test cases for NR V2X Synchronization Reference Selection/Reselection**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

Add the Rel-16 NR V2X Synchronization Reference Selection/Reselection test case

**Decision: Return to.**

###### 7.3.6.3.3 Selection / Reselection of V2X Synchronization Reference Source [5G\_V2X\_NRSL-Perf]

**R4-2014214 Selection or Reselection of V2X Synchronization Reference Source**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Abstract:**

Observation 1: The able loss introduced by the vehicle antenna can be a major source of noise.

Proposal 1: Test set-up for GNSS with higher priority shall include 3 SyncRef UEs, SyncRef UE1 (sync to gNB directly), SyncRef UE2 (sync to GNSS in-directly) and SyncRef UE3 (sync to GNSS directly).

**Decision: Noted.**

###### 7.3.6.3.4 L1 SL-RSRP measurements [5G\_V2X\_NRSL-Perf]

**R4-2014212 On L1 SL-RSRP accuracy for NR V2X**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Abstract:**

Observation 1: The able loss introduced by the vehicle antenna can be a major source of noise.

Proposal 1: Finalize measurement accuracy requirement once RF session concludes on cable loss issue.

**Decision: Noted.**

**R4-2014639 CR: RRM autonomous resource selection test cases for NR V2X**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm, Inc.*

**Decision: Revised to R4-2017109 (from R4-2014639).**

**R4-2017109 CR: RRM autonomous resource selection test cases for NR V2X**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm, Inc.*

**Decision: Return to.**

**R4-2014769 CR on V2X UE Resource Selection Tests for Re-evaluation**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The re-evaluation test is missing.

**Decision: Revised to R4-2017110 (from R4-2014769).**

**R4-2017110 CR on V2X UE Resource Selection Tests for Re-evaluation**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The re-evaluation test is missing.

**Decision: Return to.**

**R4-2015468 Discussion on UE Autonomous Resource Selection/Reselection Test for NR V2X**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: For UE autonomous resource selection/reselection test, the test setups are suggested as follows:

- The value of X is configured as 20%

- Active UE and subchannel allocation: there are 40 active UEs in the system, first 10 UEs occupies subchannel 0, the next 10 occupies subchannel 1, the next 10 occupies subchannel 2, following the allocation until all the 40 active UEs are allocated. The subchannels 0/1/2/3 configured for UE to be tested are each occupied by 10 UEs. The subchannel 4 configured for UE to be tested is not occupied by active UEs.

- The active UEs on subchannel 0/1/3 always transmit in 20dB higher RSRP above the threshold (corresponding to 20dB SNR). The active UEs on subchannel 2 transmit with 5dB higher RSRP above the threshold.

**Decision: Noted.**

###### 7.3.6.3.5 Congestion control measurements [5G\_V2X\_NRSL-Perf]

**R4-2014770 CR on V2X UE Congestion Control Measurement Test**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The congestion control measurement test is missing.

**Decision: Revised to R4-2017111 (from R4-2014770).**

**R4-2017111 CR on V2X UE Congestion Control Measurement Test**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The congestion control measurement test is missing.

**Decision: Return to.**

###### 7.3.6.3.6 Interruptions [5G\_V2X\_NRSL-Perf]

**R4-2015470 DraftCR on Interruption Tests for NR V2X**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The interruption requirements has been specified for NR V2X, and the corresponding tests shall be defined in TS 38.133.

**Decision: Revised to R4-2017112 (from R4-2015470).**

**R4-2017112 DraftCR on Interruption Tests for NR V2X**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The interruption requirements has been specified for NR V2X, and the corresponding tests shall be defined in TS 38.133.

**Decision: Return to.**

###### 7.3.6.3.7 Others [5G\_V2X\_NRSL-Perf]

### 7.4 Integrated Access and Backhaul for NR [NR\_IAB]

#### 7.4.4 RRM core requirements maintenance [NR\_IAB-Core]

================================================================================

**Email discussion: [97e][209] NR\_IAB\_RRM**

**R4-2017008 Email discussion summary for [97e][209] NR\_IAB\_RRM***Type: other For: Information  
Source: Moderator (ZTE Corporation)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017279 (from R4-2017008).**

**R4-2017279 Email discussion summary for [97e][209] NR\_IAB\_RRM***Type: other For: Information  
Source: Moderator (ZTE Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017115 | WF on test cases for IAB-MTs | ZTE Corporation |
|  |  |  |

**Topic #1: Core requirements maintenance**

Issue 1-1: Conditions under which IAB-MT shall assume no-DRX

Agreement

* Conditions under which IAB-MT shall assume no DRX is used are the same as defined for the UE in section 3.6.1, TS 38.133.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015790 | Merged |
| R4-2015791 | Merged |
| R4-2016028 | Agreed |
| R4-2016170 | Revised |
| R4-2016382 | Revised |
|  |  |

**Topic #2: Perf. requirements and test cases for IAB-MTs**

Agreements:

* Only RRM performance requirements for IAB-MT are needed and the IAB-MT shall be tested with DU part disabled.
* Use conducted testing for IAB type 1-H and OTA testing for IAB type 2-O.
* Define test cases for RRM requirements under NR SA.
* Take UE test cases as baseline when defining test cases for IAB-MTs.
* The performance requirements shall be differentiated between wide area IAB-MT and local area IAB-MT if needed.
* Only unknown target cell should be considered in the testing and only local-area IAB-MT to be tested.
* Don’t define separate test cases of random access for IAB-MT.
* RRM tests are defined in both FR1 and FR2 to verify all IAB-MT requirements defined in TS 38.174.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014184 | Revised |
| R4-2016172 | Revised |

2nd round email discussion conclusions

================================================================================

**R4-2015508 CR on Link recovery for IAB-MT**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1285 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision:** The document was **withdrawn**.

**R4-2015509 CR on RLM for IAB-MT**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1286 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision:** The document was **withdrawn**.

**R4-2015790 CR on Link recovery for IAB-MT**

*Type: CR For: Agreement  
 38.174 v16.0.0 CR-0001 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The requirement for multiple SMTC configuration (up to 4) is missing in the link recovery requirement for IAB-MT

There are typos need to be fixed.

**Decision: Merged.**

**R4-2015791 CR on RLM for IAB-MT**

*Type: CR For: Agreement  
 38.174 v16.0.0 CR-0002 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The requirement for multiple SMTC configuration (up to 4) is missing in the RLM requirement for IAB-MT

**Decision: Merged.**

**R4-2016028 DraftCR for TR38.809: IAB RRM general**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Samsung*

**Abstract:**

Adding general descriptions is to summarize the meeting agreements as Rel-16 RAN4 conclusions and the reference for future release IAB RRM requirement standardization.

Chair: This is the Draft CR to TR 38.809. The document can be endorsed instead of agreed. The TR is under change control. Is there any Big CR for TR 38.809 which will combine all changes?

**Decision: Endorsed.**

**R4-2016170 Symbols, abbreviations and definitions for IAB RRM in 38.174**

*Type: CR For: Agreement  
 38.174 v16.0.0 CR-0003 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To define missing symbols, abbreviations and definitions related to IAB RRM requirements.

**Decision: Revised to R4-2017113 (from R4-2016170).**

**R4-2017113 Symbols, abbreviations and definitions for IAB RRM in 38.174**

*Type: CR For: Agreement  
 38.174 v16.0.0 CR-0003 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To define missing symbols, abbreviations and definitions related to IAB RRM requirements.

**Decision: Return to.**

**R4-2016171 Issues with IAB RRM requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper analyze some of the issues related to RRM requirements

**Decision: Noted.**

**R4-2016382 Correction on IAB RRM requirements in TS 38.174**

*Type: CR For: Agreement  
 38.174 v16.0.0 CR-0005 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Maintenance CR for IAB RRM requirements.

**Decision: Revised to R4-2017114 (from R4-2016382).**

**R4-2017114 Correction on IAB RRM requirements in TS 38.174**

*Type: CR For: Agreement  
 38.174 v16.0.0 CR-0005 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Maintenance CR for IAB RRM requirements.

**Decision: Return to.**

#### 7.4.5 RRM perf. requirements [NR\_IAB-Perf]

**R4-2017115 WF on test cases for IAB-MTs**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.4.5.1 General [NR\_IAB-Perf]

**R4-2014009 Scope of test cases for IAB-MTs**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision:** The document was **withdrawn**.

**R4-2015510 Discussion on performance requirements for IAB**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016172 Specification structure for IAB-MT RRM test cases in 38.174**

*Type: CR For: Agreement  
 38.174 v16.0.0 CR-0004 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To create an annex in TS 38.174 for defining RRM test cases

**Decision: Revised to R4-2017117 (from R4-2016172).**

**R4-2017117 Specification structure for IAB-MT RRM test cases in 38.174**

*Type: CR For: Agreement  
 38.174 v16.0.0 CR-0004 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To create an annex in TS 38.174 for defining RRM test cases

**Decision: Return to.**

**R4-2016173 Principles for IAB RRM test cases**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper discussed general principles for RRM tests for IAB

**Decision: Noted.**

**R4-2016174 IAB RRM test case list**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

The paper discussed general principles for RRM tests for IAB

**Decision: Noted.**

**R4-2016383 discussion on IAB RRM test cases**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion the RRM test cases for IAB.

**Decision: Noted.**

**R4-2016594 Scope of test cases for IAB-MTs**

*Type: discussion For: Discussion  
 Source: ZTE Corporation, Qualcomm Incorporated*

**Decision: Noted.**

##### 7.4.5.2 Test cases [NR\_IAB-Perf]

**R4-2014184 [draft CR] Test cases for timing for IAB-MT**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: ZTE Corporation*

**Abstract:**

The test cases for timing of IAB-MTs in FR1 need to be specified in TS 38.174.

**Decision: Revised to R4-2017116 (from R4-2014184).**

**R4-2017116 [draft CR] Test cases for timing for IAB-MT**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: ZTE Corporation*

**Abstract:**

The test cases for timing of IAB-MTs in FR1 need to be specified in TS 38.174.

**Decision: Return to.**

**R4-2015511 Discussion on test cases for IAB**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

### 7.5 Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements [LTE\_NR\_DC\_CA\_enh]

#### 7.5.2 RRM core requirements maintenance (38.133/36.133) [LTE\_NR\_DC\_CA\_enh-Core]

================================================================================

**Email discussion: [97e][210] LTE\_NR\_DC\_CA\_RRM\_1**

**R4-2017009 Email discussion summary for [97e][210] LTE\_NR\_DC\_CA\_RRM\_1***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017280 (from R4-2017009).**

**R4-2017280 Email discussion summary for [97e][210] LTE\_NR\_DC\_CA\_RRM\_1***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 04, 2020)

Topic #1: UE idle mode CA measurement requirements and s-NonIntraSearch.

* Sub-topic #1-1: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are not configured
  + Issue 1-1-1: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are not configured
    - Option 1: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are not configured, follow requirements in section 4.2.2.4 table 4.2.2.4-1
    - Recommended WF: Agree on option 1

Agreement: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are not configured, follow requirements in section 4.2.2.4 table 4.2.2.4-1

* Sub-topic #1-2: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured
  + Issue 1-2-1: Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ (high priority carrier not configured)
    - Option 1: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, and when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ follow requirements in section 4.2.2.4 table 4.2.2.4-1.
    - Option 2: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, and when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ follow other requirements.
      * For companies preferring this option: list exactly which other requirements (section and possibly table).

Discussion:

HW: In our understanding 4.2.2.4 table 4.2.2.4-1 is relevant to inter-frequency. For inter-RAT it should be 4.2.2.5.

Nokia: Yes it is right. Agreement covers inter-freq and can be extended to inter-RAT

Apple: Option 1 is ok. Scaling should be considered.

Agreement:

UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, and when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ follow requirements in section 4.2.2.4 table 4.2.2.4-1.

Same principles will apply for inter-RAT measurements

E-UTRAN measurements when UE is in NR IDLE or INACTIVE mode

NR measurements when UE is in LTE IDLE mode

* + Issue 1-2-2: Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ (high priority carrier configured)
    - Option 1: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, and when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ follow requirements in section 4.2.2.4 table 4.2.2.4-1.
    - Option 2: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, and when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ follow other requirements.
      * For companies preferring this option: list exactly which other requirements (section and possibly table).

Agreement:

UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, and when Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ follow requirements in section 4.2.2.4 table 4.2.2.4-1.

Same principles will apply for inter-RAT measurements

E-UTRAN measurements when UE is in NR IDLE or INACTIVE mode

NR measurements when UE is in LTE IDLE mode

* + Issue 1-2-3: Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ (high priority carrier configured)
    - Option 1: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, when Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, and the UE is configured with one or more higher priority carrier, at least follow requirements in section 4.2.2.7.
    - Option 2: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, when Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, and the UE is configured with one or more higher priority carrier, follow other requirements.
      * For companies preferring this option: list exactly which other requirements (section and possibly table).

Discussion:

ZTE: For 7 layers UE will measure for 420s. The max configurable time for T331 is 300s. The feature may not work. Need to increase the value for timer.

QC: Agree with ZTE observation. Other solutions are possible and leave decision up to RAN2.

Apple: ZTE observation is valid. T331 extension is questionable.

HW: Share same concern as Apple that T331 increase will result in higher power consumption. Option 1 may not necessarily lead to issue. Even current requirements are already very close to 60s.

Nokia: Agree with ZTE observation. Prefer to inform RAN2 that the timer is short and it is up to RAN2 whether and how to address it.

ZTE: object the agreement

Candidate agreement:

UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, when Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, and the UE is configured with one or more higher priority carrier, at least follow requirements in section 4.2.2.7.

Send LS to RAN2 to inform on the agreement and RAN4 observations that the measurement duration can exceed the maximum configurable duration of T331 timer but there is no consensus in RAN4 whether the timer value needs to be increased. It is up to RAN2 whether and how to resolve the issue.

* + Issue 1-2-4: Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ (high priority carrier not configured)
    - Option 1: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, when Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, and the UE is not configured with one or more higher priority carrier, at least follow requirements in section 4.2.2.7.
    - Option 2: UE measurement requirements for idle mode CA measurements, when SnonIntraSearchP/Q are configured, when Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ, and the UE is not configured with one or more higher priority carrier, at least follow requirements in section 4.2.2.4 table 4.2.2.4-1.

Discussion:

Nokia: Prefer Option 2.

ZTE: We can support Option 2.

MTK: Option 1 is more simple. The conclusion will depend on conclusion in 1-2-3.

HW: Same view as MTK. Option 2 is more complex.

Apple: prefer Option 1.

QC: prefer Option 1

Nokia: not sure that Option 2 has higher complexity. For Option 1 we need to inform RAN2 since this contradicts their agreements.

ZTE: we agree with Nokia. Option 2 is aligned with RAN2 conclusions that EMR measurements do not depend on the threshold.

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017118 | WF on MR-DC RRM requirements for Idle mode CA measurements | Nokia, Nokia Shanghai Bell |
| R4-2017119 | LS on RAN4 agreements for MR-DC Idle mode CA measurements | ZTE |
| R4-2017122 | WF on Test cases for MR-DC Idle mode CA measurements | Nokia, Nokia Shanghai Bell |

**Topic #2: Overlapping and non-overlapping carriers**

|  |  |
| --- | --- |
| Tdoc decisions**Tdoc** | **Decision** |
| R4-2014362 | Merged |
| R4-2015883 | Revised |
| R4-2015743 | Revised |
| R4-2015882 | Merged |
| R4-2016388 | Merged |
| R4-2016389 | Merged |

2nd round email discussion conclusions

================================================================================

================================================================================

**Email discussion: [97e][211] LTE\_NR\_DC\_CA\_RRM\_2**

**R4-2017010 Email discussion summary for [97e][211] LTE\_NR\_DC\_CA\_RRM\_2***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017281 (from R4-2017010).**

**R4-2017281 Email discussion summary for [97e][211] LTE\_NR\_DC\_CA\_RRM\_2***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 04, 2020)

Topic #1: Core requirement maintenance

* Sub-topic 1-1: Direct SCell Activation
  + Issue 1-1-2: TCI state activation at Direct SCell activation
    - Option 1 (MediaTek): Send LS to RAN2 on that missing TCI state activation in RRC command for Direct SCell activation reduces benefit of the feature.

Discussion

ZTE: TCI state information can be carried in the RRC signalling. Do not fully understand the issue here.

QC: can ZTE point to the specific section?

Apple: NW still needs to send MAC for TCI state activation after Direct SCell activation.

HW: need more time to check. There may be impact on RAN2 signalling and UE implementation. By default the TCI state activation is done via MAC and activation using RRC may have impact on UE.

MTK: Do not expect impact on legacy UE implementation. It might create new UE behavior.

ZTE: now understand the issue. The proposal is a kind of optimization and should not be discussed here.

HW: what do we suggest in the LS?

MTK: inform RAN2 that there is some issue and recommend to add the TCI state in RRC command. It does not mean UE needs to support. We can have a separate UE capability for the new behavior.

NEC: share same concern as HW. We may not need to include the solution in the LS to RAN2.

E///: Agree with NEC that we can inform RAN2 on observations. The solution can be left up to RAN2.

ZTE: we need to discuss in RAN4 whether such optimizations are needed in Rel-16 or later. For the LS we agree that we can just inform RAN2 while the decision shall be up to RAN2.

HW: we agree with E///, NEC, ZTE. We would like to understand the drawbacks of not having such configuration.

Chair: continue discussion

* Sub-topic 1-2: SCell dormancy
  + Issue 1-2-2: Rate of ACK/NACK feedback loss on non-dormant serving cells resulting from CQI measurements and RRM measurements on dormant SCells
    - Option 1 (Qualcomm): Relax interruption requirements from X=0.5% to X=2% for non-dormant serving cell which either is intra-band contiguous to dormant serving cell, or is in a different band to the dormant serving cell.

Discussion:

E///: another alternative is to clarify that X=0.5% applies separately for CQI measurements and RRM measurements to be on par with LTE.

HW: the proposed alternative is agreeable

Nokia: agree

Apple: agree with QC observation but X = 2% can be too much. Open for other approaches.

QC: ok with 0.5% for CSI and prefer larger value for RRM (e.g. 1%)

MTK: need to have internal check

ZTE: would like to understand why RRM measurements need larger X

QC: 0.5% are coming from LTE. In LTE we have wideband CRS signals. In NR we have narrowband SSB.

E///: in LTE the measurements are based on center 6RBs. Ok to look into concerns QC raised.

Agreement: Rate of ACK/NACK feedback loss on non-dormant serving cells resulting from CQI measurements and RRM measurements on dormant SCells is X = 0.5% for each of CQI measurements and X = [1.0%] for RRM measurements

Topic #3: Cross Carrier scheduling of Active BWP switch

* Sub-topic 3-1: Active BWP switching delay under Cross Carrier Scheduling
  + Issue 3-1-1: Active BWP switching delay for single CC
    - Option 1a (Huawei): Active BWP switching delay is relaxed by 1 slot at smaller SCS of scheduling and scheduled cells when cross carrier scheduling is used.
    - **Option 1b (Qualcomm): Active BWP switching delay is relaxed by 1 slot at smaller SCS of scheduling cell, scheduled cell before and scheduled cell after active BWP change when cross carrier scheduling is used.**
    - Option 1c (NEC): Active BWP switching delay is relaxed by 1 slot when cross carrier scheduling is used.
    - Option 2 (Ericsson): Active BWP switching delay is relaxed by Y OFDM symbol durations at SCS of scheduling cell (µPDCCH) when cross carrier scheduling is used.
      * If SCS of scheduling and scheduled cells are the same: Y=0
      * If SCS of scheduling and scheduled cells are different:

|  |  |
| --- | --- |
| µPDCCH | Y [symbol durations] |
| 0 | 4 |
| 1 | 5 |
| 2 | 10 |
| 3 | 14 |

Agreement: Active BWP switching delay is relaxed by 1 slot at smaller SCS of scheduling cell, scheduled cell before and scheduled cell after active BWP change when cross carrier scheduling is used.

* + Issue 3-1-2: Active BWP switching delay for multiple CCs
    - Option 1a (Huawei): Active BWP switching delay is relaxed by 1 slot at smaller SCS of scheduling and scheduled cells when cross carrier scheduling is used.
    - Option 1b (Qualcomm): Active BWP switching delay is relaxed by 1 slot at smaller SCS of scheduling cell, scheduled cells before and scheduled cells after active BWP change when cross carrier scheduling is used. is clarified as being the longer for any of the scheduled cells, had each scheduled cell been the only one triggered.
    - Option 1c (NEC): Active BWP switching delay is relaxed by 1 slot when cross carrier scheduling is used.
    - Option 2 (Ericsson): Active BWP switching delay is relaxed by Y OFDM symbol durations at SCS of scheduling cell (µPDCCH) when cross carrier scheduling is used.
      * If SCS of scheduling and scheduled cells are the same: Y=0
      * If SCS of scheduling and scheduled cells are different:

|  |  |
| --- | --- |
| µPDCCH | Y [symbol durations] |
| 0 | 4 |
| 1 | 5 |
| 2 | 10 |
| 3 | 14 |

Agreement: Active BWP switching delay is relaxed by 1 slot at smaller SCS of scheduling cell, scheduled cells before and scheduled cells after active BWP change when cross carrier scheduling is used. is clarified as being the longer for any of the scheduled cells, had each scheduled cell been the only one triggered.

Topic #4: Test cases

* Sub-topic 4-1: Test case list for Direct SCell activation
  + Issue 4-1-4: Functionality to be tested
    - Option 1 (Huawei): Direct activation upon SCell addition
    - Option 2 (Ericsson): Direct activation upon SCell addition, handover, and RRC resume
    - Option 3: Direct activation upon SCell addition, handover

Agreement: Direct activation upon SCell addition, handover

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017123 | WF on RRM Core requirements maintenance in MR-DC RRM 2 | Ericsson |
| R4-2017124 | LS on TCI state indication at Direct SCell activation | MediaTek |
| R4-2017130 | WF on Test Cases for Direct SCell Activation and SCell Dormancy | Ericsson |

**Topic #1: Core requirement maintenance**

Issue 1-1-1: Starting point for interruption window at Direct SCell activation

Agreement

* Remove HARQ-ACK time from the earliest possible starting point of an interruption window for Direct SCell activation (clauses 8.3.4 and 8.3.9).

Issue 1-2-1: Removal of Editor’s Note following RAN1 agreement

Agreement

* Remove Editor’s Note since related RAN1 agreement has been reached and is in line with existing specification text in 38.133

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015745 | Revised |
| R4-2016584 | Agreed |
| R4-2016020 | Revised |
| R4-2016021 | Revised |

**Topic #2: Non-aligned frame borders and interruptions**

Issue 2-1-1: Clarify the CA with non-aligned frame border scenario

Agreement

* Clarify impact of CA with non-aligned frame borders on SCC interruption length due to measurement gaps.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014360 | Revised |

**Topic #3: Cross Carrier scheduling of Active BWP switch**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015745 | Revised |
| R4-2015305 | Return to |
| R4-2016428 | Not pursued |
| R4-2015504 | Revised |

**Topic #4: Test cases**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2017118 WF on MR-DC RRM requirements for Idle mode CA measurements**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017119 LS on RAN4 agreements for MR-DC Idle mode CA measurements**

*Type: LS out For: Approval  
To: RAN2  
Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017123 WF on RRM Core requirements maintenance in MR-DC RRM 2**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017124 LS on TCI state indication at Direct SCell activation**

*Type: LS out For: Approval  
To: RAN2  
Source: MediaTek*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014229 On cell-grouping UE capability for synchronous NR-DC**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014230 Reply LS on cell-grouping UE capability for synchronous NR-DC**

*Type: LS out For: Approval  
 to RAN1, RAN2  
 Source: Apple*

**Decision: Return to.**

**R4-2014359 Discussion on interruption time for unaligned CA scenarios**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014360 CR on TS38.133 interruption time for CA with non-aligned frame boundaries**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1156 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

The total interruption time for the CA with non-aligned frame boundaries scenario does not consider and count the time duration of the slot which is partially overlapped with the measurement gap.

**Decision: Revised to R4-2017128 (from R4-2014360).**

**R4-2017128 CR on TS38.133 interruption time for CA with non-aligned frame boundaries**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1156 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

The total interruption time for the CA with non-aligned frame boundaries scenario does not consider and count the time duration of the slot which is partially overlapped with the measurement gap.

**Decision: Return to.**

##### 7.5.2.1 Early Measurement reporting [LTE\_NR\_DC\_CA\_enh-Core]

**R4-2014361 Discussion on LTE CRS based and NR SSB based measurement in NR IDLE/INACTIVE mode**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014362 CR on TS38.133 for measurement capability of IDLE mode DCCA measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1157 Cat: F (Rel-16)  
  
 Source: MediaTek inc., Huawei, HiSilicon*

**Abstract:**

UE requirement for MR-DC early measurement reporting in TS 38.133 is not finalized and following modifications are needed:

1. In WF agreed in RAN4 #95e, the agreed measurement capability is total number of LTE inter-RAT EMR carriers ≤7, not total number of FDD E-UTRA inter-RAT carriers ≤7 and total number of TDD E-UTRA inter-RAT carriers ≤7.

2. The measurement capabilities for UE supporting inter-freq. or inter-RAT EMR measurement in NR IDLE/INACTIVE mode are specified in different sections 4.2.2.1 and 4.3.2.2. A clarification must be added to show that measurement capabilities in section 4.2.2.1 and in section 4.3.2.2 should be simultaneously followed.

3. RAN2’s capability names have been updated to idleInactiveEUTRA-MeasReport-r16 and idleInactiveNR-MeasReport-r16.

4. Complete the measurement requirement of overlapping and non-overlapping early measurement reporting

5. Introduce the requirement for beam level reporting

**Decision: Merged.**

**R4-2015587 Remaining issues on NR EMR**

*Type: discussion For: Discussion  
 Source: ZTE*

**Decision: Noted.**

**R4-2015742 Discussion on remaining issues in EMR requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015743 CR on EMR requirements in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6976 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon, MediaTek*

**Abstract:**

Core requirements for LTE-NR inter-RAT EMR are incomplete.

**Decision: Revised to R4-2017121 (from R4-2015743).**

**R4-2017121 CR on EMR requirements in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6976 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon, MediaTek*

**Abstract:**

Core requirements for LTE-NR inter-RAT EMR are incomplete.

**Decision: Return to.**

**R4-2015881 Early Measurement Reporting**

*Type: discussion For: Approval  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2015882 CR on UE requirement for MR-DC early measurement reporting in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6985 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

UE requirements for MR-DC early measurement reporting in TS 36.133 are not finalized. This CR brings changes for finalization of the feature.

**Decision: Merged.**

**R4-2015883 CR on UE requirement for MR-DC early measurement reporting in 38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1338 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

UE requirements for MR-DC early measurement reporting in TS 38.133 are not finalized. This CR brings changes for finalization of the feature.

**Decision: Revised to R4-2017120 (from R4-2015883).**

**R4-2017120 CR on UE requirement for MR-DC early measurement reporting in 38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1338 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

UE requirements for MR-DC early measurement reporting in TS 38.133 are not finalized. This CR brings changes for finalization of the feature.

**Decision: Return to.**

**R4-2016388 Updates in EMR requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1374 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RAN4 has agreed on the definition overlapping/non-overlapping carriers in R4-2005847, but their definitions are still missing in the specification.

The terminology “EMR”, “early measurement reporting”, “idle CA measurements”, “idle CA/DC measurements”, are used inconsistently across specification, etc.

**Decision: Merged.**

**R4-2016389 Updates in EMR requirements**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6998 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RAN4 has agreed on the definition overlapping/non-overlapping carriers in R4-2005847, but their definitions are still missing in the specification.

Also, the EMR measurements are inconsistently referred to as idle mode measurements, DC measurements, etc.

**Decision: Merged.**

**R4-2016573 Early measurement reporting in MR-DC**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

##### 7.5.2.2 Efficient and low latency serving cell configuration, activation and setup [LTE\_NR\_DC\_CA\_enh-Core]

**R4-2014363 Discussion on direct Scell activation**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014629 Discussion on TCI state activation in direct SCell activation**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2015301 Discussion on RRM requirements for SCell dormancy**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

Discussion on BWP switch delay for dormancy transition of multiple SCells

**Decision: Noted.**

**R4-2015744 Discussion on remaining issues in SCell dormancy and cross-carrier scheduled BWP switching**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015745 CR on BWP switching and SCell dormancy**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1322 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In SCell dormancy delay requirement, there is an editor note pending on RAN1 conclusion on whether dormancy indication within DCI 0\_1/1\_1 can be received after first 3 OFDM symbols in a slot or not. RAN1 has agreed that there is no restriction, so the editor note can be removed.

The BWP switching requirements for cross-carrier scheduling case need to be defined.

**Decision: Revised to R4-2017125 (from R4-2015745).**

**R4-2017125 CR on BWP switching and SCell dormancy**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1322 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In SCell dormancy delay requirement, there is an editor note pending on RAN1 conclusion on whether dormancy indication within DCI 0\_1/1\_1 can be received after first 3 OFDM symbols in a slot or not. RAN1 has agreed that there is no restriction, so the editor note can be removed.

The BWP switching requirements for cross-carrier scheduling case need to be defined.

**Decision: Return to.**

**CR 38.133 Removal of brackets for SCell Dormancy and Direct SCell Activation**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1348 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

SCell Dormancy: The specification text contains requirements on maximum rate of interruptions resulting from RRM and CSI measurements on dormant SCell. The value, [0.5]%, is within brackets.

Direct SCell activation: The specification text contains side condition on number of SCells that can be directly activated simultaneously. The value, [2], is within brackets.

**Decision: Revised to R4-2017304 (from R4-2016020).**

**R4-2017304 CR 38.133 Removal of brackets for SCell Dormancy and Direct SCell Activation**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1348 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

SCell Dormancy: The specification text contains requirements on maximum rate of interruptions resulting from RRM and CSI measurements on dormant SCell. The value, [0.5]%, is within brackets.

Direct SCell activation: The specification text contains side condition on number of SCells that can be directly activated simultaneously. The value, [2], is within brackets.

**Decision: Return to.**

**R4-2016021 CR 36.133 Removal of brackets for NR SCell Dormancy**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6988 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

SCell Dormancy: The specification text contains requirements on maximum rate of interruptions resulting from RRM and CSI measurements on dormant NR SCell. The value, [0.5]%, is within brackets.

**Decision: Revised to R4-2017127 (from R4-2016021).**

**R4-2017127 CR 36.133 Removal of brackets for NR SCell Dormancy**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6988 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

SCell Dormancy: The specification text contains requirements on maximum rate of interruptions resulting from RRM and CSI measurements on dormant NR SCell. The value, [0.5]%, is within brackets.

**Decision: Return to.**

**R4-2016570 Dormant and Non-dormant BWP switching**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2016575 Staring point of an Interruption window at Direct SCell activation**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Chair: moved from AI 7.5.1**

**Decision: Noted.**

**R4-2016584 CR to Staring point of an Interruption window at Direct SCell activation**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1401 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

In the current version of 38.133, the earliest possible starting point of an interruption window due to Direct SCell activation at SCell addition is limited to the time after the corresponding HARQ-ACK transmission, which is not aligned with other interruption requirements for RRM based command execution.

**Chair: moved from AI 7.5.1**

**Decision: Agreed.**

**R4-2017126 CR to Staring point of an Interruption window at Direct SCell activation**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1401 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

In the current version of 38.133, the earliest possible starting point of an interruption window due to Direct SCell activation at SCell addition is limited to the time after the corresponding HARQ-ACK transmission, which is not aligned with other interruption requirements for RRM based command execution.

**Chair: moved from AI 7.5.1**

**Decision: Withdrawn.**

**R4-2015504 CR on BWP switching delay on mulitple CCs**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1283 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The requirements for cross carrier DCI-based BWP switching delay on multiple CCs should be added in Rel-16.

The defination of N in non-simultaneous RRC-based BWP switch is refered to the simultaneous BWP switch. However, for non-simultaneous case, N could also be one for the single CC BWP switch.

There are some editorial errors need to be fixed.

**Chair: moved from AI 7.13.1.3**

**Decision: Revised to R4-2017129 (from R4-2015504).**

**R4-2017129 CR on BWP switching delay on mulitple CCs**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1283 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The requirements for cross carrier DCI-based BWP switching delay on multiple CCs should be added in Rel-16.

The defination of N in non-simultaneous RRC-based BWP switch is refered to the simultaneous BWP switch. However, for non-simultaneous case, N could also be one for the single CC BWP switch.

There are some editorial errors need to be fixed.

**Decision: Return to.**

#### 7.5.3 RRM perf. requirements (38.133) [LTE\_NR\_DC\_CA\_enh-Perf]

**R4-2017122 WF on Test cases for MR-DC Idle mode CA measurements**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017130 WF on Test Cases for Direct SCell Activation and SCell Dormancy**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.5.3.1 General [LTE\_NR\_DC\_CA\_enh-Perf]

**R4-2014368 Discussion on performance part for SCell dormancy**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2015746 Discussion on accuracy requirements for EMR**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015747 draftCR to introduce accuracy requirements for EMR 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Measurement accuracy requriements need to be defind for EMR.

**Decision: Return to.**

**R4-2015748 draftCR to introduce accuracy for EMR 36.133**

*Type: draftCR For: Endorsement  
 36.133 v16.7.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Measurement accuracy requriements need to be defind for EMR.

**Decision: Return to.**

**R4-2016017 General discussion on MR-DC RRM test cases**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Background information on proposal of test case list and time plan for MR-DC RRM test cases.

**Decision: Noted.**

**R4-2016378 Accuracy requirements for MR-DC EMR (36.133)**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6995 Cat: F (Rel-16)  
  
 Source: Nokia Corporation*

**Abstract:**

Introduction of accuracy requirements for MR-DC EMr idle mode measurements.

**Decision: Return to.**

**R4-2016386 Accuracy requirements for MR-DC EMR (38.133)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1373 Cat: F (Rel-16)  
  
 Source: Nokia Corporation*

**Abstract:**

Introduction of accuracy requirements for MR-DC EMr idle mode measurements.

**Decision: Return to.**

**R4-2016571 Performance requirements for Dormant SCell**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

##### 7.5.3.2 Test cases [LTE\_NR\_DC\_CA\_enh-Perf]

**R4-2014369 CR on TS38.133 for NR FR1 – NR FR1 Scell dormancy test case in SA**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The SCell dormancy is introduced in Rel-16 so that UE can achieve power saving. In last meeting, it has been agreed that the test case for SCell dormancy shall be defined in RRM performance part. Thus, the test case “NR FR1 – NR FR1 SCell dormancy in SA” is provided in this CR.

**Decision: Return to.**

**R4-2015749 Discussion on RRM test for MR-DC enhancement**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015884 Discussion on test cases for MD-DC EMR**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2016018 MR-DC RRM test case list and time plan**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Proposed test case list and time plan for MR-DC RRM test cases.

**Decision: Noted.**

### 7.6 UE power saving in NR [NR\_UE\_pow\_sav]

================================================================================

**Email discussion: [97e][212] NR\_UE\_pow\_sav\_RRM**

**R4-2017011 Email discussion summary for [97e][212] NR\_UE\_pow\_sav\_RRM**

*Type: other For: Information  
Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017282 (from R4-2017011).**

**R4-2017282 Email discussion summary for [97e][212] NR\_UE\_pow\_sav\_RRM**

*Type: other For: Information  
Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017133 | WF on RRM test cases for power saving | CATT |
| R4-2017134 | Big CR: Introduction of Rel-16 NR UE Power Saving RRM Performance requirements | CATT |

**Topic #1: RRM core requirements maintenance**

Issue 1-2: Do you think subclause 4.2.2.9.4 and 4.2.2.10.4 should be removed from 38.133 given the measurement relaxation requirements when both low mobility and not-at-cell-edge criteria are fulfilled has been defined in 38.304?

Agreement: Do not remove subclause 4.2.2.9.4 and 4.2.2.10.4

Issue 1-3: If HighpriorityRelax is configured and UE fulfils low mobility criterion, whether to remove the descriptions on requirements on UE behaviours when Srxlev > SnonIntraSearchP, Squal > SnonIntraSearchQ in subclause 4.2.2.10.2 and 4.2.2.11.2 of 38.133?

Agreement: Do not remove description

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014408 | Noted |
| R4-2014528 | Noted |
| R4-2015482 | Revised |
| R4-2015574 | Agreed |
| R4-2016066 | Noted |
| R4-2016146 | Revised |

**Topic #2: RRM measurement relaxation-Perf. Part**

Issue 2-1-2: Whether to have different priority frequency layers for inter-frequency/inter-RAT in the same test?

Agreement: Use different priority frequency layers for inter-frequency/inter-RAT in the same test

Issue 2-1-3: Whether to include high priority layer cell search for inter-frequency/inter-RAT?

Agreement: Exclude high priority layer cell search for inter-frequency/inter-RAT

Issue 2-1-8: Whether to exclude the cell search process from test repetition or not

Agreement: Exclude the cell search process from test repetition

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014455 | Revised |
| R4-2014371 | Revised |
| R4-2014410 | Revised |
| R4-2014656 | Revised |
| R4-2014836 | Revised |
| R4-2015484 | Revised |
| R4-2016065 | Revised |
| R4-2016148 | Revised |

2nd round email discussion conclusions

================================================================================

#### 7.6.1 RRM core requirements maintenance (38.133) [NR\_UE\_pow\_sav-Core]

**R4-2014408 CR for TS38.133, Remove duplication definition for measurement requirements for power saving**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1169 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

The applicability of relaxed measurement requirements for EMR is defined clearly in TS38.304. The conditions of “T331 timer is not running…” in current specification is not accurate and duplicated.

1 hour measurement interval has been defined in TS38.304, and no tested will be defined in RAN4. The measurements for UE fulfillslow mobility and not-at-cell edge criteria are duplicated and may lead to misalignment with RAN2 specification.

For measurement requirements for higher priority carrier for inter frequency and inter-RAT when UE fulfills not-at-cell edge criterion are normal requirements, they need not be defined in clause 4.2.2.10.3 and 4.2.2.11.3.

**Decision: Not pursued.**

**R4-2014527 Discussion on remaining issues of R16 UE power saving**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2014528 CR on RRM relaxation in R16 UE power saving**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1185 Cat: F (Rel-16)  
  
 Source: vivo*

**Abstract:**

Removed duplicated descriptions which are already captured in TS 38.304.

**Decision: Not pursued.**

**R4-2015482 Correction CR to Rel-16 UE power saving requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1275 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Correct some mistakes;

Made some clarifications

**Decision: Revised to R4-2017131 (from R4-2015482).**

**R4-2017131 Correction CR to Rel-16 UE power saving requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1275 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Correct some mistakes;

Made some clarifications

**Decision: Return to.**

**R4-2015574 CR to 38.133: Correction to relaxed measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1305 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

In TS38.331 v16.2.0, the combineRelaxedMeasCondition-r16 is defined as follows.

relaxedMeasurement-r16 SEQUENCE {

…

combineRelaxedMeasCondition-r16 ENUMERATED {true} OPTIONAL, -- Need R

…

}

The IE is either absent or configured as true.

However in TS38.133 v16.5.0 the requirement is specified as follows.

“…and combineRelaxedMeasCondition [2] not configured or configured but set to FALSE, …”

The IE cannot be set to FALSE so the requirement is incorrect.

**Decision: Agreed.**

**R4-2016066 CR for correcting wrong requirement for UE fulfilling not-at-cell edge criterion for measurement relaxation**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1359 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Current version of the specification wrongly lists a parameter related to low mobility condition in the section relative to UE fulfilling not-at-cell edge condition

**Decision: Not pursued.**

**R4-2016146 Corrections to UE power saving requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1360 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

During the transition period UE is required to apply a certain types of requirements, but it is not clear what they are or where they are defined. Also some references are corrected.

**Decision: Revised to R4-2017132 (from R4-2016146).**

**R4-2017132 Corrections to UE power saving requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1360 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

During the transition period UE is required to apply a certain types of requirements, but it is not clear what they are or where they are defined. Also some references are corrected.

**Decision: Return to.**

#### 7.6.2 RRM perf. requirements (38.133) [NR\_UE\_pow\_sav-Perf]

**R4-2014455 Work plan for power saving RRM test cases**

*Type: other For: Approval  
 Source: CATT*

**Decision: Revised to R4-2017135 (from R4-2014455).**

**R4-2017135 Work plan for power saving RRM test cases**

*Type: other For: Approval  
 Source: CATT*

**Decision: Return to.**

**R4-2017133 WF on RRM test cases for power saving**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017134 Big CR: Introduction of Rel-16 NR UE Power Saving RRM Performance requirements (TS 38.133)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-TBA Cat: B (Rel-16)  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: For e-mail approval.**

##### 7.6.2.1 General [NR\_UE\_pow\_sav-Perf]

**R4-2014370 Discussion on performance part for cell reselection**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014657 Discussion on test cases for power saving RRM**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2014835 Considerations on test cases for UE power saving RRM**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2016147 Discussions on UE power saving performance requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss and provide our view on the open issues in performance part that were identified at last meeting.

**Decision: Noted.**

##### 7.6.2.2 Test cases [NR\_UE\_pow\_sav-Perf]

**R4-2014371 CR on TS38.133 for cell reselection to FR1 inter-RAT E-UTRA test case with low mobility criterion**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The low mobility and not-at-cell edge criterion are introduced in Rel-16 so that UE can measure neighboring cell with relaxed measurement time. On the other hands, in last meeting, it has been agreed that the test case for cell reselection to lower priority E-UTRAN shall be defined in RRM performance part. Thus, the proposed test cases are provided in this CR.

**Decision: Revised to R4-2017136 (from R4-2014371).**

**R4-2017136 CR on TS38.133 for cell reselection to FR1 inter-RAT E-UTRA test case with low mobility criterion**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The low mobility and not-at-cell edge criterion are introduced in Rel-16 so that UE can measure neighboring cell with relaxed measurement time. On the other hands, in last meeting, it has been agreed that the test case for cell reselection to lower priority E-UTRAN shall be defined in RRM performance part. Thus, the proposed test cases are provided in this CR.

**Decision: Return to.**

**R4-2014409 Discussion on RRM test cases for power saving**

*Type: discussion For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2014410 CR for TS38.133, test case for cell reselection to FR1 intra-frequency NR case for power saving**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1170 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

It is agreed that the test cases for relaxed RRM measurement requirements should be defined.

**Decision: Revised to R4-2017137 (from R4-2014410).**

**R4-2017137 CR for TS38.133, test case for cell reselection to FR1 intra-frequency NR case for power saving**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1170 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

It is agreed that the test cases for relaxed RRM measurement requirements should be defined.

**Decision: Return to.**

**R4-2014656 RRM test cases for NR UE power saving**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

Add the RRM test cases for Rel-16 NR UE power saving

**Decision: Revised to R4-2017138 (from R4-2014656).**

**R4-2017138 RRM test cases for NR UE power saving**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

Add the RRM test cases for Rel-16 NR UE power saving

**Decision: Return to.**

**R4-2014836 CR for test case for cell reselection to FR1 inter-RAT E-UTRA for not at cell edge criterion**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1205 Cat: B (Rel-16)  
  
 Source: vivo*

**Abstract:**

Add test case for cell reselection to FR1 inter-RAT E-UTRA for not at cell edge criterion

**Decision: Revised to R4-2017139 (from R4-2014836).**

**R4-2017139 CR for test case for cell reselection to FR1 inter-RAT E-UTRA for not at cell edge criterion**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1205 Cat: B (Rel-16)  
  
 Source: vivo*

**Abstract:**

Add test case for cell reselection to FR1 inter-RAT E-UTRA for not at cell edge criterion

**Decision: Return to.**

**R4-2015483 Discussion on test cases for measurement relaxation in power saving**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015484 Test case for cell reselection to FR2 intra-frequency NR case for UE configured with relaxed measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Specify the test case for Cell reselection to FR2 intra-frequency NR case for UE configured with relaxed measurement criterion

**Decision: Revised to R4-2017140 (from R4-2015484).**

**R4-2017140 Test case for cell reselection to FR2 intra-frequency NR case for UE configured with relaxed measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Specify the test case for Cell reselection to FR2 intra-frequency NR case for UE configured with relaxed measurement criterion

**Decision: Return to.**

**R4-2016065 Draft CR on Cell reselection Tests for UE configured with relaxed measurement criterion**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm Incorporated*

**Abstract:**

No Cell Reselection tests are specified for UE configured with relaxed measurement criterion

**Decision: Revised to R4-2017141 (from R4-2016065).**

**R4-2017141 Draft CR on Cell reselection Tests for UE configured with relaxed measurement criterion**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm Incorporated*

**Abstract:**

No Cell Reselection tests are specified for UE configured with relaxed measurement criterion

**Decision: Return to.**

**R4-2016148 Cell reselection to FR2 inter-frequency NR case under power saving**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1361 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Inter-frequency cell reselection requirements were relaxed for UEs operating under power saving. However, test case is missing to verify the new requirements.

**Decision: Revised to R4-2017142 (from R4-2016148).**

**R4-2017142 Cell reselection to FR2 inter-frequency NR case under power saving**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1361 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Inter-frequency cell reselection requirements were relaxed for UEs operating under power saving. However, test case is missing to verify the new requirements.

**Decision: Return to.**

**R4-2016149 Discussions on testing cell reselection to FR2 inter-frequency NR case**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss the methods for testing the requirements for cell reselection to a FR2 inter-frequency NR case.

**Decision: Noted.**

### 7.7 NR Positioning Support [NR\_pos]

#### 7.7.1 General [NR\_pos-Core/Perf]

#### 7.7.2 RRM core requirements maintenance (38.133) [NR\_pos-Core]

================================================================================

**Email discussion: [97e][213] NR\_pos\_RRM\_1**

**R4-2017012 Email discussion summary for [97e][213] NR\_pos\_RRM\_1**

*Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017283 (from R4-2017012).**

**R4-2017283 Email discussion summary for [97e][213] NR\_pos\_RRM\_1**

*Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 05, 2020)

Sub-topic 4-7 UE capability for additional measurement gap patterns for PRS measurements

Agreement: Add a new feature to the RAN4 NR UE feature list

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 11. NR Positioning | 11-1 | Additional measurement gap patterns for PRS measurements | 1. MG pattern with MGL=10 ms, MGRP=80 ms for PRS measurements 2. MG pattern with MGL=20 ms, MGRP=160 ms for PRS measurements | RAN1 feature list: 13-1 Common DL PRS Processing Capability | Yes | N/A | The network cannot configure additional MG patterns for PRS measurements | Per UE | No | No | N/A | New MG patterns are applicable for PRS and NR/LTE RRM measurements i.e. new gaps are not shared between PRS and 2G/3G RRM measurements.  The new measurement gap patterns can be requested by the UE for FDD and TDD NR positioning measurements.  The new measurement gap patterns can be requested by the UE and configured by the network only when the UE is configured via LPP with NR positioning measurements requiring such gaps and can only be used during the corresponding positioning measurement period. | Optional with capability signalling |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

Sub-topic 1-5 Measurement period of multiple PRS layers – overlapping case (related to 4-4)

* Option 1 (existing requirement): Measurement period of multiple PRS layers is defined as summation of the measurement period in each frequency layer
* Option 2 (Ericsson): CSSF is the NR concept which is used for all types of measurements including RRM, scaling based on the number of frequency layers is the LTE concept. Hence, for the gap sharing case, CSSF shall be used in the requirements, but Σ over frequency layers shall be replaced with the max operator:

TRSTD, Total = maxi (TRSTD,i).

Discussion:

E///: the legacy CSSF concept relies on multiple frequency layers. The proposed concept is very different. We should follow the existing concept. For the existing CSSF concept we have problems with current equation.

Intel: we already discussed in the last meeting. We need to take into account UE processing capabilities and this is the reason to use different approach.

HW: we agree with E/// that the concept is different. However, not all measurement opportunities can be used due to UE processing capabilities and legacy approach does not work.

E///: we can use legacy CSSF concept and add a clarification on what happens when the processing capability is exceeded.

QC: Do not agree with E/// proposal. When the processing capability is not exceeded it is possible that Max() approach also works. Also, using the max(TRSTD) means that all layers should use the same MG.

HW: Do not agree with E///. In case we define requirements based on UE processing capabilities, then the spec will become very complex.

HW: Option 1 for topic 1-5 and 4-4 will cover the E/// proposal + extend to additional cases.

E///: this contradicts to the existing concept.

Agreement:

* Measurement period of multiple PRS layers – overlapping case
* Option 1 (HW, Intel, QC):
  + Measurement period of multiple PRS layers is defined as summation of the measurement period in each frequency layer
  + CSSF is only for the MG sharing between PRS and RRM layers. Count only a single PRS layer for a gap occasion in CSSF calculation for both PRS and RRM layers.
* Option 2 (E///):
  + CSSF is the NR concept which is used for all types of measurements including RRM, scaling based on the number of frequency layers is the LTE concept. Hence, for the gap sharing case, CSSF shall be used in the requirements, but Σ over frequency layers shall be replaced with the max operator:

TRSTD, Total = maxi (TRSTD,i).

* + Number of PRS layers to be counted in CSSF calculation is the number of frequency layers for PRS-based positioning measurements

Sub-topic 4-4 Number of PRS layers to be counted in CSSF calculation (related to 1-5)

* Option 1 (HW): CSSF is only for the MG sharing between PRS and RRM layers. Count only a single PRS layer for a gap occasion in CSSF calculation for both PRS and RRM layers.
* Option 2 (Ericsson): frequency layers for PRS-based positioning measurements

Sub-topic 1-3 Measurement period extension due to SSB collision

* Option 1 (CATT, Intel, HW, QC, OPPO): RSTD measurement period to be defined for cases when PRS samples are not dropped.
* Option 2 (OPPO): The same measurement period requirement shall be met, regardless of whether some the PRS symbols are dropped or not during this measurement period
* Option 3 (Ericsson): RAN4 decides among the following options for the dropped PRS (which are allowed according to RAN1):
  + - Option a: UE extends the RSTD measurement period in a specified way, based on the number of dropped PRS.
    - Option b: UE is allowed to extend the RSTD measurement period (clarified in the requirements) if more than N PRS are dropped, but the exact value is not specified.
    - Option c: The RSTD requirements apply, regardless of how many PRS are dropped.

Agreement:

Existing RSTD measurement period is defined for cases when PRS samples are not dropped.

UE is allowed to extend the RSTD measurement period if one or more PRS samples are dropped due to SSB collision, but the exact value is not specified.

Sub-topic 1-4 Measurement period when configured with PRS-RSRP

* Option 1 (CATT, Intel, HW, QC): RSTD measurement period shall not be impacted by PRS-RSRP measurement.
* Option 2 (Ericsson): When RSTD is configured together with PRS-RSRP and the required PRS-RSRP measurement period is longer than that for RSTD (configured without RSTD), then the RSTD measurement continues over the entire PRS-RSRP measurement period

Discussion:

HW: it is related to 2-2. Wonder when such situations can happen if both RSRP and RSTD use 4 samples.

E///: this is related to measurement period. This is related how CSSF is calculated. It can happen that RSTD is measured on multiple layers and RSRP is measured on a single layer. Our proposal is not to change the requirement but to clarify UE behavior.

QC: what is the situation being considered? Is UE doing TDOA with RSRP as a secondary measurement or UE doing AOA/TDOA. These scenarios may need to be treated separately.

HW: Scenarios mentioned by QC are valid. Need to further check in the 2nd round.

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017143 | WF on UE PRS measurement requirements | Huawei, HiSilicon |
|  |  |  |

**Topic #2: PRS-RSRP measurement**

Sub-topic 2-1 Measurement period extension due to SSB collision

Agreement: Follow the same conclusion for RSTD (in sub-topic 1-3).

Sub-topic 2-3 Measurement period of multiple PRS layers – overlapping case

Agreement: Follow the same conclusion for RSTD (in sub-topic 1-5).

Sub-topic 2-4 Measurement period of multiple PRS layers – non-overlapping case

Agreement: Follow the same conclusion for RSTD (in sub-topic 1-6).

Sub-topic 2-5 Measurement reporting requirements for non-periodic reporting

Agreement: Remove the following editor note in clause 9.9.3.4.

*Editor’s note: the measurement reporting requirements for aperiodic reports are FFS.*

**Topic #3: UE Rx-Tx time difference measurement**

Sub-topic 3-1 Measurement period extension due to SSB collision

Agreement: Follow the same conclusion for RSTD (in sub-topic 1-3).

Sub-topic 3-2 Measurement period when configured with PRS-RSRP

Agreement: Follow the same conclusion for RSTD (in sub-topic 1-4).

Sub-topic 3-3 Measurement period of multiple PRS layers – overlapping case

Agreement: Follow the same conclusion for RSTD (in sub-topic 1-5).

Sub-topic 3-4 Measurement period of multiple PRS layers – non-overlapping case

Agreement: Follow the same conclusion for RSTD (in sub-topic 1-6).

Sub-topic 3-5 Measurement reporting requirements for non-periodic reporting

Agreement:

Follow the same conclusion for PRS-RSRP (in sub-topic 2-5).

Remove the following editor note in clause 9.9.4.4.

*Editor’s note: the measurement reporting requirements for aperiodic reports are FFS.*

**Topic #4: Other requirements**

Sub-topic 4-1 Framework in defining CSSF for RRM/PRS MG sharing

Tentative agreement: Define CSSF based on existing framework unless technical issues are identified.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015751 | Merged |
| R4-2016391 | Revised |
| R4-2016558 | Merged |
| R4-2015753 | Revised |
| R4-2016393 | Merged |
| R4-2016557 | Merged |
| R4-2015369 | Revised |
| R4-2015755 | Merged |
| R4-2016395 | Merged |
| R4-2016559 | Merged |
| R4-2016999 | Revised |
| R4-2015757 | Merged |
| R4-2015758 | Revised |
| R4-2016397 | Merged |
| R4-2016556 | Revised |
| R4-2016156 | Revised |
| R4-2014282 | Approved |
|  |  |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2017143 WF on UE PRS measurement requirements**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.7.2.1 PRS-RSTD measurement requirements [NR\_pos-Core]

**R4-2014004 Measurement period for PRS-RSTD**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Withdrawn.**

**R4-2014445 Discussion on PRS RSTD measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014573 Further discussion on NR PRS RSTD measurement report requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014799 Further discussion on maintenance for RSTD measurement requirement**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: OPPO*

**Decision: Noted.**

**R4-2015750 Discussion on remaining issues for RSTD measurement requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015751 CR to update RSTD measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1323 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The measurement period is FFS for the case when measurement gaps and processing time T do not have overlap between different positioning frequency layers

The definition of Lprs used in defining measurement period is not fully clear

The measurement period requirements cannot apply if PRS is dropeed due to collision with SSB, or a resource sampling exceeds UE capability

**Decision: Merged.**

**R4-2016390 On UE positioning measurements: RSTD**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On UE positioning measurements: RSTD

**Decision: Noted.**

**R4-2016391 UE positioning measurements: RSTD**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1375 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Incomplete requirements, incorrect references

**Decision: Revised to R4-2017144 (from R4-2016391).**

**R4-2017144 UE positioning measurements: RSTD**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1375 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Incomplete requirements, incorrect references

**Decision: Return to.**

**R4-2016507 PRS-RSTD measurement period requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

This contribution addresses remaining issues related to PRS-RSTD measurement requirements.

**Decision: Noted.**

**R4-2016558 Revision of PRS-RSTD measurement period requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1396 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Clarify some aspects of the PRS-RSTD measurement period definition.

**Decision: Merged.**

##### 7.7.2.2 PRS-RSRP measurement requirements [NR\_pos-Core]

**R4-2014006 Requirements for PRS-RSRP measurements**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2014575 Discussion on UE RX-TX time difference measurement requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015369 CR on PRS-RSRP report mapping**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1254 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

CR R4-2009129 was agreed in RAN4#95e meeting but not implemented in 38.133.

**Discussion:**

The secretary commented that the CR number 1254 is missing on the coversheet.

**Decision: Revised to R4-2017146 (from R4-2015369).**

**R4-2017146 CR on PRS-RSRP report mapping**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1254 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

CR R4-2009129 was agreed in RAN4#95e meeting but not implemented in 38.133.

**Discussion:**

The secretary commented that the CR number 1254 is missing on the coversheet.

**Decision: Return to.**

**R4-2015752 Discussison on remaining issues for PRS-RSRP measurement requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015753 CR to update PRS-RSRP measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1324 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The measurement period is FFS for the case when measurement gaps and processing time T do not have overlap between different positioning frequency layers

The definition of Lprs used in defining measurement period is not fully clear

The reporting requirements for aperiodic reporting is FFS

**Decision: Revised to R4-2017145 (from R4-2015753).**

**R4-2017145 CR to update PRS-RSRP measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1324 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The measurement period is FFS for the case when measurement gaps and processing time T do not have overlap between different positioning frequency layers

The definition of Lprs used in defining measurement period is not fully clear

The reporting requirements for aperiodic reporting is FFS

**Decision: Return to.**

**R4-2016392 On UE positioning measurements: PRS-RSRP**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On UE positioning measurements: PRS-RSRP

**Decision: Noted.**

**R4-2016393 UE positioning measurements: PRS-RSRP**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1376 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Incomplete requirements, incorrect references

**Decision: Merged.**

**R4-2016557 Revision of PRS-RSRP measurement period requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1395 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Clarify some aspects of the PRS-RSRP measurement period definition.

**Decision: Merged.**

##### 7.7.2.3 UE Rx-Tx time difference measurement requirements [NR\_pos-Core]

**R4-2014003 UE Rx-Tx measurements**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2014446 Discussion on UE Rx-Tx time difference measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2015754 Discussison on remaining issues for UE Rx-Rx time difference measurement requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015755 CR to update UE Rx-Tx time difference measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1325 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The measurement period is FFS for the case when measurement gaps and processing time T do not have overlap between different positioning frequency layers

The definition of Lprs used in defining measurement period is not fully clear

The reporting requirements for aperiodic reporting is FFS

There is an editor note related to UE processing capability N

Applicability related to SRS/PRS time/frequency relation is not missing.

**Decision: Merged.**

**R4-2016394 On UE positioning measurements: UE Rx-Tx**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On UE positioning measurements: UE Rx-Tx

**Decision: Noted.**

**R4-2016395 UE positioning measurements: UE Rx-Tx**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1377 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Incomplete requirements, incorrect references

**Decision: Merged.**

**R4-2016508 UE Rx-Tx time difference measurement period requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

This contribution addresses remaining issues related to UE Rx-Tx time difference measurement requirements.

**Decision: Noted.**

**R4-2016559 Revision of UE Rx-Tx time difference measurement period requirements and applicability**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1397 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Specify applicability of UE Rx-Tx time difference measurement requirements when UL timing changes and clarify some aspects of the PRS-RSRP measurement period definition.

**Decision: Merged.**

##### 7.7.2.4 Other requirements [NR\_pos-Core]

**R4-2014005 New gap patterns for PRS measurements**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2014282 LS on new per-UE MG for NR positioning**

*Type: LS out For: Approval  
 to RAN2  
 Source: Apple*

**Abstract:**

Two information points are missing in the last LS R4-2012285: (1)these two new MG patterns are applicable for PRS and NR/LTE RRM measurements, i.e. new gaps are not shared between PRS and 2G/3G RRM measurements.

(2)these two new MG patterns are defined as

**Decision: Approved.**

**R4-2015756 Discussion on remaining issues in CSSF for PRS measurement**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015757 CR on CSSF for PRS measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1326 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

There are some remaining open issues in CSSF due to PRS measurement.

**Decision: Merged.**

**R4-2015758 CR to introduce new measurement gap patterns for positioning in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6977 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

New MG patterns have been introduced for positioning in 38.133. It is also agreed that the new MG patterns can be used for LTE measurement. The new patterns need to be also introduced in 36.133 because

1. The new MG patterns will impact the MG interruption on LTE serving cells in NE-DC

2. The new MG patterns will impact the LTE measurement, at least we need to define the effective measurement time as UE cannot search and measure for a duration of 9ms

**Decision: Revised to R4-2017148 (from R4-2015758).**

**R4-2017148 CR to introduce new measurement gap patterns for positioning in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6977 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

New MG patterns have been introduced for positioning in 38.133. It is also agreed that the new MG patterns can be used for LTE measurement. The new patterns need to be also introduced in 36.133 because

1. The new MG patterns will impact the MG interruption on LTE serving cells in NE-DC

2. The new MG patterns will impact the LTE measurement, at least we need to define the effective measurement time as UE cannot search and measure for a duration of 9ms

**Decision: Return to.**

**R4-2016156 Refinements on CSSF within gap to include NR positioning measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1362 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

CR 0941 was agreed at RAN4 #96-e in R4-2012286 on the matter of gap sharing between RRM and NR positioning measurements. This contained open issues such as how to define long-periodicicity NR measurements for positioning, which do not enter the gap competition, for PRS periodicities ≤160 ms and left the NR measurement term open.

**Decision: Revised to R4-2017150 (from R4-2016156).**

**R4-2017150 Refinements on CSSF within gap to include NR positioning measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1362 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

CR 0941 was agreed at RAN4 #96-e in R4-2012286 on the matter of gap sharing between RRM and NR positioning measurements. This contained open issues such as how to define long-periodicicity NR measurements for positioning, which do not enter the gap competition, for PRS periodicities ≤160 ms and left the NR measurement term open.

**Decision: Return to.**

**R4-2016505 General NR positioning measurement requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

This contribution discusses residual issues related to general requirements for NR positioning measurements

**Decision: Noted.**

**R4-2016556 Revision of NR positioning measurement requirements applicability**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1394 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Specify applicability of NR positioning measurement requirements under various scenarios

**Decision: Revised to R4-2017149 (from R4-2016556).**

**R4-2017149 Revision of NR positioning measurement requirements applicability**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1394 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Specify applicability of NR positioning measurement requirements under various scenarios

**Decision: Return to.**

**R4-2014798 CR to TS 38.133 on measurement period requirements for PRS RSTD, PRS-RSRP and UE Rx-Tx(section 9.9)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Decision: Revised to R4-2016999 (from R4-2014798).**

**R4-2016999 CR to TS 38.133 on measurement period requirements for PRS RSTD, PRS-RSRP and UE Rx-Tx(section 9.9)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

Chair: moved from AI 7.7.1

**Decision: Revised to R4-2017147 (from R4-2016999).**

**R4-2017147 CR to TS 38.133 on measurement period requirements for PRS RSTD, PRS-RSRP and UE Rx-Tx(section 9.9)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

Chair: moved from AI 7.7.1

**Decision: Return to.**

**R4-2016396 On CSSF for positioning measurements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On CSSF for positioning measurements

Chair: moved from AI 7.7

**Decision: Noted.**

**R4-2016397 Correction to CSSF for positioning measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1378 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Incomplete requirements

Chair: moved from AI 7.7

**Decision: Merged.**

#### 7.7.3 RRM perf. requirements (38.133) [NR\_pos-Perf]

================================================================================

**Email discussion: [97e][214] NR\_pos\_RRM\_2**

**R4-2017013 Email discussion summary for [97e][214] NR\_pos\_RRM\_2**

*Type: other For: Information  
Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017284 (from R4-2017013).**

**R4-2017284 Email discussion summary for [97e][214] NR\_pos\_RRM\_2**

*Type: other For: Information  
Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 05, 2020)

Sub-topic 1-1 Work plan of performance part

* Option 1 (Intel): the parallel discussions for the accuracy requirements and test cases are needed to meet RAN4 current target.
* Option 2 (Ericsson): For the test cases, the two-phases approach is needed.

Discussion:

E///: Accuracy and test cases should go in parallel. We can consider a phased approach for test cases based on the amount of work.

Sub-topic 2-1 SINR side condition for FR2

* Option 1 (QC, HW): -3dB for reference TRP and -10 dB for neighbor TRP
* Option 2 (CATT, Intel, Ericsson): -6dB for reference TRP and -13 dB for neighbor TRP

Discussion:

HW: can compromise to Option 2.

QC: the motivation for Option 1 is to have tighter requirements.

Intel: in the last meeting an issue on TDL-C and low SINR was raised. It is being addressed in this meeting separately.

QC: TDL-C issue was for FR1 and it is a different issue.

E///: requirements can be discussed separately. The side conditions are more related to the deployment characteristics.

Agreement:

SINR side condition for FR2

Reference TRP: -6dB

Neighbor TRP: -13dB

Sub-topic 2-2 Number of samples for accuracy requirements

* Option 1. (CATT, Huawei, Intel, Qualcomm): Single PRS sample which includes a number of PRS repetitions.
* Option 2 (Ericsson): The RSTD accuracy requirements shall apply for any DL-PRS-ResourceRepetitionFactor≥1 and any LPRS≥2 which is given by the higher-layer parameter dl-PRS-NumSymbols.

Moderator notes: the same conclusion can be applied for other measurements (e.g. PRS RSRP and UE Rx-Tx time difference)

Discussion:

E///: need to clarify the issue. The number of samples was already agreed.

Intel: this is about the definition of a single sample

QC: we discuss the basic measurement unit

E///: our intention that accuracy requirements shall be defined for no repetition case and for the case of multiple repetitions.

HW: we prefer to define the repetition as a side condition. For large BW we can define requirements without repetitions. For small BW we may need repetitions.

Agreements:

Define the requirements at least for the cases without repetition and multiple repetitions (within the slot and across the slots within one PRS period (i.e. TPRS)) can be considered for small BW

Sub-topic 2-9 How to define the accuracy requirements with the combinations of PRS BW and other parameters (e.g. comb size, repetition)

* Option 1 (Huawei). RAN4 to decide the combinations of PRS BW and repetitions for which the requirements are defined. The combinations that were used in the agreed simulation can be used as a starting point
* Option 1a (Qualcomm) Accuracy requirements would be specified as a function of PRS bandwidth and the total number of comb pattern repetitions contained in one PRS sample.
* Option 1b (Intel) Accuracy requirements should be defined at least regarding to PRS bandwidth and the number of comb size.
* Option 2 (Ericsson): The RSTD accuracy requirements shall apply for any DL-PRS-ResourceRepetitionFactor≥1 and any LPRS≥2 which is given by the higher-layer parameter dl-PRS-NumSymbols. On BW dependency*:*

**Table 1: RSTD accuracy in FR1**

|  |  |
| --- | --- |
| **Accuracy [Tc]** | **PRS BW [PRB]** |
| ±90 | TBD ≤ BW ≤ 48 |
| ±50 | 48 < BW≤ 132 |
| ±35 | BW >132 |

**Table 2: RSTD accuracy in FR2**

|  |  |
| --- | --- |
| **Accuracy [Tc]** | **PRS BW [PRB]** |
| ±80 | TBD ≤ BW ≤ 32 |
| ±40 | 32 < BW≤ 64 |
| ±30 | BW >64 |

Moderator notes: 2-9 cover the issues of 2-3,2-4, 2-10. the same conclusion can be applied for other measurements (e.g. PRS RSRP and UE Rx-Tx time difference)

Discussion

Chair: further fill in the tables in this meeting for RSTD accuracy for further analysis

**Table 1: RSTD accuracy in FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Accuracy [Tc]** | **PRS BW, MHz (or PRBs)** | **SCS, kHz** | **Repetition factor** | **Comb size** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Table 2: RSTD accuracy in FR2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Accuracy [Tc]** | **PRS BW, MHz (or PRBs)** | **SCS, kHz** | **Repetition factor** | **Comb size** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Sub-topic 5-2 Test cases for the different deployment scenarios

* Option 1 (Intel, Huawei): Only need to define the test cases for SA
* Option 2 (Ericsson). RAN4 will develop at least the following test cases for NR PRS-based positioning measurements in Rel-16:
  + *SA (FR1 and FR2) without CA,*
  + *NR-DC with FR1 PCell*

Discussion:

E///: Requirements cover also CA and NE-DC scenarios. As a compromise we can consider NR-DC as well.

HW: Do not understand why PRS measurement test cases should cover scenario which are not covered for all other RRM measurements. Do not see rationale behind Option 2.

E///: for NR-DC we aim to test positioning for both FR1 PCell and FR2 PSCell.

HW: why do we need FR2 PSCell. UE can do it even without PSCell?

Intel: based on RAN2 understanding the CA is not supported. In our understanding the requirements apply for PCell only.

Agreement:

Define test cases for

SA FR1 without CA

SA FR2 without CA

FFS: NR-DC with FR1 PCell and FR2 PSCell

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017151 | WF on UE PRS performance requirements | Intel Corporation |
|  |  |  |

**Topic #2: Measurement Accuracy Requirements for PRS RSTD**

2-11: Group delay calibration margin

Agreement:

Further decide on the group delay calibration margin.

Margin equals to zero if the reference and neighbouring resources are on the same frequency layer in FR1

**Topic #3: Measurement Accuracy Requirements for PRS RSRP**

3-2: Number of samples for PRS RSRP accuracy requirements

Agreement: Follow the same principle for that of RSTD measurement.

3-4: How to define the accuracy requirements with the combinations of PRS BW and repetitions

Agreement: Follow the same principle for that of RSTD measurement.

**Topic #4: Measurement Accuracy Requirements for UE Rx-Tx Time Difference**

4-2: Antenna panel assumption

Agreement: Follow the same conclusion as for RSTD requirements

4-3: Rx-Tx calibration error budget at UE and gNB

Agreement: Further decide on the margin to account for the group delay calibration error for both UE Rx and Tx. The margin for gNB can be FFS separately

4-5a: Applicability of accuracy requirements in the case of HO

Agreement: UE Rx-Tx time difference accuracy requirements do NOT apply with HO during the measurement period

**Topic #5: Test cases**

5-1: Test cases for the different positioning method

Agreement: No need to define separated E-CID test case in Rel16

5-2: Test cases for DRX

Agreement: NO DRX case will be tested only for NR positioning measurement requirements in Rel16

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2016400 | Revised |
| R4-2014450 | Merged |
| R4-2015760 | Revised |
| R4-2016405 | Merged |
| R4-2014451 | Revised |
| R4-2015762 | Merged |
| R4-2016403 | Merged |
| R4-2015764 | Merged |
| R4-2014452 | Merged |
| R4-2016407 | Revised |
| R4-2014572 | Revised |
| R4-2015370 | Revised |
| R4-2015766 | Merged |
| R4-2016401 | Approved |
| R4-2015567 | Revised |
|  |  |
|  |  |
|  |  |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2017151 WF on UE PRS performance requirements**

*Type: other For: Approval  
 Source: Intel Corporation*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.7.3.1 General [NR\_pos-Perf]

**R4-2014571 Discussion on NR Positioning test cases configuration and list**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014572 Draft CR to TS 38.133: PRS configurations for NR Pos RRM tests**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Intel Corporation*

**Decision: Revised to R4-2017156 (from R4-2014572).**

**R4-2017156 Draft CR to TS 38.133: PRS configurations for NR Pos RRM tests**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2015567 Work plan for NR Positioning RRM Performance part**

*Type: discussion For: Approval  
 Source: Intel Corporation*

**Decision: Revised to R4-2017158 (from R4-2015567).**

**R4-2017158 Work plan for NR Positioning RRM Performance part**

*Type: discussion For: Approval  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2016398 General discussion on NR RRM positioning test cases**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

General discussion on NR RRM positioning test cases

**Decision: Noted.**

##### 7.7.3.2 UE requirements and test cases [NR\_pos-Perf]

###### 7.7.3.2.1 Measurement accuracy requirements [NR\_pos-Perf]

7.7.3.2.1.1 PRS RSTD [NR\_pos-Perf]

**R4-2014447 Discussion on PRS RSTD accuracy requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014450 CR on PRS RSTD accuracy requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1181 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The performance requirements for RSTD measurement need to be specified.

**Discussion:**

The secretary commented that the CR number 1181 is missing on the coversheet.

**Decision: Merged.**

**R4-2014574 Discussion on NR PRS RSTD Measurement Accuracy Requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015759 Discussion on accuracy requirements for RSTD measurement**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015760 draftCR to introduce accuracy requirements for RSTD measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

There is no accuracy requirements for RSTD measurement.

**Decision: Revised to R4-2017153 (from R4-2015760).**

**R4-2017153 draftCR to introduce accuracy requirements for RSTD measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

There is no accuracy requirements for RSTD measurement.

**Decision: Return to.**

**R4-2016404 On RSTD measurement accuracy**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On RSTD measurement accuracy

**Decision: Noted.**

**R4-2016405 RSTD measurement accuracy**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1382 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RSTD measurements accuracy requirements are missing

**Decision: Merged.**

**R4-2016510 PRS-RSTD measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this contribution we discuss open issues concerning PRS-RSTD measurement accuracy and propse accuracy requirements.

**Decision: Noted.**

7.7.3.2.1.2 PRS RSRP [NR\_pos-Perf]

**R4-2014007 Accuracy requirements for PRS-RSRP measurements**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2014448 Discussion on PRS RSRP accuracy requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014451 CR on PRS-RSRP accuracy requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1182 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The performance requirements for PRS-RSRP measurement need to be specified.

**Discussion:**

The secretary commented that the CR number 1182 is missing on the coversheet.

**Decision: Revised to R4-2017154 (from R4-2014451).**

**R4-2017154 CR on PRS-RSRP accuracy requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1182 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The performance requirements for PRS-RSRP measurement need to be specified.

**Discussion:**

The secretary commented that the CR number 1182 is missing on the coversheet.

**Decision: Return to.**

**R4-2014578 Discussion on PRS RSRP accuracy requirements for NR Positioning**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014579 Link-level simulation results for PRS RSRP measurement**

*Type: other For: Information  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015761 Discussion on accuracy requirements for PRS-RSRP measurement**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015762 draftCR to introduce accuracy requirements for PRS-RSRP measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

There is no accuracy requirements for PRS-RSRP measurement.

**Decision: Merged.**

**R4-2016402 On PRS-RSRP measurement accuracy**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On PRS-RSRP measurement accuracy

**Decision: Noted.**

**R4-2016403 PRS-RSRP measurement accuracy**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1381 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

PRS-RSRP measurements accuracy requirements are missing

**Decision: Merged.**

**R4-2016509 PRS-RSRP measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this contribution we discuss residual issues concerning PRS-RSRP measurement accuracy.

**Decision: Noted.**

7.7.3.2.1.3 UE Rx-Tx time difference [NR\_pos-Perf]

**R4-2014449 Discussion on UE Rx-Tx time difference accuracy requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014452 CR on UE Rx-Tx time difference accuracy requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1183 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The performance requirements for UE Rx-Tx time difference measurement need to be specified.

**Discussion:**

The secretary commented that the CR number 1183 is missing on the coversheet.

**Decision: Merged.**

**R4-2014576 Discussion on UE RX-TX time difference measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014577 Link-level simulation results for UE RX-TX time difference measurement**

*Type: other For: Information  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015763 Discussion on accuracy requirements for UE Rx-Tx time difference measurement**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015764 draftCR to introduce accuracy requirements for UE Rx-Tx time difference measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

There is no accuracy requirements for UE Rx-Tx time difference measurement.

**Decision: Merged.**

**R4-2016406 On UE Rx-Tx measurement accuracy**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On UE Rx-Tx measurement accuracy

**Decision: Noted.**

**R4-2016407 UE Rx-Tx measurement accuracy**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1383 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

UE Rx-Tx measurements accuracy requirements are missing

**Decision: Revised to R4-2017155 (from R4-2016407).**

**R4-2017155 UE Rx-Tx measurement accuracy**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1383 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

UE Rx-Tx measurements accuracy requirements are missing

**Decision: Return to.**

**R4-2016511 UE Rx-Tx time difference measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this contribution we discuss open issues concerning UE Rx-Tx time difference measurement accuracy and propse accuracy requirements.

**Decision: Noted.**

###### 7.7.3.2.2 Test cases [NR\_pos-Perf]

**R4-2015370 CR on conditions for NR RSTD measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1255 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The conditions for NR RSTD measurement need to be defined when specifying the performance requirements for RSTD measurement in 38.133.

**Discussion:**

The secretary commented that the CR number 1255 is missing on the coversheet.

**Decision: Revised to R4-2017157 (from R4-2015370).**

**R4-2017157 CR on conditions for NR RSTD measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1255 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The conditions for NR RSTD measurement need to be defined when specifying the performance requirements for RSTD measurement in 38.133.

**Discussion:**

The secretary commented that the CR number 1255 is missing on the coversheet.

**Decision: Return to.**

**R4-2015765 Discussion on RRM test case for UE positioning requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015766 draftCR on PRS RMC for positioning test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 to define RRM test cases for positioning measurement, and a common RMC for PRS configuration is needed.

**Decision: Merged.**

**R4-2016399 NR RRM positioning test cases list and time plan**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

NR RRM positioning test cases list and time plan

**Decision: Noted.**

**R4-2016400 NR RRM positioning test cases structure**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1379 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

No specification structure for NR positioning test cases

**Decision: Revised to R4-2017152 (from R4-2016400).**

**R4-2017152 NR RRM positioning test cases structure**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1379 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

No specification structure for NR positioning test cases

**Decision: Return to.**

###### 7.7.3.2.3 Other [NR\_pos-Perf]

**R4-2016401 Correction to UE Rx-Tx measurement report mapping**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1380 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The parameter k used in the gNB timing measurement report mapping is corrected.

**Decision: Endorsed.**

##### 7.7.3.3 gNB requirements [NR\_pos-Perf]

================================================================================

**Email discussion: [97e][215] NR\_pos\_RRM\_3**

**R4-2017014 Email discussion summary for [97e][215] NR\_pos\_RRM\_3**

*Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017285 (from R4-2017014).**

**R4-2017285 Email discussion summary for [97e][215] NR\_pos\_RRM\_3**

*Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 05, 2020)

Issue 1-1-1: Selection of option for gNB measurement accuracy requirements

* Option 1: E///, Nokia
  + Define accuracy for SRS-RSRP and gNB Rx-Tx time difference
* Option 2: CATT, HW, CMCC
  + Define accuracy for SRS-RSRP, gNB Rx-Tx time difference and UL RTOA

Discussion:

HW: UL RTOA is the only UL measurement which can enable the UL-based positioning. Clear interest from vendors and operators.

E///: RTOA procedure is applicable only for the case of precise synch among the BSs. RTOA requires a lot of time and simulation efforts in RAN4.

Nokia: Same view as E///. UL RTOA has drawbacks comparing to other methods incl. synchronization and increased UE power consumption. Multi-RTT has some benefits. We see one operator involved in the discussion.

Intel: slightly prefer Option 2 in case the UL RTOA requirements can reuse the gNB Rx-Tx.

QC: ok with either Option. Slight preference for Option 2.

HW: to E/// for synch we are defining the measurement requirements which does not mandate any gNB synchronization. For example DL methods also require tight synchronization but it does not mean we need to remove those. We can reuse the gNB Rx-Tx time different requirements.

HW: to Nokia we should not discuss different positioning methods and should simply enable the requirements for all method so that vendors and operators can decide which one to use. Requirements are suggested to be defined based on Rel-16 SRS.

E///: do not think we can reuse the gNB Rx-Tx requirements.

Nokia: agree with E/// statement. We have concern on non-guaranteed transmission which is planned to be addressed in Rel-17.

Huawei: to E/// what really matters is Es/Iot for the measurement accuracy. For non-guaranteed transmission the issue applies to gNB Rx-Tx as well.

Agreement:

Define measurement accuracy requirements for

SRS-RSRP

gNB Rx-Tx time difference

FFS: UL RTOA

Further investigate whether the accuracy requirements for gNB Rx-Tx can be reused. If there are no technical issues to reuse gNB Rx-Tx time difference requirements, then the UL RTOA requirements will be defined.

Further study the impact from non-guaranteed SRS transmission for different methods

Issue 1-2-1: Optionality of gNB measurement accuracy requirements

* Option 1: QC, CATT, ZTE, HW
  + Mandatory for gNB to meet accuracy for supported positioning measurement
* Option 2: E///, Nokia
  + gNB shall meet accuracy requirements for supported positioning measurement as declared by the manufacturer

Discussion:

E///: The BS hardware is fixed. It is much better to give a recommendation rather than a requirement.

Nokia: Same view as E///. It cannot be mandated that gNB support each and every combination of parameters (e.g. BW, supported SRS configurations, etc).

Agreement:

gNB shall meet accuracy requirements for supported positioning measurement for the test configurations (e.g. CBW, SRS configurations, etc) declared by the manufacturer

Issue 1-3-1: Side conditions (e.g. SINR) for applicability of accuracy

* Option 1: CATT, QC
  + One set of side conditions to meet accuracy for UE in serving as well as in neighbour cells
* Option 2: ZTE, HW, E///, Nokia
  + Accuracy is defined for two different side conditions (two sets of Es/Iot).

Agreement: Accuracy is defined for two different side conditions (two sets of Es/Iot)

High SNR side condition (Es/Iot1) which corresponds to for example typical serving cell conditions or low interference neighbor cell conditions

Low SNR side condition (Es/Iot2) which corresponds to for example typical neighbor cell conditions

Issue 1-3-2: If two conditions are used for applicability of accuracy then whether they depend on cell type?

* Option 1: ZTE, Nokia, E///
  + One side condition is to meet accuracy for UE in serving and another one for UE in neighbour cells
* Option 2: HW, QC
  + The two sets of Es/Iot conditions are agnostic to cell type

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017159 | WF on gNB positioning measurement requirements | Ericsson |
| R4-2017160 | Updated system simulation assumptions on gNB positioning measurement for deriving side conditions | Ericsson |

**Topic #1: gNB requirements**

Issue 1-3-3: How to derive side conditions (e.g. SINR)

Agreements: Based on system simulations. Note: as agreed in issue 1-3-1 there will be two different side conditions: low Es/Iot and high Es/Iot values.

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015770 | Noted |
| R4-2016062 | Revised |

2nd round email discussion conclusions

================================================================================

**R4-2017159 WF on gNB positioning measurement requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017160 Updated system simulation assumptions on gNB positioning measurement for deriving side conditions**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014002 gNB requirements for NR positioning**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Abstract:**

This paper discusses some pending issues left from last meeting

**Decision: Noted.**

**R4-2014453 Discussion on gNB measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2015767 Discussion on the scope gNB requirements for NR positioning**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon, CMCC*

**Decision: Noted.**

**R4-2015768 Discussion on gNB positioning measurement requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015769 System and link level simulation results for gNB measurement requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015770 draftCR to introduce accuracy requirements for gNB positioning measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

There is no accuracy requirements for gNB positioning measurement.

**Decision: Postponed.**

**R4-2016062 gNB timing positioning measurement report mapping update for k**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1358 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The parameter k used in the gNB timing measurement report mapping is corrected.

**Decision: Revised to R4-2017161 (from R4-2016062).**

**R4-2017161 gNB timing positioning measurement report mapping update for k**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1358 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The parameter k used in the gNB timing measurement report mapping is corrected.

**Decision: Return to.**

**R4-2016088 gNB Positioning Requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on WF from the last meeting and a proposal to split the requirements.

**Decision: Noted.**

**R4-2016109 gNB Positioning UL SRS System Simulation Results**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Simulation results according to agreed assumptions.

**Decision: Noted.**

**R4-2016154 gNB Positioning UL SRS Link Level Simulation Results**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Simulation results according to agreed assumptions

**Decision: Noted.**

**R4-2016157 On gNB measurement accuracy requirements for NR positioning**

*Type: discussion For: Agreement  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion on gNB measurement accuracy requirements for NR positioning.

**Decision: Noted.**

**R4-2016158 System simulation results for SRS for NR positioning**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Partial system simulation results for SRS for NR positioning.

**Decision: Noted.**

**R4-2016159 System simulation results for SRS for NR positioning**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Updated system simulation results for SRS for NR positioning.

**Decision: Noted.**

**R4-2016506 gNB requirements for positioning**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

This contribution discusses remaining issues about gNB requirements for NR positioning

**Decision: Noted.**

### 7.8 Physical layer enhancements for NR URLLC [NR\_L1enh\_URLLC-Core]

### 7.9 Enhancements on MIMO for NR [NR\_eMIMO]

#### 7.9.2 RRM core requirements maintenance (38.133) [NR\_eMIMO-Core]

================================================================================

**Email discussion: [97e][216] NR\_eMIMO\_RRM**

**R4-2017015 Email discussion summary for [97e][216] NR\_eMIMO\_RRM**

*Type: other For: Information  
Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017286 (from R4-2017015).**

**R4-2017286 Email discussion summary for [97e][216] NR\_eMIMO\_RRM**

*Type: other For: Information  
Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 06, 2020)

Issue 3-1-3: Accuracy requirements of L1-SINR under normal condition

* Proposals
  + Option 1: For Scenario 1A: ±5 dB in FR1 and ±6.5 dB in FR2; for CMR + IMR: ±3.5 dB in FR1 and ±5 dB in FR2 (Qualcomm)
    - Option 1a: same requirement for FR1 and FR2 for CMR only; Different for CMR+IMR. (Apple)
  + Option 2: For Scenario 1A: ±4.5 dB in FR1 and ±4.5 dB in FR2; for CMR + IMR: ±4 dB in FR1 and ±4 dB in FR2 (MediaTek)
  + Option 3: +/-4.0dB for Scenario 1A; +/-3.5 dB for Scenario 2A and 2B; and +/-3.0dB for Scenario 2C and 2D (Samsung)
  + Option 4: +/-3.5dB for Scenario 1A, 2A and 2B; and +/-3.0dB for Scenario 2C and 2D (Huawei)
* Moderator’s opinion: Key point of this issue is to decide how many levels for the accuracy requirements. After that we can derive the concrete number from the determined methodology. We can discuss in the 1st round GTW session for details.
* Tentative agreements: Discuss on How many levels for accuracy requirement:
  + Option 1 (QC, MTK): two levels [1A], [2A, 2B, 2C, 2D]
  + Option 2 (SS): three levels [1A], [2A, 2B], [2C, 2D]
  + Option 3 (HW): two levels [1A, 2A, 2B], [2C, 2D]

Discussion:

MTK: 5 scenarios. Need to group the requirements.

Apple: no need to group the requirements.

E///: we need to check the results first.

Issue 3-1-4: Difference of accuracy requirements of L1-SINR between FR1 and FR2

* Proposals
  + Option 1: No obvious difference as it is SINR (MediaTek, Huawei, Samsung, CMCC, Intel)
  + Option 2: Consider RF margin 1.5dB higher for FR2 than FR1(Qualcomm)
    - Option 2a: Same RF margin for CMR only; 1.5 dB higher for FR2 (Apple)
* Moderator’s opinion: We can discuss in the 1st round GTW session for details. Option 2a (difference between FR1 and FR2 for CMR only scenario) would be a compromise solution.
* Tentative agreements: Discuss on accuracy requirement difference between FR1 and FR2
  + Option 1: No obvious difference
  + Option 2: FR2 1.5dB higher than FR1
  + Option 3: Difference exists for CMR only scenario

Discussion

QC: We need to have higher margin for FR2 due to directivity.

Samsung: L1-SINR RF margin should be smaller than for L1-RSRP case which already has 1.5dB

MTK: RAN1 agreement is that UE needs to use same Rx beam from channel and interference measurements. So, we think that the margin is not needed.

Apple: For CMR both noise and interference are measured on the same resource. So, all RF margins are cancelled out. For IMR the measurements are done on different Tx beams. Even if Rx beam is same then there still may be some mismatch.

MTK: not clear how different Tx beams will affect the accuracy

Apple: we make channel and interference measurements at different time. We cannot make sure that RF parameters are same.

HW: For CMR+IMR scenario as MTK mentioned UE will use same Rx beam and no margin needed

Intel: same view as MTK. In case of different Tx beams and same Rx beams there is no impact on accuracy and rather on side conditions.

Agreements:

Follow RAN1 assumption that UE uses same Rx beam for channel and interference measurements for both CMR only and CMR+IMR cases

Margins for L1-SINR accuracy requirements

CMR only measurements: same implementation margin is applied for FR1 and FR2. No FR2 specific margin is applied.

CMR+IMR measurements: additional FR2 margin is FFS

Issue 3-1-5: Accuracy requirements of L1-SINR under extreme condition

* Proposals
  + Option 1: 1dB higher for extreme condition than normal condition (Samsung, Ericsson)
  + Option 2: Other values (Qualcomm, Apple)
    - Option 2a: 2dB higher for extreme condition than normal condition (MediaTek)
* Moderator’s opinion: We can discuss in the 1st round GTW session for details.
* Tentative agreements: Discuss in the GTW, extreme condition compared to normal condition
  + Option 1: 1dB higher
  + Option 2: other values (proponent could give their proposal)

Discussion:

MTK: we have 2dB for L1-RSRP

Samsung: we need to follow SS-SINR which has 1dB higher

MTK: SS-SINR is L3 measurement with 5 samples. L1-SINR is 1 sample and is quite different.

Samsung: L1-SINR is not an absolute metric comparing to L1-RSRP and accuracy should be better.

E///: for SSB-based L1-RSRP the difference is 1dB under extreme conditions

MTK: need to check the values

Apple: sometimes the delta is up to 4.5dB for RSRP for absolute case and 1 dB for relative RSRP

E///: for relative accuracy the margin is 1 dB

Agreement: Accuracy requirements of L1-SINR under extreme condition is

* Option 1: 1dB higher than for normal condition (Samsung, Ericsson)
* Option 2: 2dB higher than for normal condition
* Other options are not precluded

Issue 3-2-3: Io condition of dBm/BWChannel for accuracy requirement

* Proposals
  + Option 1: Define accuracy requirement for “Max Io -50 dBm” only (MediaTek, Qualcomm, Huawei, Samsung)
  + Option 2: Define accuracy requirement for “Max Io -70 dBm” and “Min Io -70 dBm + Max Io -50 dBm” (Ericsson)
* Moderator’s opinion: We can discuss in the 1st round GTW session for details.
* Tentative agreements: Discuss on Io condition of dBm/BWChannel for accuracy requirement
  + Option 1: “Max Io -50 dBm” only
  + Option 2: “Max Io -70 dBm” and “Min Io -70 dBm + Max Io -50 dBm”

Agreement: Define accuracy requirement for “Max Io -50 dBm” only

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017164 | WF on NR eMIMO RRM Performance requirements | Samsung |
|  |  |  |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015826 | Revised |
| R4-2016240 | Revised |
| R4-2014291 | Revised |
| R4-2014757 | Revised |
| R4-2015473 | Revised |
| R4-2014606 | Revised |
| R4-2015829 | Revised |

2nd round email discussion conclusions

================================================================================

**R4-2014244 Discussion on RRM requirements for Multi-TRP**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014245 CR to 38.133 on RRM requirements for multi-TRxP**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1143 Cat: F (Rel-16)  
  
 Source: Apple*

**Abstract:**

In RAN4#96e it was agreed that there are no impacts to MRTD requirements due to multi TRxP deployment and in addition it was captured in chairman’s notes that signals from multi-TRxPs of the same serving cell will be received within CP in intra-band contiguous CA scenarios. The agreement doesn’t cover the case of multiple CCs. There is a need to further clarify that signals from all CCs and multi-TRxP are received within CP.

**Decision: Return to.**

**R4-2014246 CR to 38.133 on Link recovery requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1144 Cat: F (Rel-16)  
  
 Source: Apple*

**Abstract:**

PBFD and PCBD was introduced in Rel-16 eMIMO for BFD and CBD respectively for SCell. Currently, PBFD and PCBD are defined as:

The values of PBFD used in Table 8.5.3.2-1 and Table 8.5.3.2-2 are defined as

For each CSI-RS resource in the set configured for PCell or PSCell

-PBFD = 1,.

For each CSI-RS resource in the set configured for a Scell

-PBFD is the number of band(s) on which UE is performing beam failure detection only for Scell.

The values of PCBD used in Table 8.5.5.2-1 and Table 8.5.5.2-2 are defined as

For each SSB resource in the set configured for Pcell or PSCell

-PCBD = 1.

For each SSB resource in the set configured for a Scell

-PCBD is the number of band(s) on which UE is performing candidate beam detection only for Scell.

The values of PCBD used in Table 8.5.6.2-1 and Table 8.5.6.2-2 are defined as

For each CSI-RS resource in the set configured for Pcell or PSCell

-PCBD = 1.

For each CSI-RS resource in the set configured for a Scell

-PCBD is the number of band(s) on which UE is performing candidate beam detection only for Scell.

Based on the current definition of PBFD and PCBD, for each resource in PCell or PSCell, the value is 1. This would be fine for SA, EN-DC and NE-DC when only PCell or PScell are configured. But this doesn’t cover NR-DC when we have both PCell and PScell configured.

The definition of PBFD and PCBD needs be updated to cover NR-DC case.

As an example, the proposed change for PCBD for SSB based CBD is captured below:

The values of PCBD used in Table 8.5.5.2-1 and Table 8.5.5.2-2 are defined as

For each SSB resource in the set configured for PCell or PSCell in EN-DC or NE-DC or SA; or PCell in NR-DC

- PCBD = 1.

For each SSB resource in the set configured for PSCell in NR-DC

- PCBD = 1 + number of band(s) on which UE is performing candidate beam detection only for SCell.

For each SSB resource in the set configured for a Scell

- PCBD is the number of band(s) on which UE is performing candidate beam detection only for Scell in EN-DC or NE-DC or SA

- PCBD = 1+ number of band(s) on which UE is performing candidate beam detection only for Scell.

Similar changes are required for PBFD and PCBD for CSI-RS based CBD

**Discussion:**

The secretary asked what is the correct Version? It reads 16.2.0 on the coversheet but the CR is allocated for 16.5.0.

**Decision: Return to.**

**R4-2015826 CR: Clarification of L1-SINR reporting with CSI-RS based CMR and dedicated IMR configured**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1334 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Clarification of L1-SINR reporting with CSI-RS based CMR and dedicated IMR configured.

**Decision: Revised to R4-2017165 (from R4-2015826).**

**R4-2017165 CR: Clarification of L1-SINR reporting with CSI-RS based CMR and dedicated IMR configured**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1334 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Clarification of L1-SINR reporting with CSI-RS based CMR and dedicated IMR configured.

**Decision: Return to.**

**R4-2016029 DraftCR to TS38.133 on L1-SINR Measurement Requirement**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Samsung*

**Abstract:**

L1-SINR measurement is introduced in Rel-16 MIMO enhancement work item. Accordingly, L1-SINR measurement requirement needs to be defined. However, current section 9.8 for L1-SINR measurement requirement in TS38.133 is not complete.

**Decision: Return to.**

#### 7.9.3 RRM perf. requirements (38.133) [NR\_eMIMO-Perf]

**R4-2017164 WF on NR eMIMO RRM Performance requirements**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.9.3.1 General [NR\_eMIMO-Perf]

**R4-2014756 Discussion on RRM Performance part for Rel-16 NR eMIMO**

*Type: discussion For: Approval  
 Source: Samsung*

**Decision: Noted.**

##### 7.9.3.2 L1-SINR measurement accuracy [NR\_eMIMO-Perf]

**R4-2014247 Simulation results for L1-SINR Measurement accuracy**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014297 Requirements for L1-SINR measurement accuracy**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

We present the simulation results in this contribution and propose L1-SINR accuracy values.

**Decision: Noted.**

**R4-2014603 Discussion on L1-SINR measurement accuracy requirement**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014758 Simulation results summary for L1-SINR measurement accuracy**

*Type: discussion For: Information  
 Source: Samsung*

**Decision: Noted.**

**R4-2014759 Discussion on L1-SINR measurement accuracy requirement**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2015471 Discussion on L1-SINR measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016239 Simulation results of L1-SINR measurement accuracy**

*Type: other For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The document has presented the simulation results of L1-SINR measurement accuracy for CMR-only, SSB+NZP-IMR, SSB+ZP-IMR, CSI-RS+NZP-IMR and CSI-RS+ZP-IMR.

**Decision: Noted.**

**R4-2016240 CR to TS 38.133: Adding L1-SINR accuracy requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Following the approval of the L1-SINR measurement requirements, the L1-SINR accuracy requirements need to be specified.

**Decision: Revised to R4-2017166 (from R4-2016240).**

**R4-2017166 CR to TS 38.133: Adding L1-SINR accuracy requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Following the approval of the L1-SINR measurement requirements, the L1-SINR accuracy requirements need to be specified.

**Decision: Return to.**

##### 7.9.3.3 Test cases [NR\_eMIMO-Perf]

###### 7.9.3.3.1 L1-SINR measurements [NR\_eMIMO-Perf]

**R4-2014291 Draft test case CR on measurement procedure of L1-SINR for CSI-RS-based CMR and no dedicated IMR**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The core requirements were completed in discussions and specified in R4 96-e. This CR aims to introduce the L1-SINR measurement procedure test case for the scenario of CSI-RS based CMR and no dedicated IMR.

**Decision: Revised to R4-2017167 (from R4-2014291).**

**R4-2017167 Draft test case CR on measurement procedure of L1-SINR for CSI-RS-based CMR and no dedicated IMR**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The core requirements were completed in discussions and specified in R4 96-e. This CR aims to introduce the L1-SINR measurement procedure test case for the scenario of CSI-RS based CMR and no dedicated IMR.

**Decision: Return to.**

**R4-2014604 Discussion on test cases for L1-SINR measurement**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014757 DraftCR on L1-SINR measurement test case with CSI-RS CMR and dedicated IMR**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Samsung*

**Abstract:**

In Rel-16, the L1-SINR measurement procedure requirement is defined. Therefore the according test cases should be defined in Annex A. In this draft CR, CSI-RS based CMR and dedicated IMR scenario is introduced.

**Decision: Revised to R4-2017168 (from R4-2014757).**

**R4-2017168 DraftCR on L1-SINR measurement test case with CSI-RS CMR and dedicated IMR**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Samsung*

**Abstract:**

In Rel-16, the L1-SINR measurement procedure requirement is defined. Therefore the according test cases should be defined in Annex A. In this draft CR, CSI-RS based CMR and dedicated IMR scenario is introduced.

**Decision: Return to.**

**R4-2015472 Discussion on L1-SINR measurement tests for NR eMIMO**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015473 DraftCR on L1-SINR measurement procedure tests with SSB based CMR and dedicated IMR**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

In Rel-16, the L1-SINR measurement procedure tests with SSB based CMR and dedicated IMR need to be introduced for NR eMIMO.

**Decision: Revised to R4-2017169 (from R4-2015473).**

**R4-2017169 DraftCR on L1-SINR measurement procedure tests with SSB based CMR and dedicated IMR**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

In Rel-16, the L1-SINR measurement procedure tests with SSB based CMR and dedicated IMR need to be introduced for NR eMIMO.

**Decision: Return to.**

**R4-2015827 Simulation results of L1-SINR measurement accuracy**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution provides the simulation results of L1-SINR measurement accuracy.

**Decision: Noted.**

###### 7.9.3.3.2 BFR for SCell [NR\_eMIMO-Perf]

**R4-2014605 Discussion on test cases for SCell BFR**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014606 Introduction of test cases for BFD and link recovery procedure for Scell**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The discussion of RRM core part for SCell BFR has been closed and it has been agreed that the test case for SCell BFR shall be defined in performance part. According to email discussion, the SCell BFR is divided into two categories as follows:

BFD and link recovery procedure (UE is not provided by schedulingRequestID-BFR-SCell-r16)

Link Recovery with Link Recovery Request (UE is provided by schedulingRequestID-BFR-SCell-r16)

The details between these two categories is discussed in discussion paper and the test case in this CR is defined for category 1 “BFD and link recovery procedure”.

**Decision: Revised to R4-2017170 (from R4-2014606).**

**R4-2017170 Introduction of test cases for BFD and link recovery procedure for Scell**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The discussion of RRM core part for SCell BFR has been closed and it has been agreed that the test case for SCell BFR shall be defined in performance part. According to email discussion, the SCell BFR is divided into two categories as follows:

BFD and link recovery procedure (UE is not provided by schedulingRequestID-BFR-SCell-r16)

Link Recovery with Link Recovery Request (UE is provided by schedulingRequestID-BFR-SCell-r16)

The details between these two categories is discussed in discussion paper and the test case in this CR is defined for category 1 “BFD and link recovery procedure”.

**Decision: Return to.**

**R4-2015828 Link recovery test with link recovery requests**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the test case for link recovery with LRR

**Decision: Noted.**

**R4-2015829 Draft CR: Introduction of test case of link recovery with link recovery requests**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Ericsson*

**Abstract:**

Introduction of test case of link recovery with link recovery requests

**Decision: Revised to R4-2017171 (from R4-2015829).**

**R4-2017171 Draft CR: Introduction of test case of link recovery with link recovery requests**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Ericsson*

**Abstract:**

Introduction of test case of link recovery with link recovery requests

**Decision: Return to.**

###### 7.9.3.3.3 DL/UL beam indication with reduced latency and overhead [NR\_eMIMO-Perf]

**R4-2014010 Test cases for applicable timing for PL RS activated by MAC-CE**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Return to.**

**R4-2014011 [draft CR] Test cases for applicable timing for PL RS activated by MAC-CE**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE Corporation*

**Abstract:**

Add test cases for delay requirements for pathloss RS activation / update.

**Decision: Return to.**

###### 7.9.3.3.4 Others [NR\_eMIMO-Perf]

**R4-2014292 Draft test case CR on measurement performance of L1-SINR for CSI-RS-based CMR and no dedicated IMR**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The core requirements were completed in discussions and specified in R4 96-e. This CR aims to introduce the test case of measurement performance for the scenario of CSI-RS based CMR and no dedicated IMR.

**Decision: Return to.**

**R4-2015474 DraftCR on L1-SINR measurement accuracy tests with SSB based CMR and dedicated IMR**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

In Rel-16, the L1-SINR measurement accuracy tests with SSB based CMR and dedicated IMR need to be introduced for NR eMIMO.

**Decision: Return to.**

### 7.10 Add support of NR DL 256QAM for FR2 [NR\_DL256QAM\_FR2]

### 7.11 RF requirements for NR frequency range 1 (FR1) [NR\_RF\_FR1]

#### 7.11.2 RRM core requirements maintenance (38.133) [NR\_RF\_FR1-Core]

================================================================================

**Email discussion: [97e][217] NR\_RF\_FR1\_RRM**

**R4-2017016 Email discussion summary for [97e][217] NR\_RF\_FR1\_RRM**

*Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017287 (from R4-2017016).**

**R4-2017287 Email discussion summary for [97e][217] NR\_RF\_FR1\_RRM**

*Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017173 | WF on test case for DL interruption due to Tx switching between two uplink carriers | Huawei, HiSilicon |
|  |  |  |

**Topic #2: Test case**

Issue 2-1-2: Whether MRTD is considered in test cases

Agreement

* No MRTD is set in the test.

Issue 2-1-3: SRS configuration in the special slot

Agreement

* SRS configuration refers to SRSConf.1 in Table A.4.4.1.1.1-3 in TS 38.133 except that:
  + resourceMappingstartPosition: 0
  + resourceMappingnrofSymbols: n2

Issue 2-2-1: TDD configuration

Agreement

* Carrier#2 TDD UL/DL pattern is 3D1S4U, S = 10DL: 2GP: 2UL

Issue 2-2-2: Which symbol to be verified?

Agreement

* symbol #4 or symbol#5 or symbol #8 on the special slot on NR TDD carrier depending on UE capability *uplinkTxSwitchingPeriod*
* symbol level DL interruption can’t be verified in LTE

Issue 2-3-1: TDD configuration

Agreement

* Carrier#2 TDD UL/DL pattern is 3D1S4U, S = 10DL: 2GP: 2UL

Issue 2-3-2: Which symbol to be verified?

Agreement

* For NR FDD carrier (Cell 1), this test verifies that the UE correctly receive the PDCCH scheduled on the symbol #8 or symbol #9 or symbol #10 in the second slot of every 4 slots (i.e., the slot overlapping with the special slot of the NR TDD carrier) depending on UE capability *uplinkTxSwitchingPeriod*
* For NR TDD carrier (Cell 2), this test verifies that the UE correctly receive the PDCCH scheduled on the symbol #4 or symbol #5 or symbol #8 on the special slot depending on UE capability *uplinkTxSwitchingPeriod*

Issue 2-4-1: TDD configuration

Agreement

* - Carrier#1 TDD UL/DL pattern is 3D1S4U, S = 10DL: 2GP: 2UL;
* - Carrier#2 TDD UL/DL pattern is 1D1S2U, S = 10DL: 2GP: 2UL

Issue 2-4-2: Which symbol to be verified?

Agreement

* For NR TDD PCell (Cell 1), this test verifies that the UE correctly receive the PDCCH scheduled on the symbol #4 or symbol #5 or symbol #8 on the special slot depending on UE capability uplinkTxSwitchingPeriod.
* For NR TDD SCell (Cell 2), this test verifies that the UE correctly receive the PDCCH scheduled on the symbol #4 or symbol #5 or symbol #8 on the 2nd special slot of every 8 slots depending on UE capability uplinkTxSwitchingPeriod.

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014505 | Return to |
| R4-2014506 | Return to |
| R4-2015488 | Agreed |
| R4-2014504 | Return to |
| R4-2014734 | Return to |
| R4-2015487 | Return to |

2nd round email discussion conclusions

================================================================================

**R4-2014505 CR to TS 38.133: Add information on the inter-band EN-DC and UL CA configurations with no DL interruption**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1184 Cat: F (Rel-16)  
  
 Source: China Telecom*

**Abstract:**

In RAN4 #96e, it was agreed in WF R4-2011731 that DL interruption is not allowed for some inter-band EN-DC and UL CA configurations. The exact EN-DC and UL CA configurations for which DL interruptions are not allowed will be captured in TS 38.101-1 and TS 38.101-3 respectively, as seen in our companion CRs in

R4-2015195/6.

Meanwhile, since the DL interruption requirements for Tx switching are specified in TS 38.133 and TS 36.133, it is proposed to add the related information to TS 38.133 and TS 36.133 as well.

**Decision: Return to.**

**R4-2014506 CR to TS 36.133: Add information on the inter-band EN-DC configurations with no DL interruption**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6963 Cat: F (Rel-16)  
  
 Source: China Telecom*

**Abstract:**

In RAN4 #96e, it was agreed in WF R4-2011731 that DL interruption is not allowed for some inter-band EN-DC and UL CA configurations. The exact EN-DC and UL CA configurations for which DL interruptions are not allowed will be captured in TS 38.101-1 and TS 38.101-3 respectively, as seen in our companion CRs in

R4-2015195/6.

Meanwhile, since the DL interruption requirements for Tx switching are specified in TS 38.133 and TS 36.133, it is proposed to add the related information to TS 38.133 and TS 36.133 as well.

**Decision: Return to.**

**R4-2015488 Correction on DL interruption on Tx Switching between two uplink carriers**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1276 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The uplink switching mechanism in TS38.214 is captured in clause 6.1.6;

The interruption length due to uplink switching in NR SA for 210us switching period is not corrected implemented in the spec. (The DL interruption length was agreed in R4-2008623)

**Decision: Agreed.**

#### 7.11.3 RRM perf. requirements (38.133) [NR\_RF\_FR1-Perf]

**R4-2017173 WF on test case for DL interruption due to Tx switching between two uplink carriers**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017172 Big CR: Introduction of Rel-16 NR FR1 RF WI RRM performance requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-TBA Cat: B (Rel-16)  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: For e-mail approval.**

**R4-2014503 Discussion on test case for DL interruptions at UE switching between two uplink carriers**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2014504 Draft CR to TS 38.133: Test case for DL interruptions at UE switching between two uplink carriers in FDD+TDD inter-band CA case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: China Telecom*

**Abstract:**

Test case for DL interruptions at UE switching between NR uplink carrier 1 and NR uplink carrier 2 in FDD+TDD inter-band uplink CA case shall be specified.

**Decision: Return to.**

##### 7.11.3.1 General [NR\_RF\_FR1-Perf]

##### 7.11.3.2 Test cases [NR\_RF\_FR1-Perf]

**R4-2014733 Discussion on test case on TX switching between two TDD uplink carriers**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2014734 Draft CR to TS 38.133: Test case for DL interruptions at UE switching between two uplink carriers in TDD+TDD inter-band CA case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: CMCC*

**Abstract:**

Test case for DL interruptions at UE switching between NR uplink carrier 1 and NR uplink carrier 2 in TDD+TDD inter-band uplink CA case shall be specified.

**Decision: Return to.**

**R4-2015486 Discussion on test case on TX switching between two uplink carriers**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015487 Test case for DL Interruptions at UE switching between LTE 1Tx carrier and NR 2Tx carrier in inter-band ENDC**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Test case for DL Interruptions at UE switching between LTE 1Tx carrier and NR 2Tx carrier in inter-band ENDC shall be specified

**Decision: Return to.**

### 7.12 NR RF requirement enhancements for frequency range 2 (FR2) [NR\_RF\_FR2\_req\_enh]

#### 7.12.2 RRM core requirements maintenance (38.133) [NR\_RF\_FR2\_req\_enh-Core]

### 7.13 NR RRM requirement enhancement [NR\_RRM\_Enh-Core]

================================================================================

**Email discussion: [97e][218] NR\_RRM\_Enh\_RRM\_1**

**R4-2017017 Email discussion summary for [97e][218] NR\_RRM\_Enh\_RRM\_1**

*Type: other For: Information  
Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017288 (from R4-2017017).**

**R4-2017288 Email discussion summary for [97e][218] NR\_RRM\_Enh\_RRM\_1**

*Type: other For: Information  
Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017174 | WF on R16 RRM enhancement part 1 – BWP switching, UL spatial relation switch | Intel Corporation |
|  |  |  |

**Topic #4: BWP Switching on multiple CCs in performance part**

Number of CCs undergoing multiple BWP switching

Agreement: Option 1: 2

Test duplication for EN-DC and SA

Agreement: Option 1: Duplicated. Further discuss about applicable rule

Interruption test is needed or not

Agreement: option 1

* + Test interruption requirements along with delay requirements in one test

Cell configuration with or w/o interruption test

Agreement: for EN-DC, option 1 is agreed.

Whether DCI+Timer based simultaneous BWP switch switching can be applied in one test

Agreement: Option 1.

* + Both DCI+Timer based BWP switch can be tested in one testcase

Whether define test for Cross-carrier scheduling based Simultaneous BWP switching

Agreement: Option 1.

* + Only define self-scheduling based test cases in NR\_RRM\_enh.

**Topic #5: UL Spatial Relation Info Switching in performance part**

Testcase list for UL spatial relation info switch

Agreement:

|  |
| --- |
| TC1: MAC-CE based spatial relation switch associated with a known DL-RS in EN-DC for PUCCH |
| TC2: RRC based spatial relation switch associated with a known DL-RS in EN-DC for periodic SRS |
| TC3: MAC-CE based spatial relation switch associated with a known DL-RS in SA for PUCCH |
| TC4: RRC based spatial relation switch associated with a known DL-RS in SA for periodic SRS |

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014774 | Return to |
| R4-2014837 | Return to |
| R4-2015504 | Revised (treated in another thread) |
| R4-2015505 | Revised |
| R4-2016166 | Revised |
| R4-2016026 | Return to |
| R4-2015499 | Agreed |
| R4-2014568 | Return to |
| R4-2014838 | Return to |
| R4-2014775 | Revised |
| R4-2015500 | Revised |
| R4-2016015 | Revised |
| R4-2015885 | Withdrawn |
|  |  |

GTW session (November 09, 2020)

**Topic #1: BWP Switching on multiple CCs in core part**

Issue 1-1-1: Scenario for simultaneous RRC based BWP switch on multiple CCs

* Option 1 (Intel):
  + Simultaneous RRC based BWP switch can’t be applied for case 1. Clarify if case 2 can be applied simultaneously.
  + If both case 1 and case 2 can’t be applied simultaneously, the delay requirement about simultaneous RRC based BWP switch on multiple CCs will be removed.
  + Further discuss whether new delay requirement needs to be defined for case 1 and case 2.
* Option 2 (MTK):
  + There is no RRC-based simultaneous BWP switch for multiple CCs.
  + There is only PCell + PSCell for RRC-based partially overlapped BWP switch.
* Option 3 (Huawei, Ericsson, NEC):
  + It is feasible to change parameters of the active BWP without changing the active BWP ID for an SCell. The simultaneous BWP switch on multiple CCs triggered by RRC is feasible when any other parameters of the same active BWP is changed for the involved the SCells
* Option 4 (Apple, Intel, MTK, vivo):
  + LS to RAN2 to further clarify if there is no consensus in RAN4.
* Option 5 (ZTE):
  + From RAN4 perspective, we see the benefit to have RRC based BWP switching be applicable for SCell either that BWP switch delay can be reduced. So if RAN4 can reach agreements on this part then we can send LS to RAN2 and let RAN2 know the merit of having such mechanism.
* Option 6 (Nokia):
  + In R16, we have direct Scell activation by RRC, hence RRC-based BWP switch could be performed for all cells. Therefore, Current simultaneous RRC-based BWP switch for multiple CCs is valid.
* Recommended WF:
  + Further discussion. If no consensus is achieved, sending LS to RAN2 to further clarify.

Discussion

Intel: We can wait for Rel-15 conclusions on the relevant topic in thread [201]

Apple: also prefer to wait for Rel-15 conclusions. We also would like to clarify that the requirements are limited to Rel-15 BWP switching only.

Chair: wait for conclusions in [201]

**Topic #2: UL Spatial Relation Info Switching in core part**

Issue 2-1-1: When the UL signal has spatial relation to an unknown DL RS

* Option 1 (NTT Docomo, Qualcomm, Intel): Do not define requirements
* Option 2 (Huawei, vivo, Qualcomm, Intel): is not a typical configuration
* Option 3 (Apple, MTK, Ericsson, ZTE, Nokia): Define requirements

Issue 2-1-3: Delay requirement for unknown spatial relation

* Option 1:
  + For MAC-CE based: THARQ + 3ms + TL1-RSRP.
  + For RRC based: TRRC-processing + TL1-RSRP

Discussion:

QC: For 2-1-1 Option 1 is the consequence of Option 2.

Nokia: Agree that this is not a typical case. What we want to clarify is that UE shall not transmit before it acquires the timing.

Apple: When UE shall start transmission? Do not need additional time for timing acquisition and think that UE needs to detect the beam

MTK: This is similar to TCI state switching where we already defined requirements for unknown case. We admit that this may not be a typical configuration.

Apple: Agree that we already defined similar requirements.

HW: this is not a typical configuration. Can compromise to Option 3 under condition there is no test.

ZTE: At least the requirements need to be specified. For TC we may have a separate discussion.

Intel: Not typical. Can compromise to Option 3.

Agreement:

Define requirements for the case when the UL signal has spatial relation to an unknown DL RS

* For MAC-CE based: THARQ + 3ms + TL1-RSRP.
* For RRC based: TRRC-processing + TL1-RSRP

Do not define any test cases for this scenario

**Topic #4: BWP Switching on multiple CCs in performance part**

Issue 4-1-2: CC combinations for simultaneous BWP switch

* Option 1(Apple, Intel, Qualcomm, vivo, Qualcomm):
  + FR1+FR1
  + FR2+FR2
* Option 2 (MTK, Huawei, Ericsson, Nokia):
  + FR1+FR1
  + FR1+FR2
  + FR2+FR2

Discussion:

E///: Some non-simultaneous switching scenarios apply for FR1+FR2

Apple: We prefer to define requirements for the simultaneous case only for FR

Intel: this issue is for simultaneous BWP switch

QC: Option 1. Do not need to test non-simult

MTK: Need to test simult FR1+FR2

Nokia: For simult. Case we are ok with Option 2. FR1+FR2 is needed for non-simult

HW: we share same view as MTK

QC: for FR1+FR2 we have different SCS

Agreement

Define test cases for

FR1+FR1 simultaneous BWP switch

FR2+FR2 simultaneous BWP switch

FFS: FR1+FR2 simultaneous BWP switch

FFS: FR1+FR2 non-simultaneous BWP switch

Note 1: the agreement applies for DCI/Timer based switching. For RRC based switching further discussion shall take place whether it is feasible to have simultaneous BWP switch.

Note 2: Feasibility of FR1+FR2 testing shall be addressed

Issue 4-1-5: Cell configuration with or w/o interruption test

* Sub2: SA case
  + Option 1(MTK, vivo, Ericsson, Intel):
    - NR PCell + NR SCell
  + Option 2 (Intel):
    - NR PCell + 2 NR SCells
  + Option 3(Nokia):
    - PCell + SCell
    - NR FR1+FR2 cell (FR1 PCell + FR2 PSCell + FR2 SCell) (BWP switch only on FR2 cells)
  + Option 4(Apple):
    - For SA case we can still have interruption with CA case if there is SCS change with BWP switch on either CCs
  + Option 5(Huawei):
    - Depends on the conclusion of 4-1-4.

Issue 4-1-7: Simultaneous case or simultaneous + partial

* Sub1: For RRC based BWP switching
  + Option 1(Huawei):
    - Only define test case for simultaneous case
  + Option 2 (Apple, Intel, MTK, Ericsson, vivo, Qualcomm, Nokia, Ericsson):
    - Postpone defining testcases with RRC based simultaneous BWP switch and clarify the scenario first.
* Sub2: DCI/Timer based BWP switching:
  + Option 1(Apple, Intel, MTK, vivo, Nokia, Qualcomm)
    - Only define simultaneous multiple BWP switch test cases.
  + Option 2(Huawei):
    - No need to define test cases for partial overlap case for timer-based BWP switch on multiple CCs.
    - As for DCI-based partial overlap case, we think it is necessary to test the UE capable UE that the BWP switch in two different CGs will be performed in parallel
  + Option 3 (Ericsson):
    - Define test case for both simultaneous and partial overlap case
* Recommended WF: Further discussion. For Sub1, majority companies agree with option 1. Can option 1 agreed?

2nd round email discussion conclusions

================================================================================

================================================================================

**Email discussion: [97e][219] NR\_RRM\_Enh\_RRM\_2**

**R4-2017018 Email discussion summary for [97e][219] NR\_RRM\_Enh\_RRM\_2**

*Type: other For: Information  
Source: Moderator (ZTE Corporation)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017289 (from R4-2017018).**

**R4-2017289 Email discussion summary for [97e][219] NR\_RRM\_Enh\_RRM\_2**

*Type: other For: Information  
Source: Moderator (ZTE Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017180 | WF on R16 RRM enhancement part 2 – SRS Carrier switching, CGI reading, Mandatory MG patterns | ZTE Corporation |
|  |  |  |

**Topic #1: SRS carrier switching requirements**

Sub-topic #1-1 RRM core requirements maintenance Tentative agreements:

Agreements: Introduce requirements in TS 36.133 for interruption on LTE victim cell for LTE SRS carrier based switching under EN-DC and NE-DC

Sub-topic #1-1: RRM test cases

Agreements: Do not define delay test cases for SRS carrier-based switching for NR deployments, similar to LTE.

**Topic #2: CGI reading requirements with autonomous gap**

Sub-topic #2-1: RRM test cases

Agreements

Requirements for both CGI reading delay, and interruptions to serving cell during CGI reading should be verified by the same tests

Test requirement for interruption during CGI reading should be defined by counting number of total missed ACK/NACKs during the CGI reading procedure.

20ms NR SMTC periodicity is used in the test

**Topic #3: Mandatory gap pattern**

Sub-topic #3-1: RRM test cases

Agreements: Use existing tests for inter frequency measurement without SSB index detection and with no DRX as baseline

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2014646](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2015577](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2016421](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Return to |
| [R4-2016422](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Agreed |
| [R4-2014227](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014227.zip) | Revised |
| [R4-2014789](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014789.zip) | Revised |
| [R4-2015495](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015495.zip) | Revised |
| [R4-2015584](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015584.zip) | Revised |
| [R4-2016052](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016052.zip) | Revised |
| [R4-2016423](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016423.zip) | Revised |
| [R4-2015575](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015575.zip) | Revised |
| [R4-2015576](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015576.zip) | Revised |
| [R4-2015774](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015774.zip) | Revised |
| [R4-2015775](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015775.zip) | Revised |
| [R4-2016379](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016379.zip) | Revised |
| [R4-2014776](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2015172](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2015583](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2015776](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2016380](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2015578](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2015579](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2014644](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Return to |
| [R4-2015175](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Return to |
| [R4-2015585](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Return to |
|  |  |

GTW session (November 09, 2020)

**SRS carrier based switching**

Issue 1-2-1: Scenarios for NR SRS carrier based switching tests

* Option 1 (ZTE, Huawei, Qualcomm, MediaTek, Apple, Nokia)
  + Tests are specified for SA and EN-DC
* Option 2 (Ericsson)
  + Tests are specified for SA, NR-DC, NE-DC and EN-DC

Discussion:

E///: we prefer to have different combinations of FR1 and FR2. Do we consider different combinations for SA? For NE-DC we wanted to verify impact on NR cells.

QC: For EN-DC we verify both LTE and NR carriers interruptions.

ZTE: there are no NE-DC tests under current specification. The general principle is that EN-DC tests can verify corresponding functionality.

OPPO: same view

E///: to ZTE this is a new feature and this can justify new test cases.

ZTE: for FR1+FR2 we need to check the feasibility of such tests

Agreements

* + For NR SRS carrier based switching define tests for SA and EN-DC
    - For EN-DC the interruptions for LTE and NR carriers are tested.
    - For SA the following combinations are tested
      * FR1 CA
      * FR2 CA
      * FFS: FR1+FR2 CA with SRS switching within same FR
      * FFS: FR1+FR2 CA with SRS switching between different FRs

Issue 1-2-2: Scenarios for E-UTRA SRS carrier based switching tests

* Option 1 (ZTE, Huawei, Qualcomm, MediaTek, Apple, Nokia)
  + Tests are specified for EN-DC
* Option 2 (Ericsson)
  + Tests are specified for NE-DC and EN-DC
  + Agreement: For E-UTRA SRS carrier based switching define tests for EN-DC

Issue 1-2-7: Whether to introduce following test cases in TS 36.133

* Option 1 (Ericsson)
  + In TS 36.133, RAN4 to define the interruption tests cases for SRS carrier-based switching for the following scenarios
    - NR SRS carrier-based switching impacting E-UTRA cells in SCG in EN-DC
    - NR SRS carrier-based switching impacting E-UTRA cells in MCG in NE-DC
* Option 2 (Huawei, Qualcomm, Apple, ZTE, Nokia)
  + All the tests are captured in TS 38.133

Agreement: Capture all test cases in TS 38.133

Issue 1-2-3a: Whether to specify test for SA NR SRS carrier based switching under scenarios FR1+FR2 from necessity and test feasibility perspective

* Option 1: Yes
* Option 2: No

Issue 1-2-3b: If answer to issue 1-2-3a is Yes, then if following test cases for SA is agreeable

* Option 1
  + TC1: PCell in FR1, SCell in FR1
  + TC2: PCell in FR2, SCell in FR2
  + TC3: PCell in FR1, SCell in FR2

Issue 1-2-3c: If answer to issue 1-2-3a is No, then if following test cases for SA is agreeable

* Option 1
  + TC1: PCell in FR1, SCell in FR1
  + TC2: PCell in FR2, SCell in FR2

Issue 1-2-4a: Whether to specify test for EN-DC NR SRS carrier based switching under scenarios FR1+FR2 from necessity and test feasibility perspective

* Option 1: Yes
* Option 2: No

Issue 1-2-4b: If answer to issue 1-2-4a is Yes, then if following test cases for EN-DC is agreeable

* Option 1
  + TC1: PSCell in FR1, SCell in FR1
  + TC2: PSCell in FR2, SCell in FR2
  + TC3: PSCell in FR1, SCell in FR2

Issue 1-2-4c: If answer to issue 1-2-4a is No, then if following test cases for EN-DC is agreeable

* Option 1
  + TC1: PSCell in FR1, SCell in FR1
  + TC2: PSCell in FR2, SCell in FR2

Issue 1-2-5a: Whether to specify test for EN-DC E-UTRA SRS carrier based switching under scenarios FR1+FR2 from necessity and test feasibility perspective

* Option 1: Yes
* Option 2: No

Issue 1-2-5b: If answer to issue 1-2-5a is Yes, then if following test cases for EN-DC is agreeable

* Option 1
  + TC1: PSCell in FR1, E-UTRA SCell
  + TC2: PSCell in FR2, E-UTRA SCell
  + TC3: PSCell in FR1, E-UTRA SCell, SCell in FR2

Issue 1-2-5c: If answer to issue 1-2-5a is No, then if following test cases for EN-DC is agreeable

* Option 1
  + TC1: PSCell in FR1, E-UTRA SCell
  + TC2: PSCell in FR2, E-UTRA SCell

Issue 1-2-6: UE type for test

* Option 1
  + Tests are specified for UE capable of per-UE gap and capable of per-FR gap
* Option 2
  + No mention of UE type in the test

**CGI reading**

Issue 2-1-1: Test cases for CGI reading in LTE SA

* Option 1 (Ericsson)
  + Test 1a: NR CGI reading in LTE SA, FR1 target cell
  + Test 1b: NR CGI reading in LTE SA, FR2 target cell
* Option 2 (Huawei, Qualcomm, MediaTek, Apple, ZTE, Nokia)
  + No test if test 6a/6b is introduced.

Agreement: Do not define Test cases for CGI reading in LTE SA

Issue 2-1-2: Test cases for CGI reading in NR SA

* Option 1 (Ericsson)
  + Test 2a: LTE CGI reading in NR SA, FR1 PCell
  + Test 2b : LTE CGI reading in NR SA, FR2 PCell
  + Test 3a: NR intra-frequency CGI reading in NR SA, FR1 PCell and FR1 target cell
  + Test 3b: NR intra-frequency CGI reading in NR SA, FR2 PCell and FR2 target cell
  + Test 4a: NR inter-frequency CGI reading in NR SA, FR1 PCell and FR1 target cell
  + Test 4b: NR inter-frequency CGI reading in NR SA, FR2 PCell and FR2 target cell
* Option 2 (ZTE, Huawei, Qualcomm, MediaTek, Apple, Nokia)
  + Test 2a: LTE CGI reading in NR SA, FR1 PCell
  + Test 3a: NR intra-frequency CGI reading in NR SA, FR1 PCell and FR1 target cell
  + Test 4b: NR inter-frequency CGI reading in NR SA, FR2 PCell and FR2 target cell

Agreement: Test cases for CGI reading in NR SA

* + Test 2a: LTE CGI reading in NR SA, FR1 PCell
  + Test 3a: NR intra-frequency CGI reading in NR SA, FR1 PCell and FR1 target cell
  + Test 4b: NR inter-frequency CGI reading in NR SA, FR2 PCell and FR2 target cell

Issue 2-1-3: Test cases for CGI reading in EN-DC

* Option 1 (Ericsson)
  + Test 5a: NR intra-frequency CGI reading in EN-DC, FR1 PSCell and FR1 target cell
  + Test 5b: NR intra-frequency CGI reading in EN-DC, FR2 PSCell and FR2 target cell
  + Test 6a: NR inter-frequency CGI reading in EN-DC, FR1 PSCell and FR1 target cell
  + Test 6b: NR inter-frequency CGI reading in EN-DC, FR2 PSCell and FR2 target cell
* Option 2 (ZTE, Huawei, Qualcomm, MediaTek, Apple, Nokia)
  + Test 5a: NR intra-frequency CGI reading in EN-DC, FR1 PSCell and FR1 target cell
  + Test 6b: NR inter-frequency CGI reading in EN-DC, FR2 PSCell and FR2 target cell

Agreement: Test cases for CGI reading in EN-DC

* + Test 5a: NR intra-frequency CGI reading in EN-DC, FR1 PSCell and FR1 target cell
  + Test 6b: NR inter-frequency CGI reading in EN-DC, FR2 PSCell and FR2 target cell

Issue 2-1-5a: How to calculate missed ACK/NACK during CGI reading

* Option 1: Missed ACK/NACK is tested based on total allowed interruption during entire CGI reading, with the total number
  + Option 1a: number of interrupted slots + K1
  + Option 1b: 2 \* number of interrupted slots
  + Option 1c: FFS

Discussion:

MTK: Either 1a or 1b can work depending on HARQ configuration in the test and we can come back

QC: we proposed 1a and are ok with 1c

E///: Agree with MTK

Apple: need to consider UL as well.

Issue 2-1-6a: Test configuration for SI-RNTI scheduling periodicity

* Option 1: 20ms
* Option 2: 40ms
* Option 3: 160ms

Discussion:

E///: Originally proposed 160ms. 40ms can be considered as a compromise

QC: Prefer Option 1 to reduce test time. Do not have strong concerns on 40ms

Apple, Huawei, MTK: Same view as QC

E///: SIB decoding has limited impact on testing time for 20ms and 40ms.

QC: this is true for FR2 but there can be saving for FR1

Agreement:

Test configuration for SI-RNTI scheduling periodicity

FR1: 20ms

FR2: 40ms

Issue 2-1-7a: LTE power up time, as defined in 6.1.2.1.2 inter-RAT HO, 30ms is needed for LTE power up. How to capture in the spec?

* Option 1: In test requirement, add 30ms LTE power up time
* Option 2: In core requirement, embedded in RRC procedure delay, specifying that 15ms RRC procedure delay for intra-RAT CGI reading, additional 30ms is added for inter-RAT CGI reading.

Issue 2-1-7b: LTE power off time takes another 20ms. How to capture in the spec?

* Option 1: In test requirement, add 20ms LTE power off time
* Option 2: In core requirement

**Mandatory gap pattern**

Issue 3-1-1: Test scope and applicability

* Option 1 (CMCC, ZTE, Nokia)
  + Introduce test cases only for some of the new mandatory gap patterns, i.e. #2 and #17.
  + Rel-16 UE needs to pass both release 15 and release 16 tests
* Option 2
  + All release 16 and later on UE are required to be tested under new test cases, in which new mandatory measurement gap patterns are configured (#2, #3 and #11 for FR1, #17, #18 and #19 for FR2 if supported)
  + If the new introduced test case is to verify the same RRM requirement as some existing test case in which measurement gap pattern #0 or #13 is used, then UE is only required to pass the test in which new mandatory gap pattern is configured (#2, #3, #11, #17, #18 or #19)
* Option 3 (Qualcomm, Apple, MediaTek, Huawei)
  + Gap pattern 2 and 17 can be added to new release 16 tests
  + If UE passes new release 16 test, the same test (with different gap pattern and SMTC) in release 15 can be skipped.
* Option 4 (Ericsson, Nokia)
  + Additional testing is performed using mandatory measurement gap patterns 2, 3, 11, 17, 18, and 19 in NR SA mode with an NR target cell
* Option 1a (Moderator) New
  + Introduce test cases only for some of the new mandatory gap patterns, i.e. #2 for per-UE gap capable UE and #11 for per-FR gap capable UE in FR1 and #17 in FR2.
  + Rel-16 UE needs to pass both release 15 and release 16 tests

Discussion:

Apple: We do not propose to change anything on Rel-15. Define new Rel-16 tests. UE can skip some of the release 15 tests.

QC: for first bullet Option 3 or 1a are fine. For the 2nd bullet – we prefer to allow UE to skip some Rel-15 tests. Our RAN5 colleagues indicated that such approach is ok.

E///: This is a new way of doing testing.

Agreement:

* Introduce test cases only for some of the new mandatory gap patterns
  + [#2] for per-UE gap capable UE in FR1
  + [#11] for per-FR gap capable UE in FR1
  + #17 in FR2
* FFS if Rel-16 UE is allowed to skip some of the Rel-15 tests

2nd round email discussion conclusions

================================================================================

================================================================================

**Email discussion: [97e][220] NR\_RRM\_Enh\_RRM\_3**

**R4-2017019 Email discussion summary for [97e][220] NR\_RRM\_Enh\_RRM\_3**

*Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017290 (from R4-2017019).**

**R4-2017290 Email discussion summary for [97e][220] NR\_RRM\_Enh\_RRM\_3**

*Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017201 | WF on R16 RRM enhancement part 3 - FR2 inter-band CA RRM | Huawei |
| R4-2017202 | WF on R16 RRM enhancement part 3 – Multiple SCell activation, UE specific CBW change and feature list 9-8/9-9/9-10 | Apple |
| R4-2017203 | WF on R16 RRM enhancement part 3 - Inter-frequency measurement without MG | CMCC |

**Topic #1: Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam and/or common beam (7.13.1.5)**

Issue 1-1: Necessity of SCell activation requirement with existing serving cell on same FR2 band

Agreement: Not necessary to specify the requirements for ‘SCell being activated belongs to FR2 and there is an active serving cell on that FR2 band and the PCell or PSCell is in FR2 and the PCell or PSCell and SCell being activated are in a band pair with independent beam management’

**Topic #4: UE-specific CBW change maintenance (7.13.1.6)**

Issue 4-1: UE behavior for Tx/Rx during CBW change delay

Agreement: The UE is not required to transmit UL signals or receive DL signals during the time defined by on the cell where UE-specific CBW change occurs.

**Topic #6: TCs of Inter-frequency measurement requirement without MG (7.13.2.2.5)**

Issue 6-1: TC list for inter-frequency measurement requirement without MG

Agreement

* TC list for R16 inter-frequency measurement without MG.

|  |  |
| --- | --- |
| **TC** | Company |
| TC1: SA event triggered reporting tests for FR1 without gap when DRX is not used (A.6.6.2.X) | CMCC |
| TC2: SA event triggered reporting tests for FR1 when DRX is used (A.6.6.2.X) | Apple |
| TC3: SA event triggered reporting tests for FR2 without gap when DRX is not used (A.7.6.2.X) | Huawei |
| TC4: SA event triggered reporting tests for FR2 without gap when DRX is used (A.7.6.2.X) | Mediatek |
| Note: existing TCs only consider test cases without SSB time index detection | |

Issue 6-2-1: MG configuration in TCs

Agreement: Do not configure gap in inter-frequency measurement without MG tests.

**Topic #7: TCs of UE-specific CBW change (7.13.2.2.7)**

Issue 7-1-1: TC list for UE-specific CBW change

Agreement

|  |  |
| --- | --- |
| **Test case list for UE specific CBW change** | **TC parameters** |
| TC1: UE specific CBW change on FR1 NR PSCell with non-DRX in synchronous EN- DC (A.4.5.x) | * *offsetToCarrier* is changed for TC of UE specific CBW change, while *carrierBandwidth* is unchanged in this TC (same as RF channel BW defined in each test)*.* * Reuse the parameters as much as possible from TC of RRC based BWP switching except the BWP switching parameters. |

Issue 7-1-2: new section for CBW configuration

Agreement: add the following generic section into TS38.133

Table A.3.x.1-1: DL CBW patterns for UE specific CBW configuration

|  |  |  |  |
| --- | --- | --- | --- |
| BWP Parameters | Unit | Values | |
| Reference CBW |  | DLCBW.1.1 | DLCBW.1.2 |
| OffsetToCarrier | RB | 0 | RBx Note 1 |
| carrierBandwidth | RB | Same as RF channel defined in each test | Same as RF channel defined in each test |
| Note 1: RBx is offset in frequency domain between Point A (lowest subcarrier of common RB 0) and the lowest usable subcarrier on this carrier. Note that RBx has to be within the CBW of BS. | | | |

**Topic #8: TCs of Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam (7.13.2.2.9)**

Issue 8-2: TC configurations for inter-band CA requirement for FR2 UE measurement capability of independent Rx beam

Agreement:

* For SCell activation and deactivation delay test in FR2 inter-band CA, it is suggested that the test consists of three time period. (add a note to clarify that bands 1 and 2 are inter-band CA operating bands in FR2 as specified in Table 5.2A.2-1 in TS38.101-2)
  + Before the test starts, the UE is connected to Cell 1 (PCell) on FR2 band 1.
  + At the beginning of T1, the UE receives an RRC message to add Cell 2 as SCell on FR2 band 2. The time duration T1 is the preparation period for the test.
  + At the beginning of T2, the UE receives a MAC message for SCell activation. During time duration T2, the SCell activation delay and interruptions to PCell need to be tested.
  + At the beginning of T3, the UE receives a MAC message for SCell deactivation. During time duration T3, the SCell deactivation delay and interruptions to PCell need to be tested.

**Topic #9: feature list of NR RRM requirement enhancement (9-8/9-9/9-10) from thread #117**

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014275 | Revised |
| R4-2014874 | Revised |
| R4-2015985 | Agreed |
| R4-2015772 | Revised |
| R4-2016019 | Agreed |
| R4-2016583 | Revised |
| R4-2014364 | Agreed |
| R4-2014861 | Agreed |
| R4-2015496 | Revised |
| R4-2014277 | Revised |
| R4-2014276 | Revised |
| R4-2014777 | Revised |
| R4-2015773 | Revised |
| R4-2014226 | Revised |
| R4-2014365 | Revised |
| R4-2014732 | Revised |
| R4-2015497 | Revised |
| R4-2014279 | Revised |
| R4-2015302 | Revised |
| R4-2015777 | Revised |
| R4-2016169 | Revised |
| R4-2015476 | Revised |
|  |  |
|  |  |
|  |  |
|  |  |

GTW session (November 09, 2020)

**Core maintenance**

Issue 1-2: Beam management resources for IBM UE

* Option 1 (QC, Apple, MTK, Intel): IBM UEs shall be able to add/configure/activate cells on both FR2 inter-band CCs only when beam management resources are configured in the both bands irrespective of network deployment, e.g. collocated vs. non-collocated

Discussion:

Nokia: we would like to clarify what this means

Agreement: IBM UEs shall be able to add/configure/activate cells on both FR2 inter-band CCs only when beam management resources are configured in the both bands

Issue 2-1: Tx beam assumption of FR1 intra-band contiguous CA (this is important issue to discuss and it would be the basis for other discussion for multiple Scell activation)

* Option 1 (MTK): The network should guarantee the transmitted signals from Scells have the same downlink spatial domain transmission filter on one OFDM symbol in intra-band FR1.
* Option 1a (Apple): The network should guarantee the transmitted signals from Scells have the same downlink spatial domain transmission filter on one OFDM symbol in intra-band contiguous FR1.
* Option 2 (Huawei, ZTE, Nokia): Common Tx beam for FR1 intra-band contiguous CA should not be taken as a generic assumption for all RRM requirements
* Option 3 (Qualcomm, Ericsson): RAN4 to revisit one of conditions for multiple SCell activation requirement for FR1 contiguous CA, and update it as follows:
  + Replace “its SSB DL Tx beam is same as the corresponding SSB DL Tx beam at the same SSB position of contiguous FR1 known cell or contiguous FR1 active serving cell” with “its MRTD with contiguous FR1 known cell or contiguous FR1 active serving cell is smaller than or equal to CP duration with respect to the to-be-activated SCell’s SSB numerology”
  + Replace “its SSB DL Tx beam is different as the corresponding SSB DL Tx beam at the same SSB position of contiguous FR1 known cell or contiguous FR1 active serving cell” with “its MRTD with contiguous FR1 known cell or contiguous FR1 active serving cell is larger than CP duration with respect to the to-be-activated SCell’s SSB numerology”
* Option 3a (MTK, Apple, QC): RAN4 to revisit one of conditions for multiple SCell activation requirement for FR1 contiguous CA, and update it as follows:
  + Replace
    - “its SSB DL Tx beam is same as the corresponding SSB DL Tx beam at the same SSB position of contiguous FR1 known cell or contiguous FR1 active serving cell” with
    - “its RTD with contiguous FR1 known cell or contiguous FR1 active serving cell is smaller than or equal to CP duration with respect to the to-be-activated SCell’s SSB numerology and its reception power difference with contiguous FR1 known cell or contiguous FR1 active serving cell is smaller than or equal to XdB”, X is FFS.
  + Replace
    - “its SSB DL Tx beam is different as the corresponding SSB DL Tx beam at the same SSB position of contiguous FR1 known cell or contiguous FR1 active serving cell” with
    - “its RTD with contiguous FR1 known cell or contiguous FR1 active serving cell is larger than CP duration with respect to the to-be-activated SCell’s SSB numerology or its reception power difference with contiguous FR1 known cell or contiguous FR1 active serving cell is larger than XdB”, X is FFS.

Discussion

E///: We are ok with Option 3a. X needs further discussion. X = 6 dB is ok for us. It gives more flexibility to the NW.

Apple: we need to further check whether 6dB is ok. Also suggest to keep the current SSB side condition of -2 dB.

Nokia: Does the SSB position refer to the same SSB index? For power difference should it be discussed in RF?

Apple: Same SSB index shall be assumed. For power difference – this is related to RRM discussion.

Nokia: We are ok to specify RTD conditions but prefer not to define relative power

Apple: we can further study the exact values. It is important to consider relative power since different beams have different power.

Huawei: can we put CP into []?

MTK: Same view with Apple. Relative power shall be in the scope. In case of large imbalance there may be AGC issues.

MTK: this can be extended to the generic requirements

Agreement

RAN4 to revisit one of conditions for multiple SCell activation requirement for FR1 contiguous CA, and update it as follows:

* + 1) Replace
    - “its SSB DL Tx beam is same as the corresponding SSB DL Tx beam at the same SSB position of contiguous FR1 known cell or contiguous FR1 active serving cell” with
    - “its RTD with contiguous FR1 known cell or contiguous FR1 active serving cell is smaller than or equal to [CP duration] with respect to the to-be-activated SCell’s SSB numerology and its reception power difference with contiguous FR1 known cell or contiguous FR1 active serving cell is smaller than or equal to XdB”, X is FFS.
  + 2) Replace
    - “its SSB DL Tx beam is different as the corresponding SSB DL Tx beam at the same SSB position of contiguous FR1 known cell or contiguous FR1 active serving cell” with
    - “its RTD with contiguous FR1 known cell or contiguous FR1 active serving cell is larger than [CP duration] with respect to the to-be-activated SCell’s SSB numerology or its reception power difference with contiguous FR1 known cell or contiguous FR1 active serving cell is larger than XdB”, X is FFS.

Issue 2-2-1: Extend the assumption in FR1 multiple SCells activation to single FR1 SCell activation (first meeting for discussing)

* Option 1 (HW, Ericsson, Apple, ZTE, Nokia):
  + Extend the UE requirement (to skip cell detection for unknown FR1 SCell that is intra-band contiguous to active serving cell) to single SCell activation, from Rel-16 onwards.
* Option 2 (MTK, QC):
  + FFS on option 1.

Discussion:

MTK: this depends on the conclusions for issue 2-1 (RTD and power imbalance)

E///: not clear how is it relevant to 2-1?

HW: same view as E///. These issues are not related.

MTK: Single CC case is inherited from Rel-15. We need to check if it can work for the new Rel-16 conditions.

Issue 2-2-2: Requirement applicability on the other being-activated SCells during the FR1 multiple SCells activation (first meeting for discussing)

* Option 1 (Huawei, Ericsson, Apple, QC, ZTE):
  + No requirement applies for other being-activated SCells, if no requirements apply for any of the FR1 unknown SCell activated with the same MAC CE
* Note: Moderator reworded the proposal by adding “being-activated”.
* Option 2 (MTK, Nokia):
  + FFS on option 1.

Issue 2-2-3: Condition of SMTC configuration to apply multiple SCell activation requirement (first meeting for discussing)

* Option 1 (Huawei, Apple, MTK, QC):
  + Multiple SCell activation requirements apply provided that SMTC offset and periodicity is same for all SCells activated by the same MAC CE
* Option 2 (Ericsson, Nokia):
  + Disagree with option 1.

Issue 3-1: Power imbalance condition for inter-frequency without MG (first meeting for discussing)

* Option 1 (Huawei, QC): The power imbalance between serving frequency layer and inter-frequency layer on which UE performs without gap shall be within [6]dB
* Option 2 (MTK, Intel): In the test case of inter-frequency measurement without MG, the power imbalance between serving frequency layer and inter-frequency layer on which UE performs without gap shall be within [6]dB.
* Option 3 (Ericsson, Apple, ZTE): such power imbalance limitation in option 1 is not needed

**Testing**

Issue 6-2-2: SSB time index detection in TCs

* Option 1 (CMCC, Ericsson, Huawei, QC)
  + It is proposed that RAN4 further discuss whether to introduce test case with SSB time index detection. The proposed alternatives are:
    - Alt1: TC1 FDD is without SSB time index detection, TC2 FDD is with SSB time index detection
    - Other alternatives are not precluded.
* Option 2 (Apple, MTK)
  + Prefer to not test SSB index detection for inter-frequency measurement without MG test cases.

Discussion:

QC: Option 2 is fine for us as well

Apple: the main purpose is to check if UE can make detection without gap. We can compromise to Option 1.

MTK: we already have Rel-15 tests with SSB time index detection. Rel-16 UE already passed such tests.

CMCC: Option 1 is a good compromise. Not increase test number and have good test coverage. In practical networks SSB index detection is needed and should be tested.

Agreement:

* TC1 FDD is without SSB time index detection
* TC2 FDD is with SSB time index detection
* TDD tests are defined without SSB time index detection

Issue 6-2-3: DRX cycle setup in TCs

* Option 1: TC2 tests one DRX cycle only and TC4 tests one DRX cycle only. The DRX cycle in TC2 and TC4 can be different.
* Option 2: TC2 tests two DRX cycles and TC4 tests two DRX cycles.

Discussion:

Apple: Option 1 is more practical.

QC: Option 1

CMCC: Option 1

Agreement: TC2 tests one DRX cycle only and TC4 tests one DRX cycle only. The DRX cycle in TC2 and TC4 can be different.

Issue 8-1: TC list for inter-band CA requirement for FR2 UE measurement capability of independent Rx beam

* + Option 1 (Ericsson, Apple, MTK): The test case list for interband FR2+FR2 CA is

|  |  |
| --- | --- |
| Test 1 | SCell Activation and deactivation for FR2+FR2 inter-band |
| Test 2 | NR FR2- NR FR2 DL active BWP switch of PCell with non-DRX in SA |

* + Option 2 (Huawei, Apple, Qualcomm, MTK, Intel): For SCell activation and deactivation delay requirements, it is suggested to introduce new test cases for FR2 inter-band CA scenario in Rel-16.

Discussion:

Apple: Ok with Option 2.

E///: we are ok.

Agreement: TC list for inter-band CA requirement for FR2 UE measurement capability of independent Rx beam

|  |  |
| --- | --- |
| Test 1 | SCell Activation and deactivation for FR2+FR2 inter-band |

Issue 8-2: TC configurations for inter-band CA requirement for FR2 UE measurement capability of independent Rx beam

* Proposal 2(QC): RAN4 to introduce RRM test case(s) for IBM UEs supporting inter-band FR2 CA to verify if the UE meets RRM performance requirement(s) on both inter-bands when 2 AoAs are concurrently active from different angles, provided that
  + 2 AoAs are (pseudo) randomly selected and/or at least [X] degrees apart within a spherical coverage
    - If any restriction is identified by RF session, it should be respected and possible test directions will be updated accordingly
  + Both inter-band CCs transmit and configure reference signal(s) for independent beam management
  + SSB on one band and CSI-RS and/or PDCCH/PDSCH on the other band can have different numerologies
  + At least one RRM accuracy performance requirement should be met on both bands, and FFS on which RRM requirement.

2nd round email discussion conclusions

================================================================================

**R4-2017174 WF on R16 RRM enhancement part 1 – BWP switching, UL spatial relation switch**

*Type: other For: Approval  
 Source: Intel Corporation*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017180 WF on R16 RRM enhancement part 2 – SRS Carrier switching, CGI reading, Mandatory MG patterns**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017201 WF on R16 RRM enhancement part 3 - FR2 inter-band CA RRM**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017202 WF on R16 RRM enhancement part 3 – Multiple SCell activation, UE specific CBW change and feature list 9-8/9-9/9-10**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017203 WF on R16 RRM enhancement part 3 - Inter-frequency measurement without MG**

*Type: other For: Approval  
 Source: CMCC*

**Abstract:**

**Discussion:**

**Decision: Return to.**

#### 7.13.1 RRM core requirements maintenance (38.133) [NR\_RRM\_Enh-Core]

##### 7.13.1.1 SRS carrier switching requirements [NR\_RRM\_Enh\_Core]

**R4-2014646 38.133 CR on conditions for NR SRS carrier switching**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1192 Cat: F (Rel-16)  
  
 Source: Qualcomm, Inc.*

**Abstract:**

When UL BWP switching is performed, RF retuning is required, therefore SRS carrier switching can not be performed simultaneously. A sentence is added to SRS carrier switching condition, to avoid collision between UL BWP switching on either carrier and SRS carrier switching.

**Decision: Revised to R4-2017181 (from R4-2014646).**

**R4-2017181 38.133 CR on conditions for NR SRS carrier switching**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1192 Cat: F (Rel-16)  
  
 Source: Qualcomm, Inc.*

**Abstract:**

When UL BWP switching is performed, RF retuning is required, therefore SRS carrier switching can not be performed simultaneously. A sentence is added to SRS carrier switching condition, to avoid collision between UL BWP switching on either carrier and SRS carrier switching.

**Decision: Return to.**

**R4-2015577 CR to 38.133: Correction to SRS carrier based switching requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1307 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

There are redundant sentences in the requirements that should be removed.

Wording should be improved to make the requirements clearer.

**Decision: Revised to R4-2017182 (from R4-2015577).**

**R4-2017182 CR to 38.133: Correction to SRS carrier based switching requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1307 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

There are redundant sentences in the requirements that should be removed.

Wording should be improved to make the requirements clearer.

**Decision: Return to.**

**R4-2016421 Missing requirements for LTE SRS carrier-based switching**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-7000 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

LTE SRS carrier-based switching requirements impacting LTE cells in EN-DC and NE-DC are missing in TS 36.133. Ambiguous terminology.

**Decision: Return to.**

**R4-2016422 Correction in NR SRS carrier-based switching requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1391 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Incorrect requirement

**Decision: Agreed.**

##### 7.13.1.2 CGI reading requirements with autonomous gap [NR\_RRM\_Enh\_Core]

**R4-2015575 CR to 38.133: Correction to relaxed measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1306 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

For change #1

Reference clause is incorrect.

The applicable scenario for inter-RAT E-UTRA cell CGI reading is NR SA and NE-DC rather than EN-DC as in the requirement.

For change #2

Remove brackets

**Decision: Revised to R4-2017189 (from R4-2015575).**

**R4-2017189 CR to 38.133: Correction to relaxed measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1306 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

For change #1

Reference clause is incorrect.

The applicable scenario for inter-RAT E-UTRA cell CGI reading is NR SA and NE-DC rather than EN-DC as in the requirement.

For change #2

Remove brackets

**Decision: Return to.**

**R4-2015576 CR to 36.133: Correction to NR CGI reading interruption requirements**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6972 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

Reference clause number is incorrect.

TMIB\_NR should be 25\* TSMTC for NR cells on FR2 by considering agreement that 1 additional SMTC is needed for AGC.

**Decision: Revised to R4-2017190 (from R4-2015576).**

**R4-2017190 CR to 36.133: Correction to NR CGI reading interruption requirements**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6972 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

Reference clause number is incorrect.

TMIB\_NR should be 25\* TSMTC for NR cells on FR2 by considering agreement that 1 additional SMTC is needed for AGC.

**Decision: Return to.**

**R4-2015774 CR on CGI reading requirements 38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1328 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

SIB1 transmission is dynamically scheduled by PDCCH, so the actualy SIB1 transmission periodicty could be different from the default periodicity or SMTC periodicty.

There is no requirement applicable for NR CGI reading configured by NR PSCell when UE is in EN-DC.

The references to LTE serving cells interruption requirements for EN-DC and NE-DC are wrong.

The last sentence in 9.11.1 states that overall CGI delay includes the RRC procedure delay and the reporting delay in 9.11.3, while the reporting delay in 9.11.3 already includes RRC procedure delay, so the RRC procedure delay is counted twice.

**Decision: Revised to R4-2017191 (from R4-2015774).**

**R4-2017191 CR on CGI reading requirements 38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1328 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

SIB1 transmission is dynamically scheduled by PDCCH, so the actualy SIB1 transmission periodicty could be different from the default periodicity or SMTC periodicty.

There is no requirement applicable for NR CGI reading configured by NR PSCell when UE is in EN-DC.

The references to LTE serving cells interruption requirements for EN-DC and NE-DC are wrong.

The last sentence in 9.11.1 states that overall CGI delay includes the RRC procedure delay and the reporting delay in 9.11.3, while the reporting delay in 9.11.3 already includes RRC procedure delay, so the RRC procedure delay is counted twice.

**Decision: Return to.**

**R4-2015775 CR on CGI reading requirements 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6978 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

SIB1 transmission is dynamically scheduled by PDCCH, so the actualy SIB1 transmission periodicty could be different from the default periodicity or SMTC periodicty.

The last sentence in 8.1.2.4.27.1 states that overall CGI delay includes the RRC procedure delay and the reporting delay in 8.1.2.4.27.3, while the reporting delay in 8.1.2.4.27.1 already includes RRC procedure delay, so the RRC procedure delay is counted twice.

The requirements in 8.1.2.4 are only applicable for UE in LTE SA but not EN-DC or NE-DC.

MIB decoding delay for FR2 should be 25 SMTC periods (24 plus 1 for AGC).

The side condition of -3dB for MIB and SIB1 decoding is not captured.

**Decision: Revised to R4-2017192 (from R4-2015775).**

**R4-2017192 CR on CGI reading requirements 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6978 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

SIB1 transmission is dynamically scheduled by PDCCH, so the actualy SIB1 transmission periodicty could be different from the default periodicity or SMTC periodicty.

The last sentence in 8.1.2.4.27.1 states that overall CGI delay includes the RRC procedure delay and the reporting delay in 8.1.2.4.27.3, while the reporting delay in 8.1.2.4.27.1 already includes RRC procedure delay, so the RRC procedure delay is counted twice.

The requirements in 8.1.2.4 are only applicable for UE in LTE SA but not EN-DC or NE-DC.

MIB decoding delay for FR2 should be 25 SMTC periods (24 plus 1 for AGC).

The side condition of -3dB for MIB and SIB1 decoding is not captured.

**Decision: Return to.**

**R4-2016379 Maintenance CR on NR CGI reading in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6996 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update on the requirements for NR CGI reading in 36.133

**Decision: Revised to R4-2017193 (from R4-2016379).**

**R4-2017193 Maintenance CR on NR CGI reading in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6996 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update on the requirements for NR CGI reading in 36.133

**Decision: Return to.**

##### 7.13.1.3 BWP switching on multiple CCs [NR\_RRM\_Enh\_Core]

**R4-2014570 Discussion of RRC based BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014773 Remaining issues on multiple BWP switch**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014774 CR on multiple BWP switch in R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1203 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

RRC-based BWP switch cannot apply for SCell.

Thus, there is no the scenario for multiple RRC-based simultaneous BWP switch. For RRC-based partially overlapped multiple BWP switch, the application scenario will only be PCell plus PSCell in NR-DC.

**Decision: Return to.**

**R4-2014837 CR for simultaneous DCI based BWP switch delay on multiple CCs**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1206 Cat: F (Rel-16)  
  
 Source: vivo*

**Abstract:**

Current specification provides inconsistent ways on how to determine the SCS where BWP switch is based on.

Clear ambiguity of “all involved CCs”

Add value of D into specs.

**Decision: Return to.**

**R4-2015304 Discussion on cross carrier BWP switch delay requirements for single and multiple CC**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We provide our views on delay requirements for DCI based BWP switching when the DCI indication is through cross carrier scheduling.

**Decision: Noted.**

**R4-2015305 CR to TS 38.133 on DCI based BWP switch requirements for cross carrier scheduling**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1252 Cat: F (Rel-16)  
  
 Source: NEC*

**Abstract:**

Existing DCI based BWP switch requirements are not applicable for DCI receved through cross-carrier schedling.

**Decision: Return to.**

**R4-2015505 CR on interruption due to active BWP switching on mulitple CCs**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1284 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The requirements of interruptions due to active BWP switch on multiple CCs resue the same requirements of BWP switch on single CC. However, the starting point of each BWP swich on multiple CCs is different from that of BWP switch on single CC.

**Decision: Revised to R4-2017175 (from R4-2015505).**

**R4-2017175 CR on interruption due to active BWP switching on mulitple CCs**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1284 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The requirements of interruptions due to active BWP switch on multiple CCs resue the same requirements of BWP switch on single CC. However, the starting point of each BWP swich on multiple CCs is different from that of BWP switch on single CC.

**Decision: Return to.**

**R4-2015506 Discussion on requirements maintenance for BWP switch on multiple CCs**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016165 Analysis of RRC based non-simultaneous multiple CC BWP**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The number of CCs in diferent CG can be different in RRC based non-simultaneous multiple CC BWP. This is clarified in the core requirements.

**Decision: Noted.**

**R4-2016166 Correction to RRC based non-simultaneous multiple CC BWP**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1367 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To correct requirements on RRC based non-simultaneous BWP on multiple CCs

**Decision: Revised to R4-2017176 (from R4-2016166).**

**R4-2017176 Correction to RRC based non-simultaneous multiple CC BWP**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1367 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To correct requirements on RRC based non-simultaneous BWP on multiple CCs

**Decision: Return to.**

**R4-2016427 On Active BWP switching under cross-carrier scheduling**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on core requirements for active BWP switching with cross carrier scheduling.

**Decision: Noted.**

**R4-2016428 CR 38.133 Active BWP switching with cross-carrier scheduling**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1392 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Requirements for active BWP switching when cross carrier scheduling (Rel-16 feature) is used are missing.

**Decision: Not pursued.**

##### 7.13.1.4 Spatial relation switch for uplink [NR\_RRM\_Enh\_Core]

**R4-2014250 Requirements for UL spatial relation info switch**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014771 Remaining issues on active spatial relation switch**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2015308 Discussion on spatial relation switch for uplink**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015498 Discussion on the remaining issues on spatial relation switch**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015499 Correction on RRC based spatial relation switch delay**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1281 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For RRC based spatial relation delay, the unit is not correct.

**Decision: Agreed.**

**R4-2016026 CR 38.133 Corrections to MAC-CE and RRC-based spatial relation switching requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1351 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The current specification text refers to a condition for the requirement to apply in the following way: “ […] when beamCorrespondenceWithoutUL-BeamSweeping sets to 1 […]”. What this means may not be immediately clear to the reader. Moreover, the condition is mentioned at the end of a paragraph, which means that the reader has to parse the whole paragraph before potentially finding that the requirement as such does not apply.

**Decision: Return to.**

##### 7.13.1.5 Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam and/or common beam [NR\_RRM\_Enh\_Core]

**R4-2014275 Draft CR on maintenance for inter-band FR2 CA RRM**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

CBM specific RRM requirement is downscoped from R16 and the corresponding requirement shall be cleaned up in TS38.133.

**Decision: Revised to R4-2017204 (from R4-2014275).**

**R4-2017204 Draft CR on maintenance for inter-band FR2 CA RRM**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

CBM specific RRM requirement is downscoped from R16 and the corresponding requirement shall be cleaned up in TS38.133.

**Decision: Return to.**

**R4-2014873 Discussion on Inter-band CA requirement for FR2**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014874 Correction on unknown SCell activation in FR2.**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1212 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

Requirement is missing for unknown SCell activation in FR2 with FR1-FR2 CA (e.g NR SA, PCell in FR1 and SCell in FR2), because the applicability of requiremrent was changed to cover the case with FR2 inter-band CA. However, the requirement is still needed for FR1-FR2 CA.

**Decision: Revised to R4-2017205 (from R4-2014874).**

**R4-2017205 Correction on unknown SCell activation in FR2.**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1212 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

Requirement is missing for unknown SCell activation in FR2 with FR1-FR2 CA (e.g NR SA, PCell in FR1 and SCell in FR2), because the applicability of requiremrent was changed to cover the case with FR2 inter-band CA. However, the requirement is still needed for FR1-FR2 CA.

**Decision: Return to.**

**R4-2015309 Discussion on inter-band CA requirement for FR2**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015985 CR on measurement restrictions for FR2 inter-band CA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1340 Cat: F (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

To align with the solution of the same issue for scheduling availability

**Decision: Agreed.**

**R4-2016576 BM resources for FR2 Inter-band IBM UEs**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

##### 7.13.1.6 Other requirements maintenance [NR\_RRM\_Enh\_Core]

**R4-2014277 Draft CR on UE behavior for UE specific CBW change**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

The UE behavior for Tx/Rx during CBW change delay is missing.

**Decision: Revised to R4-2017209 (from R4-2014277).**

**R4-2017209 Draft CR on UE behavior for UE specific CBW change**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

The UE behavior for Tx/Rx during CBW change delay is missing.

**Decision: Return to.**

**R4-2014364 CR on TS38.133 for inter-frequency measurement requirement without gap**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1158 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

When all of the SMTC occasions of this inter-frequency measurement object are overlapped by the measurement gap, UE can only conduct the measurement within gap and follow the requirement in clause 9.3.4.

**Decision: Agreed.**

**R4-2014772 Remaining Issues on multiple SCell Activation**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014861 Editorial CR for inter frequency measurements without measurement gaps (9.3.9)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

Several tables in clause 9.3.9 have the incorrect table index: 9.3.4.x, which are already used in clause 9.3.4 with different content.

Some title above table is also incorrect.

**Decision: Agreed.**

**R4-2015496 CR on inter-frequency measurement without gap**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1280 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

From AGC adjustment point of view, the power imbalance between intra-frequency layer and inter-frequency layer on which UE performs inter-frequency measurement without gap shall be limited, otherwise the measurement performance will be degraded.

**Decision: Revised to R4-2017208 (from R4-2015496).**

**R4-2017208 CR on inter-frequency measurement without gap**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1280 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

From AGC adjustment point of view, the power imbalance between intra-frequency layer and inter-frequency layer on which UE performs inter-frequency measurement without gap shall be limited, otherwise the measurement performance will be degraded.

**Decision: Return to.**

**R4-2015578 CR to 38.133: Correction to mandatory gap pattern**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1308 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

The UE capability for NR only measurement are introduced as follows.

supportedGapPattern-NRonly

Indicates measurement gap pattern(s) optionally supported by the UE for NR SA and NR-DC when the frequencies to be measured within this measurement gap are all NR frequencies. The leading / leftmost bit (bit 0) corresponds to the gap pattern 2, the next bit corresponds to the gap pattern 3 and so on. The UE shall set the bits corresponding to the measurement gap pattern 2, 3 and 11 to 1.

supportedGapPattern-NRonly-NEDC

Indicates whether the UE supports gap patterns 2, 3 and 11 in NE-DC when the frequencies to be measured within this measurement gap are all NR frequencies.

measGapPatterns-NRonly-ENDC-r16

This field indicates whether the UE supports gap patterns 2, 3 and 11 in (NG)EN-DC when the frequencies to be measured within this measurement gap are all NR frequencies.

The requirements need to be consistent with the UE capability.

**Decision: Revised to R4-2017199 (from R4-2015578).**

**R4-2017199 CR to 38.133: Correction to mandatory gap pattern**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1308 Cat: F (Rel-16)  
  
 Source: ZTE*

**Abstract:**

The UE capability for NR only measurement are introduced as follows.

supportedGapPattern-NRonly

Indicates measurement gap pattern(s) optionally supported by the UE for NR SA and NR-DC when the frequencies to be measured within this measurement gap are all NR frequencies. The leading / leftmost bit (bit 0) corresponds to the gap pattern 2, the next bit corresponds to the gap pattern 3 and so on. The UE shall set the bits corresponding to the measurement gap pattern 2, 3 and 11 to 1.

supportedGapPattern-NRonly-NEDC

Indicates whether the UE supports gap patterns 2, 3 and 11 in NE-DC when the frequencies to be measured within this measurement gap are all NR frequencies.

measGapPatterns-NRonly-ENDC-r16

This field indicates whether the UE supports gap patterns 2, 3 and 11 in (NG)EN-DC when the frequencies to be measured within this measurement gap are all NR frequencies.

The requirements need to be consistent with the UE capability.

**Decision: Return to.**

**R4-2015579 CR to 36.133: Introduce requirements for mandatory gap pattern**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6973 Cat: B (Rel-16)  
  
 Source: ZTE*

**Abstract:**

The UE capability for NR only measurement under LTE SA are introduced as follows.

measGapPatterns-NRonly-r16

This field indicates whether the UE supports gap patterns 2, 3 and 11 in LTE standalone when the frequencies to be measured within this measurement gap are all NR frequencies.

The requirements need to be introduced to ensure correct configuration of corresponding gap patterns.

**Decision: Revised to R4-2017200 (from R4-2015579).**

**R4-2017200 CR to 36.133: Introduce requirements for mandatory gap pattern**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6973 Cat: B (Rel-16)  
  
 Source: ZTE*

**Abstract:**

The UE capability for NR only measurement under LTE SA are introduced as follows.

measGapPatterns-NRonly-r16

This field indicates whether the UE supports gap patterns 2, 3 and 11 in LTE standalone when the frequencies to be measured within this measurement gap are all NR frequencies.

The requirements need to be introduced to ensure correct configuration of corresponding gap patterns.

**Decision: Return to.**

**R4-2015771 Discussion on remaining issues in multiple SCell activation**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015772 CR on SCell activation requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1327 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In multiple SCell activation, UE is assumed to skip cell detection for unknown FR1 SCell that is intra-band contiguous to active serving cell. The same can be extended to single SCell activation to speed up the activation process.

In multiple SCell activation, there is a case where no requriement applies for an FR1 unknown SCell that is intra-band contiguous to active or known SCell. However, the requirements for other SCells being activated with same MAC CE are not defined

UE cannot meet the current interuption requirements for multiple SCell activation if SMTC offsets for the SCells are misaligned.

**Decision: Revised to R4-2017206 (from R4-2015772).**

**R4-2017206 CR on SCell activation requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1327 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In multiple SCell activation, UE is assumed to skip cell detection for unknown FR1 SCell that is intra-band contiguous to active serving cell. The same can be extended to single SCell activation to speed up the activation process.

In multiple SCell activation, there is a case where no requriement applies for an FR1 unknown SCell that is intra-band contiguous to active or known SCell. However, the requirements for other SCells being activated with same MAC CE are not defined

UE cannot meet the current interuption requirements for multiple SCell activation if SMTC offsets for the SCells are misaligned.

**Decision: Return to.**

**R4-2016019 CR 38.133 Removal of brackets for Multiple SCell activation**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1347 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The specification text contains side condition on Ês/Iot with value within brackets, Ês/Iot ≥ [-2]dB. The side condition is however aligned with corresponding conditions for requirements on SCell activation of single SCell, and hence can be removed.

**Decision: Agreed.**

**R4-2016574 Multi-SCell activation for FR1 intra-band contiguous CA**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2016583 CR to Multi-SCell activation for FR1 intra-band contiguous CA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1400 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

One of conditions for FR1 contiguous multi-SCell activation may conflict with RAN1 spec and potentially cause unexpected issues depending on how the assumption can be further exploited by the UE.

**Chair: moved from AI 7.5.1**

**Decision: Revised to R4-2017207 (from R4-2016583).**

**R4-2017207 CR to Multi-SCell activation for FR1 intra-band contiguous CA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1400 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

One of conditions for FR1 contiguous multi-SCell activation may conflict with RAN1 spec and potentially cause unexpected issues depending on how the assumption can be further exploited by the UE.

**Chair: moved from AI 7.5.1**

**Decision: Return to.**

#### 7.13.2 RRM perf. requirements (38.133) [NR\_RRM\_Enh-Perf]

##### 7.13.2.1 General [NR\_RRM\_Enh-Perf]

**R4-2014566 Work plan of Rel-16 NR RRM enhancements WI performance part**

*Type: discussion For: Approval  
 Source: Intel Corporation, ZTE Corporation, Apple*

**Decision: Revised to R4-2017222 (from R4-2014566).**

**R4-2017222 Work plan of Rel-16 NR RRM enhancements WI performance part**

*Type: discussion For: Approval  
 Source: Intel Corporation, ZTE Corporation, Apple*

**Decision: Return to.**

**R4-2016420 On test cases for SRS carrier-based switching in NR**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On test cases for SRS carrier-based switching in NR

**Decision: Noted.**

##### 7.13.2.2 Test cases [NR\_RRM\_Enh-Perf]

###### 7.13.2.2.1 SRS carrier switching requirements [NR\_RRM\_Enh-Perf]

**R4-2014227 E-UTRAN – NR FR2 interruptions at NR SRS carrier based switching (A.5.5.2.X)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

RRM requirements for SRS carrier based switching have been introduced. However, corresponding test cases have not yet been specified.

**Decision: Revised to R4-2017183 (from R4-2014227).**

**R4-2017183 E-UTRAN – NR FR2 interruptions at NR SRS carrier based switching (A.5.5.2.X)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

RRM requirements for SRS carrier based switching have been introduced. However, corresponding test cases have not yet been specified.

**Decision: Return to.**

**R4-2014789 CR to TS 38.133 TC for E-UTRAN – NR interruptions at E-UTRA SRS carrier based switching**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Abstract:**

The test case for E-UTRAN – NR interruptions at E-UTRA SRS carrier based switching is specified.

**Decision: Revised to R4-2017184 (from R4-2014789).**

**R4-2017184 CR to TS 38.133 TC for E-UTRAN – NR interruptions at E-UTRA SRS carrier based switching**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Abstract:**

The test case for E-UTRAN – NR interruptions at E-UTRA SRS carrier based switching is specified.

**Decision: Return to.**

**R4-2015495 TC for E-UTRAN – NR interruptions at E-UTRA SRS carrier based switching**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The test case for E-UTRAN – NR interruptions at E-UTRA SRS carrier based switching is specified.

**Decision: Revised to R4-2017185 (from R4-2015495).**

**R4-2017185 TC for E-UTRAN – NR interruptions at E-UTRA SRS carrier based switching**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The test case for E-UTRAN – NR interruptions at E-UTRA SRS carrier based switching is specified.

**Decision: Return to.**

**R4-2015581 Test case list for SRS carrier based switching**

*Type: discussion For: Approval  
 Source: ZTE*

**Decision: Noted.**

**R4-2015584 Draft CR on test case for SA interruptions at NR SRS carrier based switching**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE*

**Abstract:**

Test case for NR SRS carrier based switching need to be introduced to verify corresponding core requirements.

**Decision: Revised to R4-2017186 (from R4-2015584).**

**R4-2017186 Draft CR on test case for SA interruptions at NR SRS carrier based switching**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE*

**Abstract:**

Test case for NR SRS carrier based switching need to be introduced to verify corresponding core requirements.

**Decision: Return to.**

**R4-2016052 38133 CR for Test case of E-UTRAN NR FR1 interruptions at NR SRS carrier switching**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Revised to R4-2017187 (from R4-2016052).**

**R4-2017187 38133 CR for Test case of E-UTRAN NR FR1 interruptions at NR SRS carrier switching**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Return to.**

**R4-2016423 On TC2 configuration (SA interruptions at NR SRS carrier-based switching)**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On TC2 configuration (SA interruptions at NR SRS carrier-based switching)

**Decision: Revised to R4-2017188 (from R4-2016423).**

**R4-2017188 On TC2 configuration (SA interruptions at NR SRS carrier-based switching)**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On TC2 configuration (SA interruptions at NR SRS carrier-based switching)

**Decision: Return to.**

###### 7.13.2.2.2 Multiple Scell activation/deactivation [NR\_RRM\_Enh-Perf]

**R4-2014276 Test case of SCell activation and deactivation of multiple unknown SCells in FR1 with single activation/deactivation command**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

Test case of SCell activation and deactivation of multiple unknown SCells in FR1 with single activation/deactivation command is missing.

**Decision: Revised to R4-2017210 (from R4-2014276).**

**R4-2017210 Test case of SCell activation and deactivation of multiple unknown SCells in FR1 with single activation/deactivation command**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

Test case of SCell activation and deactivation of multiple unknown SCells in FR1 with single activation/deactivation command is missing.

**Decision: Return to.**

**R4-2014777 DraftCR on multiple SCell activation with FR1+FR2 unknown cells in NR-DC Test Case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The multiple SCell activation with FR1+FR2 unknown cells test case is missing.

**Decision: Revised to R4-2017211 (from R4-2014777).**

**R4-2017211 DraftCR on multiple SCell activation with FR1+FR2 unknown cells in NR-DC Test Case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The multiple SCell activation with FR1+FR2 unknown cells test case is missing.

**Decision: Return to.**

**R4-2015580 Test case list for NR CGI reading with autonomous gaps**

*Type: discussion For: Approval  
 Source: ZTE*

**Decision: Noted.**

**R4-2015583 Draft CR on test case for SA intra-frequency CGI identification of NR neighbor cell in FR1**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE*

**Abstract:**

Test cases for NR CGI reading need to be introduced to verify corresponding core requirements.

**Decision: Revised to R4-2017196 (from R4-2015583).**

**R4-2017196 Draft CR on test case for SA intra-frequency CGI identification of NR neighbor cell in FR1**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE*

**Abstract:**

Test cases for NR CGI reading need to be introduced to verify corresponding core requirements.

**Decision: Return to.**

**R4-2015773 draftCR to introduce multiple SCell activation TC2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on R4-2012164, RRM test cases are to be introduced for multiple SCell activation.

**Decision: Revised to R4-2017212 (from R4-2015773).**

**R4-2017212 draftCR to introduce multiple SCell activation TC2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on R4-2012164, RRM test cases are to be introduced for multiple SCell activation.

**Decision: Return to.**

###### 7.13.2.2.3 CGI reading requirements with autonomous gap [NR\_RRM\_Enh-Perf]

**R4-2014642 CGI reading test scope and requirement discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2014776 DraftCR on SA CGI identification of E-UTRA neighbor cell Test Case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The SA CGI identification of E-UTRA neighbor cell test case is missing.

**Decision: Revised to R4-2017194 (from R4-2014776).**

**R4-2017194 DraftCR on SA CGI identification of E-UTRA neighbor cell Test Case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The SA CGI identification of E-UTRA neighbor cell test case is missing.

**Decision: Return to.**

**R4-2015171 Test case list and configurations for CGI reading**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Proposed test case list for CGI reading

**Decision: Noted.**

**R4-2015172 CR to introduce interfrequency FR2 CGI reading test for SA NR (TC2)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1242 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of TC2 as discussed on RAN4 reflector for CGI reading with autonomous gaps

**Decision: Revised to R4-2017195 (from R4-2015172).**

**R4-2017195 CR to introduce interfrequency FR2 CGI reading test for SA NR (TC2)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1242 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of TC2 as discussed on RAN4 reflector for CGI reading with autonomous gaps

**Decision: Return to.**

**R4-2015776 draftCR on TC for EN-DC inter-frequency CGI identification of NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RRM core requirements for CGI reading are defined, but there is no RRM test case for CGI reading.

**Decision: Revised to R4-2017197 (from R4-2015776).**

**R4-2017197 draftCR on TC for EN-DC inter-frequency CGI identification of NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RRM core requirements for CGI reading are defined, but there is no RRM test case for CGI reading.

**Decision: Return to.**

**R4-2016380 Test cases for EN-DC intra-frequency CGI identification of NR neighbour cell in FR1**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Test cases for EN-DC intra-frequency CGI identification of NR cell with autonomous gaps in FR1

**Decision: Revised to R4-2017198 (from R4-2016380).**

**R4-2017198 Test cases for EN-DC intra-frequency CGI identification of NR neighbour cell in FR1**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Test cases for EN-DC intra-frequency CGI identification of NR cell with autonomous gaps in FR1

**Decision: Return to.**

###### 7.13.2.2.4 BWP switching on multiple CCs [NR\_RRM\_Enh-Perf]

**R4-2014251 Discussion on testcases for BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014567 Discussion on test cases for BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014568 CR on simultaneous DCI-based and Timer-based Active BWP Switch on multiple CCs on FR1 in EN-DC (section 4.5.6.3)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Intel Corporation*

**Abstract:**

test case for simultaneous DCI-based and Timer-based Active BWP Switch on multiple CCs on FR1 in EN-DC is missing.

**Decision: Return to.**

**R4-2014778 Discussion on multiple BWP switch test case**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014838 CR for test cases for simultaneously DCI/timer based bwp switch over mulitple CCs**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1207 Cat: B (Rel-16)  
  
 Source: vivo*

**Abstract:**

Add test cases for simultaneously DCI/timer based bwp switch over mulitple cc

**Decision: Return to.**

**R4-2014839 Discussion on test cases for BWP switch on multiple CCs**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2015507 Discussion on performance requirements for BWP switch on multiple CCs**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016167 Test cases for BWP switching on multiple CCs**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper discusses scenarios for RRM tests for multiple BWP switching and corresponding list of test

**Decision: Noted.**

**R4-2016381 discussion on the test cases for BWP switch on multiple CCs**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion on test cases for BWP switch considering multiple CCs.

**Decision: Noted.**

**R4-2016572 Performance requirements for BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

###### 7.13.2.2.5 Inter-frequency measurement requirement without MG [NR\_RRM\_Enh-Perf]

**R4-2014226 Test case for inter-frequency measurement without gap: SA event triggered reporting tests for FR1 when DRX is used (A.6.6.2.X)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

RRM requirements for inter-frequency measurement without gap have been introduced. However, corresponding test cases have not yet been specified.

**Decision: Revised to R4-2017213 (from R4-2014226).**

**R4-2017213 Test case for inter-frequency measurement without gap: SA event triggered reporting tests for FR1 when DRX is used (A.6.6.2.X)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

RRM requirements for inter-frequency measurement without gap have been introduced. However, corresponding test cases have not yet been specified.

**Decision: Return to.**

**R4-2014365 CR on TS38.133 SA event triggered reporting tests for FR2 without gap when DRX is used (A.7.6.2.X)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

Test case for inter-frequency measurement without MG for FR2 when DRX is used shall be specified.

**Decision: Revised to R4-2017214 (from R4-2014365).**

**R4-2017214 CR on TS38.133 SA event triggered reporting tests for FR2 without gap when DRX is used (A.7.6.2.X)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

Test case for inter-frequency measurement without MG for FR2 when DRX is used shall be specified.

**Decision: Return to.**

**R4-2014645 Inter-f without MG test scope and configuration discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2014731 Discussion on test case on inter-frequency measurement without MG**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2014732 Draft CR to TS 38.133: SA event triggered reporting tests for FR1 without gap when DRX is not used (A.6.6.2.X)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: CMCC*

**Abstract:**

Test case for inter-frequency measurement without MG shall be specified.

**Decision: Revised to R4-2017215 (from R4-2014732).**

**R4-2017215 Draft CR to TS 38.133: SA event triggered reporting tests for FR1 without gap when DRX is not used (A.6.6.2.X)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: CMCC*

**Abstract:**

Test case for inter-frequency measurement without MG shall be specified.

**Decision: Return to.**

**R4-2015497 Test case for Inter-frequency measurements: SA event triggered reporting tests for FR2 without gap when DRX is not used**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

If UE supports interFrequencyMeas-NoGap-r16 and the flag interFrequencyConfig-NoGap-r16 is configured by the network, UE shall be able to perform inter-frequency measurement without gap. The test case for SA event triggered reporting tests for FR2 without gap when DRX is not used is specified.

**Decision: Revised to R4-2017216 (from R4-2015497).**

**R4-2017216 Test case for Inter-frequency measurements: SA event triggered reporting tests for FR2 without gap when DRX is not used**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

If UE supports interFrequencyMeas-NoGap-r16 and the flag interFrequencyConfig-NoGap-r16 is configured by the network, UE shall be able to perform inter-frequency measurement without gap. The test case for SA event triggered reporting tests for FR2 without gap when DRX is not used is specified.

**Decision: Return to.**

###### 7.13.2.2.6 Mandatory MG patterns [NR\_RRM\_Enh-Perf]

**R4-2014228 Testing applicability for new mandatory gap patterns**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014643 Mandatory gap pattern test scope and applicability rule discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2014644 Mandatory gap pattern test**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm, Inc.*

**Decision: Return to.**

**R4-2015174 Test case list for mandatory measurement gap**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

CR to introduce TC2 for CGI reading as discussed on the RAN4 reflector

**Decision: Noted.**

**R4-2015175 Test cases for mandatory measurement gap**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1243 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Addition of extra tests using GP 2,3,11, 17, 18 and 19

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Return to.**

**R4-2015582 Test case list for mandatory gap pattern**

*Type: discussion For: Approval  
 Source: ZTE*

**Decision: Noted.**

**R4-2015585 Draft CR on test case for SA event triggered reporting tests with additional mandatory gap pattern**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE*

**Abstract:**

Test case for mandatory gap pattern need to be introduced to verify corresponding core requirements.

**Decision: Return to.**

###### 7.13.2.2.7 UE-specific CBW change [NR\_RRM\_Enh-Perf]

**R4-2014278 Test case list for UE specific CBW change**

*Type: discussion For: Agreement  
 38.133 v..  
 Source: Apple*

**Decision: Noted.**

**R4-2014279 Test case of UE specific CBW change on FR1 NR PSCell with non-DRX in synchronous EN-DC**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

The test case of UE specific CBW change on FR1 NR PSCell with non-DRX in synchronous EN-DC is missing.

**Decision: Revised to R4-2017217 (from R4-2014279).**

**R4-2017217 Test case of UE specific CBW change on FR1 NR PSCell with non-DRX in synchronous EN-DC**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Apple*

**Abstract:**

The test case of UE specific CBW change on FR1 NR PSCell with non-DRX in synchronous EN-DC is missing.

**Decision: Return to.**

**R4-2015302 Draft CR on TC for UE specific CBW change on FR2 NR PCell in NR SA**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: NEC*

**Abstract:**

TC for UE specific CBW change on FR2 NR PCell in NR SA are not available in specification

**Decision: Revised to R4-2017218 (from R4-2015302).**

**R4-2017218 Draft CR on TC for UE specific CBW change on FR2 NR PCell in NR SA**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: NEC*

**Abstract:**

TC for UE specific CBW change on FR2 NR PCell in NR SA are not available in specification

**Decision: Return to.**

**R4-2015777 draftCR on TC for UE specific CBW change on FR2 NR PSCell in EN-DC**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RRM core requirements for U-CBW change are defined, but there is no RRM test case for U-CBW change.

**Decision: Revised to R4-2017219 (from R4-2015777).**

**R4-2017219 draftCR on TC for UE specific CBW change on FR2 NR PSCell in EN-DC**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RRM core requirements for U-CBW change are defined, but there is no RRM test case for U-CBW change.

**Decision: Return to.**

**R4-2016168 Analysis of TC3: UE specific CBW change on FR1 NR PCell in NR SA**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper describes test case setup for UE specific CBW change in SA NR scenario

**Decision: Noted.**

**R4-2016169 TC3: UE specific CBW change on FR1 NR PCell in NR SA (A.6.5.7)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1368 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To define new test on UE specific CBW change on FR1 NR PCell in NR SA

**Decision: Revised to R4-2017220 (from R4-2016169).**

**R4-2017220 TC3: UE specific CBW change on FR1 NR PCell in NR SA (A.6.5.7)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1368 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

To define new test on UE specific CBW change on FR1 NR PCell in NR SA

**Decision: Return to.**

###### 7.13.2.2.8 Spatial relation switch for uplink [NR\_RRM\_Enh-Perf]

**R4-2014569 Discussion on test cases for UL spatial relation switch**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014775 DraftCR on spatial relation switch test case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The E-UTRAN – NR PSCell FR2 uplink spatial relation switch for a known spatial relation test case is missing.

**Decision: Revised to R4-2017177 (from R4-2014775).**

**R4-2017177 DraftCR on spatial relation switch test case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The E-UTRAN – NR PSCell FR2 uplink spatial relation switch for a known spatial relation test case is missing.

**Decision: Return to.**

**R4-2015500 TC for RRC based spatial relation switch associated with a known DL-RS**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The test case for RRC based spatial relation switch associated with a known DL-RS in EN-DC is specified.

**Decision: Revised to R4-2017178 (from R4-2015500).**

**R4-2017178 TC for RRC based spatial relation switch associated with a known DL-RS**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The test case for RRC based spatial relation switch associated with a known DL-RS in EN-DC is specified.

**Decision: Return to.**

**R4-2015885 RRC based spatial relation switch associated with a known DL-RS in SA**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1339 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Withdrawn.**

**R4-2016014 On TC3 MAC-CE based spatial relation info switching**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Background information on Test case 3: MAC-CE based spatial relation switch associated with a known DL-RS in SA.

**Decision: Noted.**

**R4-2016015 CR 38.133 TC3 MAC-CE based spatial relation info switching**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1345 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

During email discussions following the RAN4#96e meeting it was proposed that four test cases are to be introduced for verifying the spatial relation switching functionality. This CR covers TC 3: MAC-CE based spatial relation switch associated with a known  DL-RS in SA.

**Decision: Revised to R4-2017179 (from R4-2016015).**

**R4-2017179 CR 38.133 TC3 MAC-CE based spatial relation info switching**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1345 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

During email discussions following the RAN4#96e meeting it was proposed that four test cases are to be introduced for verifying the spatial relation switching functionality. This CR covers TC 3: MAC-CE based spatial relation switch associated with a known  DL-RS in SA.

**Decision: Return to.**

###### 7.13.2.2.9 Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam [NR\_RRM\_Enh-Perf]

**R4-2015173 Test case list for FR2 inter-band carrier aggregation**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

ProposedRRM test case list for FR2 +FR2 interband CA

**Decision: Noted.**

**R4-2015475 Discussion on RRM test cases for FR2 inter-band CA**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015476 DraftCR on SCell activation and deactication delay test for FR2 inter-band CA**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

In Rel-16, FR2 inter-band CA band combinations are introduced, and the SCell activation and deactication delay test need to be verified in FR2 inter-band CA scenario.

**Decision: Revised to R4-2017221 (from R4-2015476).**

**R4-2017221 DraftCR on SCell activation and deactication delay test for FR2 inter-band CA**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

In Rel-16, FR2 inter-band CA band combinations are introduced, and the SCell activation and deactication delay test need to be verified in FR2 inter-band CA scenario.

**Decision: Return to.**

**R4-2016577 Performance requirements for FR2 Inter-band IBM UEs**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

### 7.14 NR RRM requirements for CSI-RS based L3 measurement [NR\_CSIRS\_L3meas]

================================================================================

**Email discussion: [97e][221] NR\_CSIRS\_L3meas\_RRM\_1**

**R4-2017020 Email discussion summary for [97e][221] NR\_CSIRS\_L3meas\_RRM\_1**

*Type: other For: Information  
Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017291 (from R4-2017020).**

**R4-2017291 Email discussion summary for [97e][221] NR\_CSIRS\_L3meas\_RRM\_1**

*Type: other For: Information  
Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 06, 2020)

Sub-topic 2-2 CSI-RSRP requirements (issue 2-2-1)

* Issue 2-2-1: How to handle the potential performance degradation of CSI-RSRP measurement due to single FFT?
  + Option 1: Possibly specify 2 sets of requirements. (MTK, CATT, Intel, DCM, CMCC, ZTE)
    - Specify CSI-RSRP accuracy requirement with the timing offset between UE’s FFT window and the target CSI-RS shorter than CP. FFS whether and how to specify requirements with timing offset larger than CP.
    - Reuse the accuracy requirements of SS-RSRP for CSI-RS based L3 measurement with the timing offset between UE’s FFT window and the target CSI-RS shorter than CP.
  + Option 2: 1 set of requirements with a margin on existing requirements (Xiaomi, OPPO)
    - The accuracy requirement of CSI-RS L3 measurement can be defined as adding [1] dB margin on the basis of SSB based accuracy requirement.
  + Option 3: 1 set of requirements based on [3]us timing error (Huawei)
    - CSI-RSRP accuracy requirements are defined to be SCS specific.
    - CSI-RSRP accuracy requirements are derived from the simulation results.
  + Option 4: 1 set of requirements with applicability (Nokia, Apple)
    - In Rel16, the UE is not required to measure the CSI-RS resource if the timing difference exceeds a threshold. Typically, the threshold could be set to one or twice of the CP lengths.

Discussion:

Apple: commonality is that we can specify the requirements for timing offset within the CP. One CP is quite restrictive in case of multi-TRP scenarios but we are ok if this is the majority view.

CMCC: Prefer Option 1. We can specify two sets of requirements.

Nokia: Performance will be degraded in case the timing offset is larger than CP. The question is how to take into account the actual timing offset since the performance is very sensitive (e.g. > 4dB). The NW does not know the timing offset and we prefer UE not to report the RSRP in case the offset is very big.

Xiaomi: for Option 1 how can we can guarantee that timing offset is within the CP? We are open to discuss the exact threshold

Huawei: Option 3. Can compromise to Option 1. We see the need for the 2nd set of requirements. For Nokia comments – we agree that NW does not know the offset but we are not clear how the feature will work for Option 4?

QC: we analyzed 3us offset and observed 1dB degradation. We can support Option 1 with 2 sets of requirements: within CP and within 3us.

ZTE: Support of QC proposal

Agreement:

Specify the following L3 CSI-RSRP measurement accuracy requirements

* + - Case 1: the timing offset between UE’s FFT window and the target CSI-RS is smaller or equal to [CP]
      * FFS: Reuse the accuracy requirements of SS-RSRP
      * FFS on whether gNB needs to know that the timing offset is smaller or equal to CP and how to provide such information if needed
    - FFS: Case 2: the timing offset between UE’s FFT window and the target CSI-RS is larger than [CP]

Sub-topic 1-1 Measurement restriction (1-1-2)

* Issue 1-1-2: How to define requirements for scenario 1 and scenario 2?
  + Scenario 1: CSI-RS resources and SSB are fully or partially overlapped in time domain.
  + Scenario 2: CSI-RS resources and SSB are non-overlapped in time domain.
    - Option 1: (MTK, Huawei, Xiaomi, CATT, QC, OPPO, Intel, vivo, DCM, apple, ZTE)
      * CSSF frame work can generally apply to both scenarios (i.e. the CSSF shall be extended for both scenarios).
    - Option 2: (Nokia, CMCC)
      * The CSSF shall only be extended for Scenario 1 and remains unchanged for Scenario 2.

Discussion:

Nokia: In Scenario 2 there will be no interruption and the measurements can be done in parallel.

Huawei: this was discussed in Rel-15 and companies could not agree on the definition of overlapping/non-overlapping case ue to UE processing time arguments. So we decided to go with the worst case – i.e. apply CSSF all the time.

MTK: Agree with Huawei.

CMCC: we are ok to compromise to Option 1.

Apple: Agree with Option 1. UE needs to buffer data. Non-overlapping does not mean that UE can do measurements in parallel.

Apple: the agreed CR in the last meeting does not differentiate CSSF for Scenario 1 and 2 (R4-2012181)

Chair: continue discussion till the 2nd round

Tentative agreement:

* + CSSF framework applies to both Scenario 1 (CSI-RS resources and SSB are fully or partially overlapped in time domain) and Scenario 2 (CSI-RS resources and SSB are non-overlapped in time domain)

Sub-topic 1-3 Scheduling restriction (issue 1-3-1)

* Issue 1-3-1: Whether/How to define scheduling restriction when UE performs CSI-RS intra-frequency measurements in a TDD band?
  + Option 1: Introduce scheduling restriction for TDD band.
    - Option 1a: (Huawei, Xiaomi, CATT, OPPO, Intel, LGE, DCM, CMCC, Apple)
      * When UE performs CSI-RS intra-frequency measurements in a TDD band, UE is not expected to transmit on data OFDM symbols overlapped by CSI-RS resource symbols to be measured, and 1 OFDM symbols before and after each consecutive CSI-RS symbols.
    - Option 1b: (Huawei, CATT, QC, Intel, CMCC, ZTE, MTK)
      * When UE performs CSI-RS intra-frequency measurements in a TDD band, UE is not expected to transmit on data OFDM symbols fully or partially overlapped by CSI-RS resource symbols to be measured.
    - Option 1c: (Nokia)
      * When UE performs CSI-RS intra-frequency measurements in a TDD band, UE is not expected to transmit on data OFDM symbols overlapped by CSI-RS resource symbols to be measured, and 1 OFDM symbols before each consecutive CSI-RS symbols.
  + Option 2: (vivo)
    - Do not introduce scheduling restriction for TDD band.

Discussion

MTK: we prefer 1b

Nokia: not clear why there is some impact on the symbol after CSI-RS. Ok with Option 1a

Apple: 1a. NW does not know if there is overlap and 1a gives some margin.

vivo: why do we need scheduling restriction? RAN1 already resolved it

Huawei: based on RAN1 the data is prioritized but this conflict with RAN4 conclusions. So RAN1 added a clarification that prioritization applies when RAN4 shceduling restriction are not applicable.

Agreement

* + Introduce a scheduling restriction for TDD band when UE performs CSI-RS intra-frequency measurements in a TDD band
    - Option 1a: (Huawei, Xiaomi, CATT, OPPO, Intel, LGE, DCM, CMCC, Apple, Nokia)
      * When UE performs CSI-RS intra-frequency measurements in a TDD band, UE is not expected to transmit on data OFDM symbols overlapped by CSI-RS resource symbols to be measured, and 1 OFDM symbols before and after each consecutive CSI-RS symbols.
    - Option 1b: (Huawei, CATT, QC, Intel, CMCC, ZTE, MTK)
      * When UE performs CSI-RS intra-frequency measurements in a TDD band, UE is not expected to transmit on data OFDM symbols fully or partially overlapped by CSI-RS resource symbols to be measured.
    - FFS whether the scheduling restrictions apply for all scenarios when UE performs CSI-RS measurements

Sub-topic 1-4 Time domain restriction (issue 1-4-1)

* Issue 1-4-1: How to define the time domain restriction for CSI-RS resource configuration?
  + Option 1: (Huawei, Xiaomi, vivo, ZTE)
    - The CSI-RS measurement requirements apply provided that any two CSI-RS resource i and resource j of a frequency layer satisfy



* + - where Offi and Offj are time offsets (in millisecond) of CSI-RS resource i and j respectively with respect to the serving cell timing.)
  + Option 2: (existing requirement) (MTK, Xiaomi, CATT, OPPO, Nokia, Apple)
    - The CSI-RS measurement requirements apply provided that CSI-RS resources per frequency layers are configured within 5 ms window at any location

Sub-topic 1-5 Definition of CSSF

* Issue 1-5-1: Whether the additional changes can be acceptable?
  + (Based on CR R4-2014235, R4-2014623 and R4-2015491)

Sub-topic 2-2 Issue 2-2-5 (together with part 2)

* Issue 2-2-5: Whether to introduce test case for FDD duplex mode?
  + Option 1: No (MTK, Xiaomi, CATT, Qualcomm, OPPO, vivo)
  + Option 2: Yes (Huawei, Nokia, ZTE)

Sub-topic 2-3 CSI-RSRQ requirements (issue 2-3-2)

* Issue 2-3-2: Report mapping for CSI-RSRQ measurement?
  + Option 1: (Huawei, CATT, Xiaomi, OPPO, QC, Apple, ZTE)
    - Reuse the report mapping for L3 SS-RSRQ (i.e. from -43 dB to +20 dB with 0.5 dB resolution).
  + Option 2: (vivo)
    - The range of CSI-RSRQ report is from -43 dB to 0 dB with 0.5 dB resolution.

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017223 | WF on remaining issues on CSI-RS based L3 measurement requirements (core part) | Apple |
| R4-2017224 | WF on performance requirements of CSI-RS based L3 measurement | CATT |

**Topic #1: CSI-RS RRM core requirements maintenance**

Issue 1-1-1: Whether to define requirements for scenario 1 and scenario 2 in R16?

Agreement: Specify requirements for both scenario 1 and 2:

* Scenario 1: CSI-RS resources and SSB are fully or partially overlapped in time domain.
* Scenario 2: CSI-RS resources and SSB are non-overlapped in time domain.

Issue 1-1-2: How to define requirements for scenario 1 and scenario 2?

Agreement: CSI-RS and SSB for L3 measurement, including gap based and non-gap based, equally share the measurement opportunities for both scenarios.

Issue 1-3-2: Whether/How to define scheduling restriction under the case of mixed numerology?

Agreement:

* + No scheduling restriction as same numerology is assumed for intra-frequency CSI-RS and data of serving cell.
  + Add the above assumption to the applicability section in intra-frequency CSI-RS based L3 measurement specification.

Issue 1-3-3: Whether/How to define scheduling restriction for FR1 FDD?

Agreement: No scheduling restriction for FR1 FDD.

Issue 1-6-1: Whether the agreement is applicable to SSB based L1 measurement?

Agreement:

* Do not define CSI-RS measurement requirements in Rel-16 for the collision case:
  + - * Collision between CSI-RS based L3 measurement of neighbor cell and serving cell measurement for SSB/CSI-RS based RLM/BFD or other SSB/CSI-RS based L1 measurements

**Topic #2: CSI-RS RRM performance requirements.**

Issue 2-2-2: Side condition for CSI-RSRP measurement?

Agreements:

Reuse the side condition of SS-RSRP, i.e.

FR1 intra-frequency: Es/Iot≥-6dB

FR2 intra-frequency: Es/Iot≥-6dB

FR1 inter-frequency: Es/Iot≥-6dB

FR2 inter-frequency: Es/Iot≥-4dB

Issue 2-2-3: Report mapping for CSI-RSRP measurement?

Agreements: Reuse the report mapping of SS-RSRP.

Issue 2-3-1: How to define accuracy requirements for CSI-RSRQ measurement?

Agreements: Follow the principle of CSI-RSRP measurement defined in issue 2-2-1.

Issue 2-3-3: Side condition for CSI-RSRQ measurement requirements?

Agreements: Reuse the side condition for L3 SS-RSRQ.

Issue 2-3-4: Number of samples to be used for defining CSI-RSRQ measurement accuracy requirements?

Agreements: Follow the conclusion of CSI-RSRP measurement in issues 2-2-4.

Issue 2-4-1: Accuracy requirements for CSI-SINR measurement?

Agreements: Follow the principle of CSI-RSRP measurement defined in issue 2-2-1.

Issue 2-4-2: Side condition of CSI-SINR measurement?

Agreements: RAN4 to discuss how to handle the upper limit of Ês/Iot in the CSI-SINR accuracy requirement together with the timing offset. The lower bound of side condition(Ês/Iot) for CSI-SINR accuracy requirements can be same as that of L3 SS-SINR measurement

Issue 2-4-4: Number of samples to be used for defining CSI-SINR measurement accuracy requirements?

Agreements: Follow the conclusion of CSI-RSRP measurement in issues 2-2-4.

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014188 | Return to |
| R4-2014432 | Return to |
| R4-2016045 | Return to |
| R4-2014235 | Return to |
| R4-2014623 | Return to |
| R4-2015491 | Return to |
| R4-2014413 | Revised |
| R4-2014429 | Revised |
| R4-2014430 | Merged |
| R4-2014431 | Merged |
| R4-2014531 | Revised |
| R4-2014660 | Merged |
| R4-2015490 | Revised |
| R4-2015782 | Merged |
| R4-2016044 | Merged |
| R4-2014435 | Revised |
| R4-2014436 | Revised |
| R4-2014434 | Return to |
| R4-2014664 | Return to |
| R4-2016048 | Return to |
| R4-2015213 | Return to |
| R4-2014441 | Return to |
| R4-2014442 | Return to |
| R4-2014443 | Return to |
| R4-2014661 | Return to |
| R4-2014662 | Return to |
| R4-2014663 | Return to |
| R4-2014791 | Return to |
| R4-2014792 | Return to |
| R4-2015784 | Return to |
| R4-2015786 | Return to |
| R4-2015788 | Return to |
| R4-2016047 | Return to |

2nd round email discussion conclusions

================================================================================

================================================================================

**Email discussion: [97e][222] NR\_CSIRS\_L3meas\_RRM\_2**

**R4-2017021 Email discussion summary for [97e][222] NR\_CSIRS\_L3meas\_RRM\_2**

*Type: other For: Information  
Source: Moderator (OPPO)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017033.**

**R4-2017033 Email discussion summary for [97e][222] NR\_CSIRS\_L3meas\_RRM\_2**

*Type: other For: Information  
Source: Moderator (OPPO)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017292 (from R4-2017033).**

**R4-2017292 Email discussion summary for [97e][222] NR\_CSIRS\_L3meas\_RRM\_2**

*Type: other For: Information  
Source: Moderator (OPPO)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (November 06, 2020)

Issue 1-1: The structure of test cases

1. Intra-frequency measurement

Agreement:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test No. | Test | Tentative section number | Company | Note |
| TC1 | SA event triggered reporting tests without gap for NR neighbor cell in FR1 | A6.6.x | CATT | Test with non-DRX |
| TC2 | SA event triggered reporting tests without gap for NR neighbor cell in FR2 | A7.6.x | Xiaomi | Test with DRX |
| TC3 | EN-DC event triggered reporting tests without gap for NR neighbor cell in FR1 | A4.6.x | Nokia | Test with DRX |
| TC4 | EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2 | A5.6.x | Qualcomm | Test with non-DRX |

2. Inter-frequency measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test No. | Test | Tentative section number | Company | Note |
| TC1 | SA event triggered reporting tests with gap (all NR cells in FR1） | **A6.6.y** | **CATT** | Test with DRX |
| TC2 | SA event triggered reporting tests with gap for NR neighbor cell in FR2（PCell in FR2） | **A7.6.y.2** | **ZTE** | Test with non-DRX |
| TC3 | EN-DC event triggered reporting tests with gap (all NR cells in FR1） | **A4.6.y** | Xiaomi | Test with non-DRX |
| TC4 | EN-DC event triggered reporting tests with gap for NR neighbor cell in FR2 (PScell in FR2） | **A5.6.y.1** | OPPO | Test with DRX |

 3. Measurement performance

|  |  |  |  |
| --- | --- | --- | --- |
| Test No. | Test | Tentative section number | Company |
| TC1 | SA: CSI-RSRP measurement accuracy for（all NR cells in FR1） | A6.7.x | CATT |
| TC2 | SA: CSI-RSRQ measurement accuracy for（all NR cells in FR1） | A6.7.y | **Xiaomi** |
| TC3 | SA: CSI-SINR measurement accuracy for（all NR cells in FR1） | A6.7.z | **Huawei** |
| TC4 | SA: CSI-RSRP measurement accuracy for NR neighbor cell in FR2 | A7.7.x | **Xiaomi** |
| TC5 | SA: CSI-RSRQ measurement accuracy for NR neighbor cell in FR2 | A7.7.y | **ZTE** |
| TC6 | SA: CSI-SINR measurement accuracy for NR neighbor cell in FR2 | A7.7.z | **MediaTek** |
| TC7 | EN-DC: CSI-RSRP measurement accuracy for（all NR cells in FR1） | A4.7.x | Nokia |
| TC8 | EN-DC: CSI-RSRQ measurement accuracy for（all NR cells in FR1） | A4.7.y | OPPO |
| TC9 | EN-DC: CSI-SINR measurement accuracy for（all NR cells in FR1） | A4.7.z | vivo |
| TC10 | EN-DC: CSI-RSRP measurement accuracy for NR neighbor cell in FR2 | A5.7.x | Qualcomm |
| TC11 | EN-DC: CSI-RSRQ measurement accuracy for NR neighbor cell in FR2 | A5.7.y | OPPO |
| TC12 | EN-DC: CSI-SINR measurement accuracy for NR neighbor cell in FR2 | A5.7.z | **Huawei** |
| Note: for each row in this table, two test cases, one for intra-frequency and one for inter-frequency, will be defined. | | | |

Issue 1-2: Whether both DRX and non-DRX need to be tested

Candidate options:

* Option 1(CATT, Xiaomi): Test both DRX and non-DRX cases based on the current test case list
  + Option 1a(Huawei, OPPO, Nokia): For DRX cycles, distribute short DRX and long DRX in the test cases with DRX.
  + Option 1b(MTK, QC, vivo): For DRX cycles,  short DRX applies in the test cases with DRX.
* Option 2(CMCC): non-DRX + short DRX + long DRX ( for each scenario)

Discussion:

MTK: slightly prefer short DRX. Ok with short DRX for FR2 and slightly longer for FR1.

QC: same view as MTK.

Agreement:

For test cases with DRX

* FR1: Use long DRX
* FR2: Use short DRX

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |

**Topic #1: Test cases**

Issue 1-1-1: Whether to define requirements for scenario 1 and scenario 2 in R16?

Agreement: Specify requirements for both scenario 1 and 2:

* Scenario 1: CSI-RS resources and SSB are fully or partially overlapped in time domain.
* Scenario 2: CSI-RS resources and SSB are non-overlapped in time domain.

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2014288](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014288.zip) | Merged |
| [R4-2014433](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014433.zip) | Merged |
| [R4-2014189](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014189.zip) | Revised |
| [R4-2014287](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014287.zip) | Revised |
| [R4-2014444](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014444.zip) | Revised |
| [R4-2014665](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014665.zip) | Revised |
| [R4-2014626](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014626.zip) | Revised |
| [R4-2014793](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014793.zip) | Revised |
| [R4-2015586](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015586.zip) | Revised |
| [R4-2016050](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016050.zip) | Revised |
| [R4-2016051](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016051.zip) | Revised |

2nd round email discussion conclusions

================================================================================

#### 7.14.1 RRM core requirements maintenance (38.133) [NR\_CSIRS\_L3meas-Core]

**R4-2017223 WF on remaining issues on CSI-RS based L3 measurement requirements (core part)**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014188 CR on scheduling restriction for CSI-RS based intra-frequency measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1108 rev 2 Cat: B (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

(Replaces R4-2012174)

**Abstract:**

CSI-RS L3 measurement was introduced to RAN4 in Rel-16. The CR aims to add restrictions in the scheduling availability during CSI-RS L3 intra-frequency measurements. The CR is revised from R4-2012174 which was approved but not implemented.

**Decision: Return to.**

**R4-2014235 CR on CSSF with both CSI-RS and SSB**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1140 Cat: F (Rel-16)  
  
 Source: Apple*

**Abstract:**

Revise CSSF when CSI-RS resources for L3 measurement are considered on top of SSB.

R4-2012181 has been agreed in RAN4#96-bis. Due to editorial reason, it was not implemented. This CR is resubmitted based on v16.5.0

**Decision: Return to.**

**R4-2014236 On remaining core issues of CSI-RS for L3 measurements**

*Type: discussion For: Agreement  
 Source: Apple*

**Decision: Noted.**

**R4-2014314 Discussions on the remaining issues for CSI-RS L3 core requirements**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

We intend to share our views regarding the remaining open issues for maintaining the core requirements e.g. measurement restriction and scheduling restriction.

**Decision: Noted.**

**R4-2014413 CR for TS36.133, Adding requirements for CSI-RS based L3 measurement**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6962 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

CSI-RS based L3 measurement are defined in NR, and the requirements are missed in 36.133 in EN-DC and NE-DC mode.

The number of inter frequency carrers measurement for NR has changed from 7 to 8 due to introducing CSI-RS based L3 measurement.

**Decision: Revised to R4-2017225 (from R4-2014413).**

**R4-2017225 CR for TS36.133, Adding requirements for CSI-RS based L3 measurement**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6962 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

CSI-RS based L3 measurement are defined in NR, and the requirements are missed in 36.133 in EN-DC and NE-DC mode.

The number of inter frequency carrers measurement for NR has changed from 7 to 8 due to introducing CSI-RS based L3 measurement.

**Decision: Return to.**

**R4-2014429 CR on abbreviations about CSI-RS based measurement in 38.133.**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1171 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

CSI-RS based L3 measurement was introduced in 38.133. Some abbreviations about CSI-RS measurement are used and need to be defined.

**Discussion:**

The secretary commented that the CR number 1171 is missing on the coversheet.

**Decision: Revised to R4-2017226 (from R4-2014429).**

**R4-2017226 CR on abbreviations about CSI-RS based measurement in 38.133.**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1171 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

CSI-RS based L3 measurement was introduced in 38.133. Some abbreviations about CSI-RS measurement are used and need to be defined.

**Discussion:**

The secretary commented that the CR number 1171 is missing on the coversheet.

**Decision: Return to.**

**R4-2014430 CR on CSI-RS based intra-frequency measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1172 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

The clarification of the number of cells for CSI-RS based intra-frequency measurement is in the wrong place.

**Discussion:**

The secretary commented that the CR number 1172 is missing on the coversheet.

**Decision: Merged.**

**R4-2014431 CR on CSI-RS based inter-frequency measurement.**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1173 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

Some requirements for CSI-RS based inter-frequency measurement are missed.

**Discussion:**

The secretary commented that the CR number 1173 is missing on the coversheet.

**Decision: Merged.**

**R4-2014432 CR on scheduling restriction for CSI-RS based intra-frequency measurement.**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1174 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

Scheduling restriction for CSI-RS based intra-frequency measurement is not complete.

**Discussion:**

The secretary commented that the CR number 1174 is missing on the coversheet.

**Decision: Return to.**

**R4-2014433 CR on CSI-RS configuration for mobility**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1175 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

CSI-RS based L3 measurement was introduced in 38.133. The CSI-RS configuration for mobility needs to be specified when defining test cases.

**Discussion:**

The secretary commented that the CR number 1175 is missing on the coversheet.

The secretary wondered what is the correct Category? It reads B on the coversheet but the CR is allocated for F.

**Decision: Merged.**

**R4-2014434 CR on conditions for NR CSI-RS based L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1176 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

The conditions for NR CSI-RS based L3 measurement need to be defined when defining the performance requirements for CSI-RS based L3 measurement in 38.133.

**Discussion:**

The secretary commented that the CR number 1176 is missing on the coversheet.

The secretary wondered what is the correct Category? It reads B on the coversheet but the CR is allocated for F.

**Decision: Return to.**

**R4-2014530 Discussion on remaining issues for R16 CSI-RS based L3 measurements**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2014531 CR on R16 CSI-RS based L3 measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1186 Cat: F (Rel-16)  
  
 Source: vivo*

**Abstract:**

Capture last meeting agreements on the number of layers.

Remove the side condition for SSB measurement in clause 9.10.2.2 of TS 38.133

Remove the exact number of cells to be monitored in clause 9.10.2.3.

The description on relation between CSI-RS for RRM and CSI-RS for RLM is removed.

Avoid some duplication

**Decision: Revised to R4-2017227 (from R4-2014531).**

**R4-2017227 CR on R16 CSI-RS based L3 measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1186 Cat: F (Rel-16)  
  
 Source: vivo*

**Abstract:**

Capture last meeting agreements on the number of layers.

Remove the side condition for SSB measurement in clause 9.10.2.2 of TS 38.133

Remove the exact number of cells to be monitored in clause 9.10.2.3.

The description on relation between CSI-RS for RRM and CSI-RS for RLM is removed.

Avoid some duplication

**Decision: Return to.**

**R4-2014622 On remaining issues for CSI-RS based L3 measurement**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014623 Introduction of CSSF requirements for CSI-RS based L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1190 Cat: F (Rel-16)  
  
 Source: MediaTek inc., CATT*

**Abstract:**

CR R4-2012181 was agreed in last RAN4 meeting but not implemented in the version 16.5.0. This CR implements the changes in R4-2012181 with changes to improve readability.

**Decision: Return to.**

**R4-2014660 Maintenance on CSI-RS based L3 requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

CSI-RS based L3 measurement requirements were completed in last meeting, some corrections in following aspects are needed to make the spec more clear:

In TS38.300, a note is added to clarify that extended CR for CSI-RS mobility is not supported in this release.

“NOTE 3:Extended CP for CSI-RS based measurement is not supported in this release.”

The requirements for intra-frequency measurements without gap is not implemented in this section

The requirements of number of cells to be monitored for intra/inter-frequency is not clear in the spec.

Some clause number and editorial error need to be fixed.

**Decision: Merged.**

**R4-2014824 Discussion on remaining issues about CSI-RS based L3 measurement requirement**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015489 Discussion on remaining issues for CSI-RS based L3 measurement**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015490 CR on CSI-RS based intra-frequency measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1277 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

1. Based on RAN1’s discussion history, extended CP for CSI-RS based mobility measurement is not supported in Rel-16, so it implies the second condition of CP type comparison for intra-frequency measurement is always satisified in this release. In RAN2 a note is added to clarify this [R2-2007002].

2. [R4-2012261] was endorsed at RAN4#96e, however the CR was implemented mixed with positioning in clause 9.9.2.4 and 9.9.2.6.

**Decision: Revised to R4-2017228 (from R4-2015490).**

**R4-2017228 CR on CSI-RS based intra-frequency measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1277 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

1. Based on RAN1’s discussion history, extended CP for CSI-RS based mobility measurement is not supported in Rel-16, so it implies the second condition of CP type comparison for intra-frequency measurement is always satisified in this release. In RAN2 a note is added to clarify this [R2-2007002].

2. [R4-2012261] was endorsed at RAN4#96e, however the CR was implemented mixed with positioning in clause 9.9.2.4 and 9.9.2.6.

**Decision: Return to.**

**R4-2015491 CR on CSSF definition for CSI-RS based measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1278 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

[R4-2012181] on CSSF for CSI-RS based measurement was endorsed in RAN4#96e.

Some correction and clarification are made on top of [R4-2012181]:

It is agreed that Core/performance requirements in TS38.133 are specified based on the assumption that UE does not support simultaneous reception of CSI-RS and SSB. It means that CSI-RS L3 measurement and SSB based measurement are time division.

It is also agreed that Number of SSB layers should include SSB for mobility and that as associatedSSB for CSI-RS mobility.

Based on the above background, for CSSFoutsidegap, take EN-DC with FR1 only CA as an example, if SCell#1 is configured with both ssb-ConfigMobility and csi-rs-ResourceConfigMobility, SCell#2 is configured with csi-rs-ResourceConfigMobility only, SCell#3 is configured with ssb-ConfigMobility only, and there is one inter-frequency layer without gap, then SCell#1 and SCell#2 are regarded as 2 MOs including SSB and CSI-RS. The CSSF for each candidate shall be [2(for SCell#1) +2(for SCell#2)+ 1(for SCell#3)+1 (for inter-frequency layer w/o gap)].

Make some clarification on SSB MOs

The number of SSB measurement object shall include the total number of MOs with

-ssb-ConfigMobility configured, or

-ssb-ConfigMobility not configured but csi-rs-ResourceConfigMobility configured with associatedSSB.

If ssbfrequency, smtc1, smtc2 and ssbSubcarrierSpacing are same in multiple MOs, the multiple MOs are counted as one SSB measurement object.

**Decision: Return to.**

**R4-2015782 CR on CSI-RS capability requirements and time restriction**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1329 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The current wording for CSI-RS time restriction in unclear whether the case where different CSI-RS resources fall in different instances of the measurement window is supported or not.

It is agreed that the number of CSI-RS resources in any duration that equal to the length of a slot is no larger than UE reported capability, it is more clear to capture this agreement in specification for reference.

The definition of SSB frequency layer and CSI-RS frequency layer are missing in UE capability requirements, and it is more clear to capture the agreements in specification for reference.

There is no LTE-NR inter-RAT measurement, so in EN-DC the LTE PCell cannot configure CSI-RS measurement on NR carriers.

**Decision: Merged.**

**R4-2016043 CSI-RS based intra-frequency measurement requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2016044 38.133 CR on CSI-RS based intra-frequency measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1352 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

The secretary commented that the CR number 1352 is missing on the coversheet.

**Decision: Merged.**

**R4-2016045 38.133 CR on scheduling restrictions for CSI-RS based intra-frequency measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1353 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The scheduling restriction CR R4-2012174 for intra-frequency CSI-RS based measurements were not implemented due to unclear clause numbering. In addition, the scheduling restriction was not concluded for TDD and FR2 scenarios. And the impact to SSB-based intra-frequency measurements is not reflected.

**Discussion:**

The secretary commented that the CR number 1353 is missing on the coversheet.

**Decision: Return to.**

#### 7.14.2 RRM perf. requirements (38.133) [NR\_CSIRS\_L3meas-Perf]

**R4-2017224 WF on performance requirements of CSI-RS based L3 measurement**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014666 RRM test cases for CSI-RS L3 measurement performance**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

The CSI-RS based L3 RRM requirements were introduced in Rel-16, hence the test cases to verify the corresponding performance requirements shall be introduced.

**Decision: Return to.**

**R4-2015213 CR on introduce the gain to CSI-RSRP measurements point in FR1 and FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

The CSI-RS based intra-frequency and inter-frequecny measurements were introduced in Rel-16, hence the gain to CSI-RSRP measurements point in FR1 and FR2 shall be introduced.

**Decision: Return to.**

##### 7.14.2.1 General [NR\_CSIRS\_L3meas-Perf]

**R4-2014288 CR on introducing CSI-RS configurations for RRM**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1151 Cat: B (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The core requirements were completed in discussions and specified during R4 96-e. This CR aims to introduce the CSI-RS configurations for RRM since the existing CSI-RS configurations are employed for L1 use.

**Decision: Merged.**

**R4-2014435 Work plan for CSI-RS based L3 measurements**

*Type: Work Plan For: Approval  
 Source: CATT*

**Decision: Revised to R4-2017229 (from R4-2014435).**

**R4-2017229 Work plan for CSI-RS based L3 measurements**

*Type: Work Plan For: Approval  
 Source: CATT*

**Decision: Return to.**

**R4-2014436 Updated link-level simulation assumptions for CSI-RS based L3 measurements**

*Type: other For: Approval  
 Source: CATT*

**Decision: Revised to R4-2017230 (from R4-2014436).**

**R4-2017230 Updated link-level simulation assumptions for CSI-RS based L3 measurements**

*Type: other For: Approval  
 Source: CATT*

**Decision: Return to.**

**R4-2014659 Discussion on performance requirements for CSI-RS L3 measurements**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2014664 CR on side conditions for CSI-RS based intra-frequency and inter-frequency measurements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

The CSI-RS based intra-frequency and inter-frequecny measurements were introduced in Rel-16, hence the corresponding conditions for CSI-RS L3 measurements shall be introduced.

**Decision: Return to.**

**R4-2014790 Discussion on accuracy requirements for CSI-RS L3 measurements**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: OPPO*

**Decision: Noted.**

**R4-2016046 Discussion on the performance of CSI-RS based intra-frequency measurements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

###### 7.14.2.1.1 CSI-RSRP requirements [NR\_CSIRS\_L3meas -Perf]

**R4-2014354 Simulation results on CSI-RS based L3 measurements for RSRP**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

We provide the simulation results for CSI-RS based RSRP subject to certain cell timing difference and reveal the impact on defining the performance test cases in this paper

**Decision: Noted.**

**R4-2014437 Simulation results for CSI-RSRP measurement**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014439 Discussion on performance requirement for CSI-RSRP**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014441 CR on performance requirement for CSI-RSRP L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1177 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The performance requirements for CSI-RSRP L3 measurement need to be specified.

**Discussion:**

The secretary commented that the CR number 1177 is missing on the coversheet.

**Decision: Return to.**

**R4-2014624 CSI-RSRP measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014661 CR on CSI-RSRP performance requirements for CSI-RS based measurements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

The CSI-RS based intra-frequency and inter-frequecny measurements were introduced in Rel-16, hence the corresponding performance requirements for CSI-RS L3 measurements shall be introduced.

**Decision: Return to.**

**R4-2014703 Simulation results for CSI-RSRP measurement**

*Type: discussion For: Information  
 Source: CMCC*

**Decision: Noted.**

**R4-2014791 CR to TS 38.133 on CSI-RSRP measurement accuracy(section 10.1)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Decision: Return to.**

**R4-2015783 Discussion on CSI-RSRP accuracy and report mapping**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015784 CR to introduce CSI-RSRP accuracy requirements and report mapping**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

CSI-RSRP accuracy and report mapping need to be defined.

**Decision: Return to.**

**R4-2016047 38.133 CR on the intra-frequency CSI-RSRP accuracy requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1354 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The performance requirements for the CSI-RS based intra-frequency measurement needs to be specified.

**Discussion:**

The secretary commented that the CR number 1354 is missing on the coversheet.

**Decision: Return to.**

**R4-2016048 38.133 CR on the conditions for NR intra-frequency CSI-RS based measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1355 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In current TS 38.133 Annex B, only the conditions for NR intra-frequency measurements based on SSBs are available. The conditions for CSI-RS based intra-frequency measurement needs to be specified.

**Discussion:**

The secretary commented that the CR number 1355 is missing on the coversheet.

**Decision: Return to.**

**R4-2016049 Simulation results for CSI-RS based measurements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

###### 7.14.2.1.2 CSI-RSRQ requirements [NR\_CSIRS\_L3meas -Perf]

**R4-2014438 Simulation results for CSI-RSRQ measurement**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014440 Discussion on performance requirement for CSI-RSRQ**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014442 CR on performance requirement for CSI-RSRQ L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1178 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The performance requirements for CSI-RSRQ L3 measurement need to be specified.

**Discussion:**

The secretary commented that the CR number 1178 is missing on the coversheet.

**Decision: Return to.**

**R4-2014662 CR on CSI-RSRQ performance requirements for CSI-RS based L3 measurements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

The CSI-RS based intra-frequency and inter-frequecny measurements were introduced in Rel-16, hence the corresponding performance requirements for CSI-RS L3 measurements shall be introduced.

**Decision: Return to.**

**R4-2014792 CR to TS 38.133 on CSI-RSRQ measurement accuracy(section 10.1)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Decision: Return to.**

**R4-2015785 Discussion on CSI-RSRQ accuracy requirements and report mapping**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015786 CR to introduce CSI-RSRQ accuracy requirements and report mapping**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

CSI-RSRQ accuracy and report mapping need to be defined.

**Decision: Return to.**

###### 7.14.2.1.3 CSI-SINR requirements [NR\_CSIRS\_L3meas -Perf]

**R4-2014443 CR on performance requirement for CSI-SINR L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1179 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The performance requirements for CSI-SINR L3 measurement need to be specified.

**Discussion:**

The secretary commented that the CR number 1179 is missing on the coversheet.

**Decision: Return to.**

**R4-2014625 CSI-SINR measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014663 CR on CSI-SINR performance requirements for CSI-RS based L3 measurements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

The CSI-RS based intra-frequency and inter-frequecny measurements were introduced in Rel-16, hence the corresponding performance requirements for CSI-RS L3 measurements shall be introduced.

**Decision: Return to.**

**R4-2015787 Discussion on CSI-SINR accuracy requirements and report mapping**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015788 CR to introduce CSI-SINR accuracy requirements and report mapping**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

CSI-SINR accuracy and report mapping need to be defined.

**Decision: Return to.**

##### 7.14.2.2 Test cases [NR\_CSIRS\_L3meas-Perf]

**R4-2014189 Draft test case CR on EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The core requirements were completed in discussions and specified during R4 96-e. This CR aims to introduce the delay test case for CSI-RS based intra-frequency measurement in the case of EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2

**Decision: Revised to R4-2017231 (from R4-2014189).**

**R4-2017231 Draft test case CR on EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The core requirements were completed in discussions and specified during R4 96-e. This CR aims to introduce the delay test case for CSI-RS based intra-frequency measurement in the case of EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2

**Decision: Return to.**

**R4-2014287 Draft test case CR on EN-DC CSI-RSRP measurement accuracy for NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The core requirements were completed in discussions and specified during R4 96-e. This CR aims to introduce the test case in the case of EN-DC CSI-RS measurement for NR neighbor performance cell in FR2

**Decision: Revised to R4-2017232 (from R4-2014287).**

**R4-2017232 Draft test case CR on EN-DC CSI-RSRP measurement accuracy for NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

The core requirements were completed in discussions and specified during R4 96-e. This CR aims to introduce the test case in the case of EN-DC CSI-RS measurement for NR neighbor performance cell in FR2

**Decision: Return to.**

**R4-2014444 Test case for CSI-RS based L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1180 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The test cases for CSI-RS based L3 measurement need to be defined.

**Discussion:**

The secretary commented that the CR number 1180 is missing on the coversheet.

**Decision: Revised to R4-2017233 (from R4-2014444).**

**R4-2017233 Test case for CSI-RS based L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1180 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

The test cases for CSI-RS based L3 measurement need to be defined.

**Discussion:**

The secretary commented that the CR number 1180 is missing on the coversheet.

**Decision: Return to.**

**R4-2014532 CR on test cases for EN-DC CSI-SINR measurement accuracy**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: vivo*

**Abstract:**

Introduce test case for EN-DC CSI-SINR measurement accuracy

**Decision: Noted.**

**R4-2014626 Introduction of test case for CSI-SINR in SA FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

Add the test case for CSI-SINR measurement accuracy for FR2 SA

**Decision: Revised to R4-2017235 (from R4-2014626).**

**R4-2017235 Introduction of test case for CSI-SINR in SA FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

Add the test case for CSI-SINR measurement accuracy for FR2 SA

**Decision: Return to.**

**R4-2014665 RRM test cases for CSI-RS L3 intra-frequency and inter-frequency measurements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

The CSI-RS based L3 RRM requirements were introduced in Rel-16, hence the test cases to verify the corresponding requirement shall be introduced.

**Decision: Revised to R4-2017234 (from R4-2014665).**

**R4-2017234 RRM test cases for CSI-RS L3 intra-frequency and inter-frequency measurements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Xiaomi*

**Abstract:**

The CSI-RS based L3 RRM requirements were introduced in Rel-16, hence the test cases to verify the corresponding requirement shall be introduced.

**Decision: Return to.**

**R4-2014699 Discussion on test cases for CSI-RS based RRM measurement**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2014793 CR to TS 38.133: EN-DC event triggered reporting tests for NR neighbour cell in FR2 (PScell in FR1) for CSI-RS L3 inter-frequency measurements(A.5.6.x)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Abstract:**

EN-DC event triggered reporting tests with gap for NR neighbour cell in FR2 (PScell in FR1) for inter-frequency measurement (when DRX is not used) are specified.

**Decision: Revised to R4-2017236 (from R4-2014793).**

**R4-2017236 CR to TS 38.133: EN-DC event triggered reporting tests for NR neighbour cell in FR2 (PScell in FR1) for CSI-RS L3 inter-frequency measurements(A.5.6.x)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Abstract:**

EN-DC event triggered reporting tests with gap for NR neighbour cell in FR2 (PScell in FR1) for inter-frequency measurement (when DRX is not used) are specified.

**Decision: Return to.**

**R4-2014794 CR to TS 38.133: TC for EN-DC CSI-RSRQ measurement accuracy for all NR cells in FR1(A.4.7.x)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Abstract:**

TC8

**Decision: Noted.**

**R4-2014795 CR to TS 38.133: TC for EN-DC CSI-RSRQ measurement accuracy for all NR cells in FR2(A.5.7.x)**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: OPPO*

**Abstract:**

TC11

**Decision: Noted.**

**R4-2015586 Draft CR on test case for SA CSI-RS based measurement in FR2 and CSI-RSRQ accuracy in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE*

**Abstract:**

Test cases for CSI-RS based measurement need to be introduced to verify corresponding core requirements and accuracy requirements.

**Decision: Revised to R4-2017237 (from R4-2015586).**

**R4-2017237 Draft CR on test case for SA CSI-RS based measurement in FR2 and CSI-RSRQ accuracy in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE*

**Abstract:**

Test cases for CSI-RS based measurement need to be introduced to verify corresponding core requirements and accuracy requirements.

**Decision: Return to.**

**R4-2015789 CR to introduce TC for CSI-SINR measurement accuracy for FR1 SA and FR2 EN-DC**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RRM core requirements for CSI-RS measurement are defined, but there is no RRM test case for CSI-RS measurement.

**Decision: Noted.**

**R4-2016050 38.133 CR on the test case of EN-DC event triggered reporting for intra-frequency CSI-RS based measurements in FR1**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1356 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The test case for E-UTRAN-NR event triggered reporting in FR1 needs to be specified for the CSI-RS based intra-frequency measurements.

**Discussion:**

The secretary commented that the CR number 1356 is missing on the coversheet.

**Decision: Revised to R4-2017238 (from R4-2016050).**

**R4-2017238 38.133 CR on the test case of EN-DC event triggered reporting for intra-frequency CSI-RS based measurements in FR1**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1356 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The test case for E-UTRAN-NR event triggered reporting in FR1 needs to be specified for the CSI-RS based intra-frequency measurements.

**Discussion:**

The secretary commented that the CR number 1356 is missing on the coversheet.

**Decision: Return to.**

**R4-2016051 38.133 CR on the test cases of EN-DC measurement accuracy in FR1 for CSI-RS based intra-frequency and inter-frequency measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1357 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The test cases to verify the accuracy performance requirements for the CSI-RS based measurements in FR1 needs to be specified.

**Discussion:**

The secretary commented that the CR number 1357 is missing on the coversheet.

**Decision: Revised to R4-2017239 (from R4-2016051).**

**R4-2017239 38.133 CR on the test cases of EN-DC measurement accuracy in FR1 for CSI-RS based intra-frequency and inter-frequency measurements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1357 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The test cases to verify the accuracy performance requirements for the CSI-RS based measurements in FR1 needs to be specified.

**Discussion:**

The secretary commented that the CR number 1357 is missing on the coversheet.

**Decision: Return to.**

### 7.15 NR support for high speed train scenario [NR\_HST]

#### 7.15.1 RRM core requirements maintenance (38.133) [NR\_HST-Core]

================================================================================

**Email discussion: [97e][223] NR\_HST\_RRM**

**R4-2017022 Email discussion summary for [97e][223] NR\_HST\_RRM**

*Type: other For: Information  
Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017293 (from R4-2017022).**

**R4-2017293 Email discussion summary for [97e][223] NR\_HST\_RRM**

*Type: other For: Information  
Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |

**Topic #1: RRM core requirements**

Issue 1-1: aligning table caption

Agreement: table caption is aligned in the way to include RAN2 IE name, e.g. “…for UE configured with *highSpeedMeasFlag-r16*”

**Topic #2: RRM performance part**

Issue 2-1: aligning section title

Agreement: section title is aligned in the way to include RAN2 IE name, e.g. “…for UE configured with *highSpeedMeasFlag-r16*”

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2014964](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014964.zip) | Revised |
| [R4-2014981](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014981.zip) | Revised |
| [R4-2014691](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014691.zip) | Revised |
| [R4-2014221](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014221.zip) | Merged |
| [R4-2015804](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015804.zip) | Agreed |
| [R4-2016207](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016207.zip) | Agreed |
| [R4-2015492](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015492.zip) | Merged |
| [R4-2015156](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015156.zip) | Not pursued |
| [R4-2014695](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014695.zip) | Revised |
| [R4-2014697](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014697.zip) | Revised |
| [R4-2015494](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015494.zip) | Return to |
| [R4-2014533](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014533.zip) | Revised |
| [R4-2014631](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014631.zip) | Revised |
| [R4-2014692](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014692.zip) | Revised |
| [R4-2015147](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015147.zip) | Revised |
| [R4-2015493](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015493.zip) | Revised |
| [R4-2016215](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016215.zip) | Revised |

2nd round email discussion conclusions

================================================================================

**R4-2014691 38.133 CR on CSSFintra for measurement period for intra-frequency measurements in connected mode for Rel-16 NR HST**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1194 Cat: F (Rel-16)  
  
 Source: CMCC*

**Decision: Revised to R4-2017242 (from R4-2014691).**

**R4-2017242 38.133 CR on CSSFintra for measurement period for intra-frequency measurements in connected mode for Rel-16 NR HST**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1194 Cat: F (Rel-16)  
  
 Source: CMCC*

**Decision: Return to.**

**R4-2014964 CR on IDLE state cell re-selection requirements for HST in 38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1217 Cat: F (Rel-16)  
  
 Source: vivo,Huawei, HiSilicon*

**Abstract:**

As agreed in last meeting, for higher priority carrier search and measurement, there is no requirement enhancements for high speed scenario.

There is no description on how to indicate a carrier that should meet high speed performance

The requirement for 2.56s DRX cycle length is missing.

**Decision: Revised to R4-2017240 (from R4-2014964).**

**R4-2017240 CR on IDLE state cell re-selection requirements for HST in 38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1217 Cat: F (Rel-16)  
  
 Source: vivo,Huawei, HiSilicon*

**Abstract:**

As agreed in last meeting, for higher priority carrier search and measurement, there is no requirement enhancements for high speed scenario.

There is no description on how to indicate a carrier that should meet high speed performance

The requirement for 2.56s DRX cycle length is missing.

**Decision: Return to.**

**R4-2014965 CR on IDLE state cell-reselection requirements for HST in 36.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1218 Cat: F (Rel-16)  
  
 Source: vivo,Huawei, HiSilicon*

**Decision: Withdrawn.**

**R4-2014981 CR on IDLE state cell re-selection requirements for HST in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6964 Cat: F (Rel-16)  
  
 Source: vivo, Huawei, HiSilicon*

**Abstract:**

As agreed in last meeting, for higher priority carrier search and measurement, there is no requirement enhancements for high speed scenario.

There is no description on how to indicate a carrier that should meet high speed performance

**Decision: Revised to R4-2017241 (from R4-2014981).**

**R4-2017241 CR on IDLE state cell re-selection requirements for HST in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6964 Cat: F (Rel-16)  
  
 Source: vivo, Huawei, HiSilicon*

**Abstract:**

As agreed in last meeting, for higher priority carrier search and measurement, there is no requirement enhancements for high speed scenario.

There is no description on how to indicate a carrier that should meet high speed performance

**Decision: Return to.**

**R4-2015156 Correction to high speed idle mode core requirement**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1228 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The title and table number for Table 4.2.2.3-1 has incorrectly been changed to “4.2.2.3-2 Tdetect,NR\_Intra, Tmeasure,NR\_Intra and Tevaluate,NR\_Intra for UE configured with highSpeedMeasFlag-r16 (Frequency range FR1)”. The title of table 4.2.2.3-2 needs to be changed to reflect the correct name of the high speed meas flag now that it is agreed in RAN2.

**Decision: Not pursued.**

**R4-2015492 Correction on SSB based L1-RSRP Reporting for HST**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1279 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For L1-RSRP reporting, when DRX ≤320ms, K = 1 when TSSB ≤ 40 ms and RRM enhancements for high speed are configured; otherwise K = 1.5. Thus the factor 1.5 shall be replaced by K.

**Decision: Merged.**

**R4-2015804 Correction of CR0972 implementation**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1331 Cat: F (Rel-16)  
  
 Source: ETSI MCC*

**Abstract:**

Table 4.2.2.3-1 and Table 4.2.2.3-2 titles are not correctly implemented.

**Decision: Agreed.**

**R4-2016207 CR to TS 38.133: Corrections to Tables 9.5.4.1-1 and 9.5.4.2-1.**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1370 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

There is an error for the requirement in Tables 9.5.4.1-1 and 9.5.4.2-1.

The signalling for RRM enhancments for HST needs to be updated to reflect the newly specified RAN2 IE name.

**Decision: Agreed.**

#### 7.15.2 RRM perf. requirements (38.133) [NR\_HST-Perf]

**R4-2017252 Big CR: NR HST RRM performance requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-TBA Cat: B (Rel-16)***Abstract:**

**Discussion:**

**Decision: For e-mail approval.**

##### 7.15.2.1 General [NR\_HST-Perf]

**R4-2014220 On HST intra-frequency measurement requirements**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014221 CR for HST intra-frequency measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1137 Cat: F (Rel-16)  
  
 Source: Apple*

**Abstract:**

Scaling factor CSSF is missing in high speed intra-frequency measurement requirement.

**Decision: Merged.**

**R4-2014695 CR on release independent for Rel.16 NR HST RRM requirements**

*Type: CR For: Agreement  
 38.307 v15.6.0 CR-0033 Cat: B (Rel-15)  
  
 Source: CMCC*

**Abstract:**

In last RAN4 meeting, it was agreed that Rel.16 NR HST RRM requirements are release independent from Rel-15.

**Decision: Revised to R4-2017243 (from R4-2014695).**

**R4-2017243 CR on release independent for Rel.16 NR HST RRM requirements**

*Type: CR For: Agreement  
 38.307 v15.6.0 CR-0033 Cat: B (Rel-15)  
  
 Source: CMCC*

**Abstract:**

In last RAN4 meeting, it was agreed that Rel.16 NR HST RRM requirements are release independent from Rel-15.

**Decision: Return to.**

**R4-2014697 CR on release independent for Rel.16 NR HST RRM requirements**

*Type: CR For: Agreement  
 38.307 v16.4.0 CR-0035 Cat: B (Rel-16)  
  
 Source: CMCC*

**Abstract:**

In last RAN4 meeting, it was agreed that Rel.16 NR HST RRM requirements are release independent from Rel-15.

**Decision: Revised to R4-2017244 (from R4-2014697).**

**R4-2017244 CR on release independent for Rel.16 NR HST RRM requirements**

*Type: CR For: Agreement  
 38.307 v16.4.0 CR-0035 Cat: B (Rel-16)  
  
 Source: CMCC*

**Abstract:**

In last RAN4 meeting, it was agreed that Rel.16 NR HST RRM requirements are release independent from Rel-15.

**Decision: Return to.**

**R4-2015494 Accuracy requirements for NR high speed**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The R16 HST RRM enhancements are applied on FR1 intra-frequency SSB based measurement. There are no enhancement on FR1 inter-frequency SSB measurement, FR2 intra-frequency and inter-frequency SSB measurement. And there are no enhancement on CSI-RS based measurement. Thus for the measurement accuracy, it shall be explicitly point out that the legacy accuracy of FR1 intra-frequency SSB based measurement (including RSRP, RSRQ and SINR) shall be applicable when highSpeedMeasFlag-r16 is configured. In the last meeting, the accuracy of SINR under high speed has been agreed. This contribution focus on RSRP and RSRQ.

**Decision: Revised to R4-2017245 (from R4-2015494).**

**R4-2017245 Accuracy requirements for NR high speed**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The R16 HST RRM enhancements are applied on FR1 intra-frequency SSB based measurement. There are no enhancement on FR1 inter-frequency SSB measurement, FR2 intra-frequency and inter-frequency SSB measurement. And there are no enhancement on CSI-RS based measurement. Thus for the measurement accuracy, it shall be explicitly point out that the legacy accuracy of FR1 intra-frequency SSB based measurement (including RSRP, RSRQ and SINR) shall be applicable when highSpeedMeasFlag-r16 is configured. In the last meeting, the accuracy of SINR under high speed has been agreed. This contribution focus on RSRP and RSRQ.

**Decision: Return to.**

##### 7.15.2.2 Test cases [NR\_HST-Perf]

**R4-2014533 CR on test case for EUTRAN-NR cell re-selection in HST**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: vivo*

**Abstract:**

Introduce test case for reselection to higher priority FR1 NR carrier in HST scenario (Note: If

R4-2014981 is agreed then this may not needed.)

Introduce test case for reselection to lower priority FR1 NR carrier in HST scenario (Note: No related test case for R15 non-HST requirements and probably not needed)

**Decision: Revised to R4-2017246 (from R4-2014533).**

**R4-2017246 CR on test case for EUTRAN-NR cell re-selection in HST**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: vivo*

**Abstract:**

Introduce test case for reselection to higher priority FR1 NR carrier in HST scenario (Note: If

R4-2014981 is agreed then this may not needed.)

Introduce test case for reselection to lower priority FR1 NR carrier in HST scenario (Note: No related test case for R15 non-HST requirements and probably not needed)

**Decision: Return to.**

**R4-2014630 NR HST test case discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2014631 CR-NR HST RRM test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm, Inc.*

**Decision: Revised to R4-2017247 (from R4-2014631).**

**R4-2017247 CR-NR HST RRM test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Qualcomm, Inc.*

**Decision: Return to.**

**R4-2014692 Draft CR on NR-NR intra-frequency reselection for FR1 for high speed scenario**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: CMCC*

**Decision: Revised to R4-2017248 (from R4-2014692).**

**R4-2017248 Draft CR on NR-NR intra-frequency reselection for FR1 for high speed scenario**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: CMCC*

**Decision: Return to.**

**R4-2015147 Test cases for NR -NR cell identification in connected mode for high speed**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1219 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Add test cases for cell identification in high speed condition

**Decision: Revised to R4-2017249 (from R4-2015147).**

**R4-2017249 Test cases for NR -NR cell identification in connected mode for high speed**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1219 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Add test cases for cell identification in high speed condition

**Decision: Return to.**

**R4-2015493 Test cases for inter-RAT cell identification in connected mode for HST**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The following test cases for high speed are needed to be specified:

1. NR-EUTRA inter-RAT event triggered reporting test under DRX in FR1

2. EUTRA-NR inter-RAT event triggered reporting for FR1 with SSB time index detection when DRX is used

**Decision: Revised to R4-2017250 (from R4-2015493).**

**R4-2017250 Test cases for inter-RAT cell identification in connected mode for HST**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

The following test cases for high speed are needed to be specified:

1. NR-EUTRA inter-RAT event triggered reporting test under DRX in FR1

2. EUTRA-NR inter-RAT event triggered reporting for FR1 with SSB time index detection when DRX is used

**Decision: Return to.**

**R4-2016215 CR to TS 38.133: Test cases for L1-RSRP measurement for beam reporting for NR HST**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Test cases for L1-RSRP measurement for beam reporting are not defined for NR HST.

**Decision: Revised to R4-2017251 (from R4-2016215).**

**R4-2017251 CR to TS 38.133: Test cases for L1-RSRP measurement for beam reporting for NR HST**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Test cases for L1-RSRP measurement for beam reporting are not defined for NR HST.

**Decision: Return to.**

### 7.16 NR performance requirement enhancement [NR\_perf\_enh-Perf]

### 7.17 Over the air (OTA) base station (BS) testing TR [OTA\_BS\_testing-Perf]

### 7.18 2-step RACH for NR [NR\_2step\_RACH-Perf]

#### 7.18.1 RRM core requirements maintenance (38.133) [NR\_2step\_RACH-Core]

================================================================================

**Email discussion: [97e][224] NR\_2step\_RACH\_RRM**

**R4-2017023 Email discussion summary for [97e][224] NR\_2step\_RACH\_RRM**

*Type: other For: Information  
Source: Moderator (ZTE Corporation)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017294 (from R4-2017023).**

**R4-2017294 Email discussion summary for [97e][224] NR\_2step\_RACH\_RRM**

*Type: other For: Information  
Source: Moderator (ZTE Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017254 | WF on 2-step RACH RRM test cases | ZTE Corporation |
|  |  |  |

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014935 | Revised |
| R4-2014008 | Revised |
| R4-2014933 | Revised |
| [R4-2014936](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014936.zip) | Revised |
| [R4-2015303](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015303.zip) | Revised |
| [R4-2015810](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015810.zip) | Revised |
| [R4-2015811](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015810.zip) | Revised |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2014935 CR Maintenance 2-step RACH RRM requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1214 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Correction to RRM core requirements related to 2-step RACH procedure, which involves MsgB and not RAR.

**Decision: Revised to R4-2017255 (from R4-2014935).**

**R4-2017255 CR Maintenance 2-step RACH RRM requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1214 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Correction to RRM core requirements related to 2-step RACH procedure, which involves MsgB and not RAR.

**Decision: Return to.**

#### 7.18.2 RRM perf. requirements (38.133) [NR\_2step\_RACH-Perf]

**R4-2017254 WF on 2-step RACH RRM test cases**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.18.2.1 General [NR\_2step\_RACH-Perf]

**R4-2014933 Big CR on 2-step RA type RRM performance requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1213 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Addition of 2-step RACH tests for 2-step RACH.

**Decision: Revised to R4-2017253 (from R4-2014933).**

**R4-2017253 Big CR on 2-step RA type RRM performance requirements**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1213 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Addition of 2-step RACH tests for 2-step RACH.

**Decision: For e-mail approval.**

**R4-2014356 Principles for 2-step RACH test cases**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2014934 2-step RACH RRM performance requirements**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2015810 Draft CR: RMC of MsgA for 2-step RACH test**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Ericsson*

**Abstract:**

RMC of MsgA for 2-step RACH test is missing

**Decision: Revised to R4-2017259 (from R4-2015810).**

**R4-2017259 Draft CR: RMC of MsgA for 2-step RACH test**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Ericsson*

**Abstract:**

RMC of MsgA for 2-step RACH test is missing

**Decision: Return to.**

##### 7.18.2.2 Test cases [NR\_2step\_RACH-Perf]

**R4-2014008 [draft CR] 2-step RACH test case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE Corporation*

**Abstract:**

Add test cases corresponding to core requirements for 2 step RA, in specific, for FR1 NR cells in NR SA under Non-contention based RA and FR2 NR cells in EN-DC under Non-contention based RA. Correct the titles in the current test cases for 4-step RA.

**Decision: Revised to R4-2017256 (from R4-2014008).**

**R4-2017256 [draft CR] 2-step RACH test case**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: ZTE Corporation*

**Abstract:**

Add test cases corresponding to core requirements for 2 step RA, in specific, for FR1 NR cells in NR SA under Non-contention based RA and FR2 NR cells in EN-DC under Non-contention based RA. Correct the titles in the current test cases for 4-step RA.

**Decision: Return to.**

**R4-2014936 Draft CR on 2-step RA type CBRA in FR2 for NR Standalone**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of text clause with RRM performance requirements of contention-based 2-step RACH in FR2 in standalone

**Decision: Revised to R4-2017257 (from R4-2014936).**

**R4-2017257 Draft CR on 2-step RA type CBRA in FR2 for NR Standalone**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of text clause with RRM performance requirements of contention-based 2-step RACH in FR2 in standalone

**Decision: Return to.**

**R4-2015303 Draft CR on TC for 2-step RA type contention based RA in FR1 and FR2 NR cells for EN-DC**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: NEC*

**Abstract:**

Addition of 2-step RA type test cases for contention based RA in EN-DC

**Decision: Revised to R4-2017258 (from R4-2015303).**

**R4-2017258 Draft CR on TC for 2-step RA type contention based RA in FR1 and FR2 NR cells for EN-DC**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: NEC*

**Abstract:**

Addition of 2-step RA type test cases for contention based RA in EN-DC

**Decision: Return to.**

**R4-2015811 Draft CR: Introduction of 2-step RACH CFRA tests**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Ericsson*

**Abstract:**

Introduction of non-contention based random access test for 2-step RA type

**Decision: Revised to R4-2017260 (from R4-2015811).**

**R4-2017260 Draft CR: Introduction of 2-step RACH CFRA tests**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Ericsson*

**Abstract:**

Introduction of non-contention based random access test for 2-step RA type

**Decision: Return to.**

### 7.19 R16 NR maintenance [WI code or TEI16]

#### 7.19.5 RRM [WI code or TEI16]

================================================================================

**Email discussion: [97e][204] R16\_NR\_RRM\_maintenance**

**R4-2017003 Email discussion summary for [97e][204] R16\_NR\_RRM\_maintenance***Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017274 (from R4-2017003).**

**R4-2017274 Email discussion summary for [97e][204] R16\_NR\_RRM\_maintenance***Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2014378](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014378.zip) | Agreed |
| [R4-2014379](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014379.zip) | Agreed |
| [R4-2014671](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014671.zip) | Agreed |
| [R4-2014796](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014796.zip) | Revised |
| [R4-2015533](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015533.zip) | Agreed |
| [R4-2015534](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015534.zip) | Agreed |
| [R4-2015671](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015671.zip) | ~~Agreed~~ Return to |
|  |  |
|  |  |

2nd round email discussion conclusions

================================================================================

**R4-2014280 Discussion on R16 IDLE/INACTIVE RRM requirement with SMTC2-LP**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Apple*

**Decision: Noted.**

**R4-2014281 CR on R16 IDLE/INACTIVE RRM requirement with SMTC2-LP**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1150 Cat: B (Rel-16)  
  
 Source: Apple*

**Abstract:**

The SMTC2-LP is missing in the R16 RRM requirement in IDLE/INACTIVE mode.

**Decision: Return to.**

**R4-2014378 CR on TS38.133 for E-UTRAN – NR PSCell FR2 DL active BWP switch test case with FR2 SCell in non-DRX in synchronous EN-DC**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1165 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

To align with Rel-15 spec, the missing sentence “where j is the first slot of the subframe” is added in A.5.5.6.1.

**Decision: Agreed.**

**R4-2014379 CR on TS38.133 for SCell activation and deactivation delay test cases**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1166 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Abstract:**

Some equations in A.4.5.3 are missing in v16.5.0.

**Decision: Agreed.**

**R4-2014671 Fine/rough beam assumption for CLI performance test cases**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1193 Cat: F (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

Capture fine or rough beam assumption for CLI performance test cases according to agreed WF R4-2008538.

Revise wrong table number which was not fully implemented in the specification based on agreed R4-2010024.

**Decision: Agreed.**

**R4-2014796 CR on interruptions at E-UTRA SRS carrier based switching in TS38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1204 Cat: A (Rel-16)  
  
 Source: OPPO*

**Abstract:**

The interruption on active serving cells in NR SCG in FR2 is missing for EN-DC interruptions at E-UTRA SRS carrier-based switching

**Discussion:**

The secretary commented that the CR number 1204 is missing on the coversheet.

**Decision: Revised to R4-2017067 (from R4-2014796).**

**R4-2017067 CR on interruptions at E-UTRA SRS carrier based switching in TS38.133**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1204 Cat: A (Rel-16)  
  
 Source: OPPO*

**Abstract:**

The interruption on active serving cells in NR SCG in FR2 is missing for EN-DC interruptions at E-UTRA SRS carrier-based switching

**Discussion:**

The secretary commented that the CR number 1204 is missing on the coversheet.

**Decision: Return to.**

**R4-2015477 CR on maintaining L1-RSRP measurements test cases R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1273 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For CSI-RS based L1-RSRP measurement procedure tests, the L1-RSRP reporting on aperiodic CSI-RS resources need to be tested. However, in current CSI-RS based L1-RSRP measurement tests, CSI-RS is configured as periodic resources.

**Decision: Return to.**

**R4-2015478 Discussion on MRTD/MTTD requirements for FR1 intra-band NCCA**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015479 CR on MRTD/MTTD requirements for FR1 intra-band NCCA R16**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1274 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In Rel-16, non-co-located deployment is also needed for FR1 intra-band non-contiguous CA.

**Decision: Return to.**

**R4-2015533 Update NR Frequency Band Groups to include Band n48**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1299 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The frequency band group do not include Band n48.

**Decision: Agreed.**

**R4-2015534 Update NR Frequency Band Groups to include Band n65**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1300 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The frequency band group do not include Band n65.

**Decision: Agreed.**

**R4-2015671 [CR] NR Perf Maintenance R16 Cat F**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1309 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

The following errors exist in the current test cases which mislead readers:

- In Table A.6.5.6.1.2.1-3, the configuration is for Cell 1 not Cell 2. The note should be for Cell 1 only since there is only one cell in the test.

Note that those errors are not in the R15 specifications, thus a separate R16 Category F CR is submitted to correct them.

**Discussion:**

Chair: The CR status was changed to Return to (instead of proposed Agreed in the summary document). I could not find Rel-16 CR corresponding to R4-2015674 which seems to be on the same topic. If R4-2015674 is agreed, then the corresponding changes should be added to R4-2015671.

**Decision: Return to.**

**R4-2015792 [CR] Specify RRC processing delay in TCI state switching delay for R16 NR-U**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1330 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

In clause 8.10A.5, the value of TRRC\_processing is not given nor defined.

**Decision: Return to.**

**R4-2015878 Correcting the range of Lmax=8 for unpaired spectrum**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-1337 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The Table 8.1.1-2 refers to the Lmax value for different frequency ranges specified in 38.213. In RAN#89e, the range for Lmax=8 was changed for unpaired spectrum by CR0141v1 (RP-202015). RAN1 spesification is the source for supported Lmax (and NRLM) values, thus RAN4 spesifcation should be aligned.

This change is not changing any UE requirement or behaviour.

**Decision: Return to.**

#### 7.19.6 Demodulation and CSI [WI code or TEI16]

#### 7.19.7 NR MIMO OTA test methods (38.827) [FS\_NR\_MIMO\_OTA\_test]

## 8 Rel-16 UE feature list

## 9 Rel-16 spectrum related Work Items for NR

## 10 Rel-17 spectrum related Work Items for NR

### 10.24 Introduction of FR2 FWA UE with maximum TRP of 23dBm for band n257 and n258 [NR\_FR2\_FWA\_Bn257\_Bn258]

#### 10.24.1 UE RF (38.101-2) [NR\_FR2\_FWA\_Bn257\_Bn258-Core]

#### 10.24.2 RRM Core requirements (38.133) [NR\_FR2\_FWA\_Bn257\_Bn258-Core]

================================================================================

**Email discussion: [97e][228] NR\_FR2\_FWA\_Bn257\_Bn258\_RRM**

**R4-2017027 Email discussion summary for [97e][228] NR\_FR2\_FWA\_Bn257\_Bn258\_RRM**

*Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017298 (from R4-2017027).**

**R4-2017298 Email discussion summary for [97e][228] NR\_FR2\_FWA\_Bn257\_Bn258\_RRM**

*Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2015480 | Revised |
| R4-2016178 | Revised |
| R4-2015481 | Revised |

2nd round email discussion conclusions

================================================================================

**R4-2016178 Big CR on FR2 new FWA UE RRM requirements in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6994 Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

To specify inter-RAT RRM requirements for FR2 FWA UE power class.

**Decision: Revised to R4-2017262 (from R4-2016178).**

**R4-2017262 Big CR on FR2 new FWA UE RRM requirements in 36.133**

*Type: CR For: Agreement  
 36.133 v16.7.0 CR-6994 Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

To specify inter-RAT RRM requirements for FR2 FWA UE power class.

**Decision: Return to.**

**R4-2017264 Big CR: NR FR2 new FWA UE RRM requirements (TS 38.133)**

*Type: CR For: Agreement  
 38.133 v16.5.0 CR-TBA Cat: B (Rel-17)  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: For e-mail approval.**

**R4-2015480 DraftCR on RRM core requirements for FR2 new FWA UE in 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on the endorsed document [R4-2012200] in RAN4#96-e meeting, the RRM requirements for new FR2 FWA UE need to be specified in TS38.133.

**Decision: Revised to R4-2017261 (from R4-2015480).**

**R4-2017261 DraftCR on RRM core requirements for FR2 new FWA UE in 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on the endorsed document [R4-2012200] in RAN4#96-e meeting, the RRM requirements for new FR2 FWA UE need to be specified in TS38.133.

**Decision: Return to.**

#### 10.24.3 RRM Perf. requirements (38.133) [NR\_FR2\_FWA\_Bn257\_Bn258-Perf]

**R4-2015481 DraftCR on RRM performance requirements for FR2 new FWA UE in 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on the agreements in [R4-2012199] in RAN4#96-e meeting, it has been obseved that the side condition, UE gain range and test directions for FR2 RRM tests need to be introduced for FR2 new FWA UE.

**Decision: Revised to R4-2017263 (from R4-2015481).**

**R4-2017263 DraftCR on RRM performance requirements for FR2 new FWA UE in 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on the agreements in [R4-2012199] in RAN4#96-e meeting, it has been obseved that the side condition, UE gain range and test directions for FR2 RRM tests need to be introduced for FR2 new FWA UE.

**Decision: Return to.**

#### 10.24.4 Others [NR\_FR2\_FWA\_Bn257\_Bn258-Core/Perf]

## 11 Reply to ITU-R LS (RP-200042)

## 12 Rel-17 non-spectrum related work items for NR

### 12.4 NR RRM further enhancement [NR\_RRM\_enh2-Core]

================================================================================

**Email discussion: [97e][229] NR\_RRM\_enh2**

**R4-2017028 Email discussion summary for [97e][229] NR\_RRM\_enh2**

*Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017299 (from R4-2017028).**

**R4-2017299 Email discussion summary for [97e][229] NR\_RRM\_enh2**

*Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014286 | Revised |

2nd round email discussion conclusions

================================================================================

#### 12.4.1 Work plan [NR\_RRM\_enh2-Core]

**R4-2014286 Work plan for R17 FeRRM**

*Type: discussion For: Agreement  
 38.133 v..  
 Source: Apple*

**Decision: Revised to R4-2017265 (from R4-2014286).**

**R4-2017265 Work plan for R17 FeRRM**

*Type: discussion For: Agreement  
 38.133 v..  
 Source: Apple*

**Decision: Return to.**

**R4-2015310 Views on PUCCH SCell Activation/Deactivation delay requirements**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

### 12.5 NR measurement gap enhancements [NR\_MG\_enh-Core]

================================================================================

**Email discussion: [97e][230] NR\_MG\_enh**

**R4-2017029 Email discussion summary for [97e][230] NR\_MG\_enh**

*Type: other For: Information  
Source: Moderator (MediaTek)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017300 (from R4-2017029).**

**R4-2017300 Email discussion summary for [97e][230] NR\_MG\_enh**

*Type: other For: Information  
Source: Moderator (MediaTek)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014628 | Revised |

2nd round email discussion conclusions

================================================================================

#### 12.5.1 Work plan [NR\_MG\_enh-Core]

**R4-2014224 Work plan for measurement gap enhancement**

*Type: Work Plan For: Approval  
 Source: Apple*

**Decision: Noted.**

**R4-2014628 Work plan of R17 NR and MR-DC measurement gap enhancements WI**

*Type: Work Plan For: Approval  
 Source: MediaTek inc., Intel Corporation*

**Decision: Revised to R4-2017266 (from R4-2014628).**

**R4-2017266 Work plan of R17 NR and MR-DC measurement gap enhancements WI**

*Type: Work Plan For: Approval  
 Source: MediaTek inc., Intel Corporation*

**Decision: Return to.**

### 12.6 Enhancement for NR high speed train scenario in FR1 [NR\_HST\_FR1\_enh-Core]

================================================================================

**Email discussion: [97e][231] NR\_HST\_FR1\_enh**

**R4-2017030 Email discussion summary for [97e][231] NR\_HST\_FR1\_enh**

*Type: other For: Information  
Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017301 (from R4-2017030).**

**R4-2017301 Email discussion summary for [97e][231] NR\_HST\_FR1\_enh**

*Type: other For: Information  
Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014705 | Revised |

2nd round email discussion conclusions

================================================================================

#### 12.6.1 Work plan [NR\_HST\_FR1\_enh-Core]

**R4-2014225 Work plan for NR high speed train scenario in FR1**

*Type: Work Plan For: Approval  
 Source: Apple*

**Decision: Noted.**

**R4-2014705 Work plan for enhancement for NR high speed train scenario in FR1**

*Type: Work Plan For: Approval  
 Source: CMCC*

**Decision: Revised to R4-2017267 (from R4-2014705).**

**R4-2017267 Work plan for enhancement for NR high speed train scenario in FR1**

*Type: Work Plan For: Approval  
 Source: CMCC*

**Decision: Return to.**

### 12.8 Solutions for NR to support non-terrestrial networks (NTN) [NR\_NTN\_solutions]

#### 12.8.4 RRM requirements [NR\_NTN\_solutions-Core]

================================================================================

**Email discussion: [97e][232] NR\_NTN\_solutions\_RRM**

**R4-2017031 Email discussion summary for [97e][232] NR\_NTN\_solutions\_RRM**

*Type: other For: Information  
Source: Moderator (THALES)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017302 (from R4-2017031).**

**R4-2017302 Email discussion summary for [97e][232] NR\_NTN\_solutions\_RRM**

*Type: other For: Information  
Source: Moderator (THALES)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017268 | WF on NR NTN RRM requirements | THALES |

2nd round email discussion conclusions

================================================================================

**R4-2017268 WF on NR NTN RRM requirements**

*Type: other For: Approval  
 Source: THALES*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014658 Initial discussion on RRM impact for NR NTN system**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2014875 Discussion on RRM requirements in NTN**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014928 Satellite Position Accuracy**

*Type: discussion For: Decision  
 Source: Eutelsat S.A.*

**Decision: Noted.**

**R4-2015730 Initial discussion on NTN RRM requirements**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Initial discussion on NTN RRM

**Decision: Noted.**

**R4-2015946 NTN RRM and Demodulation KPIs**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The objective of this document is to propose a framework for NTN core requirements and consider in particular the potential demodulation Key Performance Indicators (KPIs) & RRM aspects to be considered by NTN RAN4 work.

**Decision: Noted.**

**R4-2016037 NTN impact on RRM**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Analysis of RRM requirements of TS 38.133

**Decision: Noted.**

### 12.9 UE Power Saving Enhancements [NR\_UE\_pow\_sav\_enh]

================================================================================

**Email discussion: [97e][233] NR\_UE\_pow\_sav\_enh\_RRM**

**R4-2017032 Email discussion summary for [97e][233] NR\_UE\_pow\_sav\_enh\_RRM**

*Type: other For: Information  
Source: Moderator (MediaTek)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017303 (from R4-2017032).**

**R4-2017303 Email discussion summary for [97e][233] NR\_UE\_pow\_sav\_enh\_RRM**

*Type: other For: Information  
Source: Moderator (MediaTek)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2017269 | WF on NR UE Power Saving Enhancements | MediaTek |
|  |  |  |

**Tdoc decisions**

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2014366 | Revised |

2nd round email discussion conclusions

================================================================================

#### 12.9.1 General and work plan [NR\_UE\_pow\_sav\_enh]

**R4-2014366 Work plan of Rel-17 Power Saving Enhancements**

*Type: Work Plan For: Approval  
 Source: MediaTek inc.*

**Decision: Revised to R4-2017270 (from R4-2014366).**

**R4-2017270 Work plan of Rel-17 Power Saving Enhancements**

*Type: Work Plan For: Approval  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2014367 Evaluation on Rel-17 RLM/BFD measurement relaxation**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2014534 Evaluation assumptions for R17 RLM/BFD relaxation**

*Type: discussion For: Approval  
 Source: vivo, MediaTek*

**Decision: Revised to R4-2017306 (from R4-2014534).**

**R4-2017306 Evaluation assumptions for R17 RLM/BFD relaxation**

*Type: discussion For: Approval  
 Source: vivo, MediaTek*

**Decision: Return to.**

#### 12.9.2 Feasibility and performance impact of relaxing UE measurements for RLM and/or BFD [NR\_UE\_pow\_sav\_enh]

**R4-2017269 WF on NR UE Power Saving Enhancements**

*Type: other For: Approval  
 Source: MediaTek*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014219 Discussion on feasibility and performance impact of RLM/BFD relaxation**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014428 Discussion on RLM relaxition for NR power saving**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014535 Discussion and initial results for R17 RLM/BFD relaxation**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2014654 Discussion on RRM measurement relaxation in connected mode for NR power saving enhancement**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2014797 Discussion on RLM BFD measurement relaxation**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: OPPO*

**Decision: Noted.**

**R4-2015199 Discussion about evaluation methodology for relaxation of RLM/BFD measurements**

*Type: discussion For: Discussion  
 Source: Nokia Solutions & Networks (I)*

**Decision: Noted.**

**R4-2015485 Preliminary discussion on RLM/BFD relaxation in power saving enhancements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016150 iscussions on UE power saving for RLM and BM**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution, we discuss the power saving techniques for UEs in radio link monitoring (RLM) and beam management (BM) procedures from an RRM perspective.

**Decision: Noted.**

## 13 Rel-17 Study Items for NR

## 14 Rel-17 Work Items for LTE

## 15 Rel-17 Study Items for LTE

## 16 Liaison and output to other groups

## 17 Revision of the Work Plan

## 18 Any other business

## 19 Close of the E-meeting

## BACKUP

**R4-20AAAAA Way forward on XXXX**

*Type: other For: Approval  
 Source: TBA*

**Abstract:**

**Discussion:**

**Decision: Return to.**