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

**DRAFT Meeting Report  
for  
TSG RAN WG4  
meeting: 96-e**

**Electronic Meeting, Online, 17/08/2020 to 28/08/2020**

Report generated on Monday, 2020-08-10 13:10 UTC

Contents:

1 Opening of the E-meeting 11

2 Approval of the agenda 12

3 Letters / reports from other groups / meetings 12

4 Rel-15 New radio access technology 17

4.1 System Parameters Maintenance [NR\_newRAT-Core] 18

4.2 UE RF requirements maintenance [NR\_newRAT] 21

4.2.1 [FR1] Maintenance for 38.101-1 [NR\_newRAT-Core] 22

4.2.1.1 Maintenance for Transmitter characteristics [NR\_newRAT-Core] 23

4.2.1.2 Maintenance for Receiver characteristics [NR\_newRAT-Core] 27

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] 34

4.2.3 Maintenance for 38.101-3 [NR\_newRAT-Core] 34

4.2.3.1 [FR1] Maintenance for Transmitter characteristics within FR1 [NR\_newRAT-Core] 35

4.2.3.2 [FR1+FR2] Maintenance for Transmitter characteristics involving both FR1 and FR2 [NR\_newRAT-Core] 36

4.2.3.3 [FR1] Maintenance for Receiver characteristics within FR1 [NR\_newRAT-Core] 36

4.2.3.4 [FR1+FR2] Maintenance for Receiver characteristics involving both FR1 and FR2 [NR\_newRAT-Core] 40

4.3 UE EMC [NR\_newRAT-Core] 40

4.3.1 General [NR\_newRAT-Core] 40

4.3.2 Emission requirements [NR\_newRAT-Core] 40

4.3.3 Immunity requirements [NR\_newRAT-Core] 41

4.4 BS RF [NR\_newRAT-Core] 41

4.4.1 General [NR\_newRAT-Core] 41

4.4.2 Transmitter characteristics maintenance [NR\_newRAT-Core] 41

4.4.3 Receiver characteristics maintenance [NR\_newRAT-Core] 41

4.5 BS conformance testing [NR\_newRAT-Perf] 44

4.5.1 General [NR\_newRAT-Perf] 44

4.5.2 BS specifications clean-ups (including conformance testing and core) [NR\_newRAT-Perf/Core] 45

4.5.2.1 eAAS specifications [NR\_newRAT-Perf/Core] 45

4.5.2.2 MSR specifications [NR\_newRAT-Perf/Core] 46

4.5.2.3 NR conformance testing specifications [NR\_newRAT-Perf] 46

4.5.3 Conducted conformance testing (38.141-1) [NR\_newRAT-Perf] 46

4.5.4 Radiated conformance testing (38.141-2) [NR\_newRAT-Perf] 46

4.6 BS EMC [NR\_newRAT-Core] 50

4.6.1 Core requirements [NR\_newRAT-Core] 50

4.6.1.1 Emission requirements [NR\_newRAT-Core] 50

4.6.1.2 Immunity requirements [NR\_newRAT-Core] 50

4.6.2 Performance requirements [NR\_newRAT-Perf] 50

4.7 RRM core requirements maintenance (38.133/36.133) [NR\_newRAT-Core] 50

4.7.1 UE measurement capability (38.133/36.133) [NR\_newRAT-Core] 50

4.7.2 Connected state mobility (38.133/36.133) [NR\_newRAT-Core] 52

4.7.3 Signaling characteristics (38.133/36.133) [NR\_newRAT-Core] 52

4.7.4 Other requirements [NR\_newRAT-Core] 56

4.8 RRM perf. requirements maintenance (38.133/36.133) [NR\_newRAT-Perf] 58

4.8.1 General [NR\_newRAT-Perf] 58

4.8.2 RRM test cases [NR\_newRAT-Perf] 59

4.9 Demodulation and CSI requirements maintenance (38.101-4/38.104) [NR\_newRAT-Perf] 73

4.9.1 UE demodulation requirements [NR\_newRAT-Perf] 73

4.9.2 CSI requirements [NR\_newRAT-Perf] 74

4.9.3 BS demodulation requirements [NR\_newRAT-Perf] 75

4.10 Positioning specs maintenance (36.171, 37.171 and 38.171) [NR\_newRAT-Perf or TEI] 75

4.11 Testability Maintenance (38.810) [FS\_NR\_test\_methods] 75

5 LTE maintenance (up to Rel15) [WI code or TEI] 76

5.1 BS RF requirements [WI code or TEI] 76

5.2 UE RF requirements [WI code or TEI] 82

5.3 RRM requirements [WI code or TEI] 84

5.4 Demodulation and CSI requirements [WI code or TEI] 87

5.4.1 UE demodulation and CSI requirements [WI code or TEI] 87

5.4.2 BS demodulation requirements [WI code or TEI] 88

6 Rel-16 Work Items for LTE 88

6.1 Additional MTC enhancements for LTE [LTE\_eMTC5] 88

6.1.1 Core requirements maintenance [LTE\_eMTC5-Core] 88

6.1.1.1 RF [LTE\_eMTC5-Core] 88

6.1.1.2 RRM [LTE\_eMTC5-Core] 88

6.1.2 RRM perf. requirements [LTE\_eMTC5-Perf] 89

6.1.2.1 General [LTE\_eMTC5-Perf] 89

6.1.2.2 Test cases [LTE\_eMTC5-Perf] 90

6.1.3 Demodulation and CSI requirements (36.101) [LTE\_eMTC5-Perf] 91

6.1.3.1 UE demodulation requirements [LTE\_eMTC5-Perf] 91

6.1.3.2 CSI requirements [LTE\_eMTC5-Perf] 92

6.2 Additional enhancements for NB-IoT [NB\_IOTenh3] 92

6.2.1 Core requirements maintenance [NB\_IOTenh3-Core] 92

6.2.1.1 RF [NB\_IOTenh3-Core] 92

6.2.1.2 RRM [NB\_IOTenh3-Core] 92

6.2.2 RRM perf. requirements [NB\_IOTenh3-Perf] 93

6.2.2.1 General [LTE\_eMTC5-Perf] 93

6.2.2.2 Test cases [LTE\_eMTC5-Perf] 93

6.2.3 Demodulation and CSI requirements (36.101/36.104) [NB\_IOTenh3-Perf] 93

6.2.3.1 UE demodulation requirements [NB\_IOTenh3-Perf] 93

6.2.3.2 BS demodulation requirements [NB\_IOTenh3-Perf] 94

6.3 Even further Mobility enhancement in E-UTRAN [LTE\_feMob] 96

6.3.1 RRM core requirements maintenance [LTE\_feMob-Core] 96

6.3.2 RRM perf. requirements [LTE\_feMob-Perf] 96

6.3.2.1 General [LTE\_feMob-Perf] 96

6.3.2.2 Test cases [LTE\_feMob-Perf] 96

6.4 LTE-based 5G terrestrial broadcast [LTE\_terr\_bcast] 97

6.4.1 Demodulation and CSI requirements (36.101) [LTE\_terr\_bcast -Perf] 97

6.4.2 Others [LTE\_terr\_bcast -Core/Perf] 97

6.5 R16 LTE maintenance [WI code] 98

6.5.1 BS RF requirements [WI code] 98

6.5.2 UE RF requirements [WI code] 98

6.5.3 RRM [WI code] 100

6.5.4 Demodulation and CSI requirements [WI code] 100

6.5.4.1 UE demodulation and CSI requirements [WI code] 100

6.5.4.2 BS demodulation requirements [WI code] 100

7 Rel-16 UE feature list 100

7.1 NR-based access to unlicensed spectrum [NR\_unlic] 100

7.1.1 System Parameters [NR\_unlic-Core] 100

7.1.1.1 Bands and band plans [NR\_unlic-Core] 100

7.1.1.2 Wideband operation related [NR\_unlic-Core] 101

7.1.1.3 Others [NR\_unlic-Core] 101

7.1.2 UE RF requirements [NR\_unlic-Core] 102

7.1.2.1 Transmitter characteristics [NR\_unlic-Core] 103

7.1.2.2 Receiver characteristics [NR\_unlic-Core] 104

7.1.3 Band combination related (Analysis, TPs, etc.) [NR\_unlic-Core] 105

7.1.4 BS RF requirements [NR\_unlic-Core] 105

7.1.4.1 Transmitter characteristics [NR\_unlic-Core] 106

7.1.4.2 Receiver characteristics [NR\_unlic-Core] 106

7.1.5 RRM core requirements (38.133) [NR\_unlic-Core] 107

7.1.5.1 General (specification structure, etc) [NR\_unlic-Core] 107

7.1.5.2 Cell re-selection [NR\_unlic-Core] 107

7.1.5.3 Handover [NR\_unlic-Core] 109

7.1.5.4 RRC connection mobility control [NR\_unlic-Core] 110

7.1.5.5 SCell activation/deactivation (delay and interruption) [NR\_unlic-Core] 111

7.1.5.6 Active TCI state switching [NR\_unlic-Core] 112

7.1.5.7 Active BWP switching [NR\_unlic-Core] 113

7.1.5.8 RLM [NR\_unlic-Core] 114

7.1.5.9 Beam management [NR\_unlic-Core] 115

7.1.5.10 Measurement requirements [NR\_unlic-Core] 116

7.1.5.11 Measurement capability and reporting criteria [NR\_unlic-Core] 118

7.1.5.12 Timing [NR\_unlic-Core] 118

7.1.5.13 Other requirements maintenance [NR\_unlic-Core] 119

7.1.6 Demodulation and CSI requirements (38.101-4/38.104) [NR\_unlic-Perf] 119

7.1.6.1 General [NR\_unlic-Perf] 119

7.1.6.2 UE demodulation requirements [NR\_unlic-Perf] 120

7.1.6.3 CSI requirements [NR\_unlic-Perf] 120

7.1.6.4 BS demodulation requirements [NR\_unlic-Perf] 120

7.2 NR mobility enhancement [NR\_Mob\_enh] 121

7.2.1 RRM core requirements maintenance (38.133) [NR\_Mob\_enh-Core] 121

7.2.2 RRM perf. requirements (38.133) [NR\_Mob\_enh-Perf] 122

7.2.2.1 General [NR\_Mob\_enh-Perf] 122

7.2.2.2 Test cases [NR\_Mob\_enh-Perf] 122

7.3 5G V2X with NR sidelink [5G\_V2X\_NRSL] 123

7.3.1 General [5G\_V2X\_NRSL] 123

7.3.2 System parameters maintenance [5G\_V2X\_NRSL-Core] 124

7.3.3 UE RF requirements maintenance [5G\_V2X\_NRSL-Core] 125

7.3.3.1 Transmitter characteristics [5G\_V2X\_NRSL-Core] 125

7.3.3.2 Receiver characteristics [5G\_V2X\_NRSL-Core] 127

7.3.4 Concurrent operation maintenance (scenarios, requirements, etc) [5G\_V2X\_NRSL-Core] 129

7.3.4.1 Transmitter characteristics [5G\_V2X\_NRSL-Core] 129

7.3.4.2 Receiver characteristics [5G\_V2X\_NRSL-Core] 130

7.3.5 RRM core requirements maintenance (38.133) [5G\_V2X\_NRSL-Core] 130

7.3.6 RRM perf. requirements (38.133) [5G\_V2X\_NRSL-Perf] 132

7.3.6.1 General [5G\_V2X\_NRSL-Perf] 132

7.3.6.2 Test cases [5G\_V2X\_NRSL-Perf] 132

7.3.7 Demodulation and CSI requirements (38.101-4) [5G\_V2X\_NRSL-Perf] 133

7.3.7.1 Work Scope [5G\_V2X\_NRSL-Perf] 133

7.3.7.2 Spec structure [5G\_V2X\_NRSL-Perf] 134

7.3.7.3 Test scenarios [5G\_V2X\_NRSL-Perf] 134

7.4 Integrated Access and Backhaul for NR [NR\_IAB] 135

7.4.1 General [NR\_IAB-Core] 135

7.4.1.1 System parameters [NR\_IAB-Core] 135

7.4.1.2 IAB-MT class [NR\_IAB-Core] 135

7.4.1.3 IAB-MT feature list [NR\_IAB-Core] 136

7.4.1.4 Others [NR\_IAB-Core] 137

7.4.2 RF requirements [NR\_IAB-Core] 137

7.4.2.1 Transmitter characteristics [NR\_IAB-Core] 137

7.4.2.1.1 Tx Power related requirements [NR\_IAB-Core] 137

7.4.2.1.2 Transmitted signal quality [NR\_IAB-Core] 139

7.4.2.1.3 Unwanted emissions [NR\_IAB-Core] 139

7.4.2.1.4 Others [NR\_IAB-Core] 141

7.4.2.2 Receiver characteristics [NR\_IAB-Core] 141

7.4.2.2.1 Sensitivity and dynamic range requirements [NR\_IAB-Core] 141

7.4.2.2.2 In-band selectivity and blocking requirements [NR\_IAB-Core] 142

7.4.2.2.3 Others [NR\_IAB-Core] 143

7.4.3 RRM core requirements (38.133) [NR\_IAB-Core] 144

7.4.3.1 RLM requirements [NR\_IAB-Core] 144

7.4.3.2 Other requirements maintenance [NR\_IAB-Core] 145

7.4.4 EMC core requirements [NR\_IAB-Core] 145

7.4.4.1 General [NR\_IAB-Core] 146

7.4.4.2 Emission requirements [NR\_IAB-Core] 146

7.4.4.3 Immunity requirements [NR\_IAB-Core] 147

7.4.5 Demodulation and CSI requirements [NR\_IAB-Perf] 147

7.4.5.1 General [NR\_IAB-Perf] 147

7.4.5.2 IAB-DU performance requirements [NR\_IAB-Perf] 148

7.4.5.3 IAB-MT performance requirements [NR\_IAB-Perf] 149

7.5 Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements [LTE\_NR\_DC\_CA\_enh] 149

7.5.1 General [LTE\_NR\_DC\_CA\_enh-Core] 149

7.5.2 RF requirements maintenance [LTE\_NR\_DC\_CA\_enh-Core] 149

7.5.3 RRM core requirements (38.133) [LTE\_NR\_DC\_CA\_enh-Core] 150

7.5.3.1 Early Measurement reporting [LTE\_NR\_DC\_CA\_enh-Core] 150

7.5.3.1.1 NR measurements for EMR [LTE\_NR\_DC\_CA\_enh-Core] 150

7.5.3.1.2 LTE NR Inter-RAT EMR [LTE\_NR\_DC\_CA\_enh-Core] 151

7.5.3.2 Efficient and low latency serving cell configuration, activation and setup [LTE\_NR\_DC\_CA\_enh-Core] 152

7.5.3.2.1 Direct SCell activation [LTE\_NR\_DC\_CA\_enh-Core] 152

7.5.3.2.2 SCell dormancy [LTE\_NR\_DC\_CA\_enh-Core] 153

7.5.3.3 Other requirements [LTE\_NR\_DC\_CA\_enh-Core] 156

7.6 UE power saving in NR [NR\_UE\_pow\_sav] 156

7.6.1 General [NR\_UE\_pow\_sav] 156

7.6.2 RRM core requirements maintenance (38.133) [NR\_UE\_pow\_sav-Core] 156

7.6.3 RRM perf. requirements (38.133) [NR\_UE\_pow\_sav-Perf] 158

7.6.3.1 General [NR\_UE\_pow\_sav-Perf] 158

7.6.3.2 Test cases [NR\_UE\_pow\_sav-Perf] 158

7.6.4 Demodulation and CSI requirements (38.101-4) [NR\_UE\_pow\_sav-Perf] 159

7.7 NR Positioning Support [NR\_pos] 160

7.7.1 General [NR\_pos-Core/Perf] 160

7.7.2 RRM core requirements (38.133) [NR\_pos-Core] 160

7.7.2.1 UE requirements [NR\_pos-Core] 160

7.7.2.1.1 PRS-RSTD measurement requirements [NR\_pos-Core] 160

7.7.2.1.2 PRS-RSRP measurement requirements [NR\_pos-Core] 162

7.7.2.1.3 UE Rx-Tx time difference measurement requirements [NR\_pos-Core] 163

7.7.2.1.4 Link simulation results for UE measurements [NR\_pos-Core] 165

7.7.2.2 New measurement gap patterns for positioning measurements [NR\_pos-Core] 166

7.7.2.3 gNB requirements [NR\_pos-Core] 168

7.7.2.4 Other requirements [NR\_pos-Core] 170

7.8 Physical layer enhancements for NR URLLC [NR\_L1enh\_URLLC-Core] 171

7.8.1 Demodulation and CSI requirements (38.101-4/38.104) [NR\_L1enh\_URLLC-Perf] 171

7.8.1.1 Performance requirements with ultra-low BLER [NR\_L1enh\_URLLC-Perf] 171

7.8.1.1.1 UE demodulation requirements [NR\_L1enh\_URLLC-Perf] 171

7.8.1.1.2 CSI requirements [NR\_L1enh\_URLLC-Perf] 173

7.8.1.1.3 BS demodulation requirements [NR\_L1enh\_URLLC-Perf] 173

7.8.1.2 Performance requirements with higher BLER [NR\_L1enh\_URLLC-Perf] 175

7.8.1.2.1 UE demodulation requirements [NR\_L1enh\_URLLC-Perf] 175

7.8.1.2.2 CSI requirements [NR\_L1enh\_URLLC-Perf] 177

7.8.1.2.3 BS demodulation requirements [NR\_L1enh\_URLLC-Perf] 178

7.9 Enhancements on MIMO for NR [NR\_eMIMO] 180

7.9.1 UE RF core requirements (38.101) [NR\_eMIMO-Core] 180

7.9.1.1 DMRS enhancement with PI/2 BPSK [NR\_eMIMO-Core] 180

7.9.1.2 Uplink Tx Full Power transmission [NR\_eMIMO-Core] 180

7.9.2 RRM core requirements (38.133) [NR\_eMIMO-Core] 181

7.9.2.1 DL/UL beam indication with reduced latency and overhead [NR\_eMIMO-Core] 181

7.9.2.2 Multi-TRP transmission related requirements [NR\_eMIMO-Core] 182

7.9.2.3 Other requirements maintenance [NR\_eMIMO-Core] 184

7.9.3 Demodulation and CSI requirements (38.101-4) [NR\_eMIMO-Perf] 185

7.9.3.1 General [NR\_eMIMO-Perf] 185

7.9.3.2 Demodulation requirements [NR\_eMIMO-Perf] 185

7.9.3.3 CSI requirements [NR\_eMIMO-Perf] 187

7.10 Add support of NR DL 256QAM for FR2 [NR\_DL256QAM\_FR2] 188

7.10.1 BS RF core requirements maintenance (38.104) [NR\_DL256QAM\_FR2] 188

7.10.2 UE RF core requirements maintenance (38.101-2) [NR\_DL256QAM\_FR2] 188

7.10.3 Demodulation and CSI requirements (38.101-4) [NR\_DL256QAM\_FR2-Perf] 188

7.10.3.1 UE Demodulation requirements [NR\_DL256QAM\_FR2-Perf] 188

7.10.3.2 SDR requirements [NR\_DL256QAM\_FR2-Perf] 189

7.10.3.3 CSI requirements [NR\_DL256QAM\_FR2-Perf] 189

7.11 RF requirements for NR frequency range 1 (FR1) [NR\_RF\_FR1] 190

7.11.1 RF core requirements [NR\_RF\_FR1-Core ] 190

7.11.1.1 Intra-band contiguous DL CA for FR1 [NR\_RF\_FR1-Core] 190

7.11.1.2 General for Intra-band UL CA [NR\_RF\_FR1-Core] 190

7.11.1.2.1 DC location for Intra-band UL CA [NR\_RF\_FR1-Core] 190

7.11.1.2.2 UE capability for Intra-band UL CA [NR\_RF\_FR1-Core] 190

7.11.1.3 Intra-band contiguous UL CA for FR1 power class 3 [NR\_RF\_FR1-Core] 191

7.11.1.4 Intra-band non-contiguous UL CA for FR1 power class 3 [NR\_RF\_FR1-Core] 192

7.11.1.4.1 MPR/A-MPR [NR\_RF\_FR1-Core] 192

7.11.1.4.2 Other TX requirements [NR\_RF\_FR1-Core] 193

7.11.1.5 Switching period between case 1 and case 2 [NR\_RF\_FR1-Core] 193

7.11.1.6 Time masks for ULSUP-TDM in case of UL timing misalignment [NR\_RF\_FR1-Core] 194

7.11.2 RRM core requirements maintenance (38.133) [NR\_RF\_FR1-Core] 194

7.11.3 RRM perf. requirements (38.133) [NR\_RF\_FR1-Perf] 194

7.11.3.1 General [NR\_RF\_FR1-Perf] 194

7.11.3.2 Test cases [NR\_RF\_FR1-Perf] 194

7.12 NR RF requirement enhancements for frequency range 2 (FR2) [NR\_RF\_FR2\_req\_enh] 195

7.12.1 RF core requirements [NR\_RF\_FR2\_req\_enh-Core] 195

7.12.1.1 FR2 MPE [NR\_RF\_FR2\_req\_enh-Core] 195

7.12.1.2 Beam Correspondence based on configured DL RS (SSB or CSI-RS) [NR\_RF\_FR2\_req\_enh-Core] 197

7.12.1.3 Intra-band non-contiguous DL CA for aggregated BW larger than 1400 MHz [NR\_RF\_FR2\_req\_enh-Core] 199

7.12.1.4 Intra-band non-contiguous UL CA [NR\_RF\_FR2\_req\_enh-Core] 199

7.12.1.5 Inter-band DL CA [NR\_RF\_FR2\_req\_enh-Core] 200

7.12.1.6 Improvement of UE MPR [NR\_RF\_FR2\_req\_enh-Core] 201

7.12.1.7 Multiband relaxation framework enhancement [NR\_RF\_FR2\_req\_enh-Core] 202

7.12.1.8 FR2 Beam Squint [NR\_RF\_FR2\_req\_enh-Core] 202

7.12.2 RRM core requirements (38.133) [NR\_RF\_FR2\_req\_enh-Core] 202

7.12.2.1 Inter-band DL CA MRTD [NR\_RF\_FR2\_req\_enh-Core] 202

7.13 NR RRM requirement enhancement [NR\_RRM\_Enh\_Core] 205

7.13.1 RRM core requirements (38.133) [NR\_RRM\_Enh\_Core] 205

7.13.1.1 SRS carrier switching requirements [NR\_RRM\_Enh\_Core] 205

7.13.1.2 CGI reading requirements with autonomous gap [NR\_RRM\_Enh\_Core] 205

7.13.1.3 BWP switching on multiple CCs [NR\_RRM\_Enh\_Core] 208

7.13.1.4 Spatial relation switch for uplink [NR\_RRM\_Enh\_Core] 211

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] 212

7.13.1.6 Other requirements maintenance [NR\_RRM\_Enh\_Core] 214

7.14 NR RRM requirements for CSI-RS based L3 measurement [NR\_CSIRS\_L3meas] 216

7.14.1 RRM core requirements (38.133) [NR\_CSIRS\_L3meas-Core] 216

7.14.1.1 CSI-RS measurement bandwidth [NR\_CSIRS\_L3meas-Core] 216

7.14.1.2 CSI-RS based intra-frequency and inter-frequency measurements definition [NR\_CSIRS\_L3meas-Core] 218

7.14.1.3 Measurement capability [NR\_CSIRS\_L3meas-Core] 219

7.14.1.4 Intra-frequency and inter-frequency measurement requirements [NR\_CSIRS\_L3meas-Core] 220

7.14.1.5 Other requirements [NR\_CSIRS\_L3meas-Core] 223

7.15 NR support for high speed train scenario [NR\_HST] 225

7.15.1 RRM core requirements maintenance (38.133) [NR\_HST-Core] 225

7.15.2 RRM perf. requirements (38.133) [NR\_HST-Perf] 227

7.15.2.1 General [NR\_HST-Perf] 227

7.15.2.2 Test cases [NR\_HST-Perf] 228

7.15.3 Demodulation and CSI requirements (38.101-4 / 38.104) [NR\_HST-Perf] 228

7.15.3.1 UE demodulation and CSI requirements [NR\_HST-Perf] 228

7.15.3.1.1 Scenarios and transmission schemes [NR\_HST-Perf] 229

7.15.3.1.2 Requirements for HST-SFN [NR\_HST-Perf] 230

7.15.3.1.3 Requirements for HST single tap [NR\_HST-Perf] 231

7.15.3.1.4 Requirements for multi-path fading channels [NR\_HST-Perf] 232

7.15.3.1.5 Network assistance and UE capability signalling [NR\_HST-Perf] 232

7.15.3.2 BS demodulation requirements [NR\_HST-Perf] 233

7.15.3.2.1 PUSCH requirements [NR\_HST-Perf] 233

7.15.3.2.2 PRACH requirements [NR\_HST-Perf] 236

7.15.3.2.3 UL timing adjustment requirements [NR\_HST-Perf] 238

7.16 NR performance requirement enhancement [NR\_perf\_enh-Perf] 240

7.16.1 UE demodulation and CSI requirements (38.101-4) [NR\_perf\_enh-Perf] 240

7.16.1.1 NR CA PDSCH requirements [NR\_perf\_enh-Perf] 240

7.16.1.2 PMI reporting requirements with larger number of Tx ports [NR\_perf\_enh-Perf] 242

7.16.1.3 LTE-NR co-existence for TDD [NR\_perf\_enh-Perf] 244

7.16.1.4 FR1 CA and EN-DC power imbalance requirements [NR\_perf\_enh-Perf] 244

7.16.1.5 NR CA CQI reporting requirements [NR\_perf\_enh-Perf] 245

7.16.2 BS demodulation requirements (38.104) [NR\_perf\_enh-Perf] 246

7.16.2.1 30% TP test point [NR\_perf\_enh-Perf] 246

7.16.2.2 Additional FR2 requirements [NR\_perf\_enh-Perf] 246

7.17 Over the air (OTA) base station (BS) testing TR [OTA\_BS\_testing-Perf] 246

7.17.1 General [OTA\_BS\_testing-Perf] 246

7.17.2 OTA calibration and test method procedures [OTA\_BS\_testing-Perf] 247

7.17.3 OTA BS measurements classification [OTA\_BS\_testing-Perf] 247

7.17.4 MU / TT values: derivation and tables [OTA\_BS\_testing-Perf] 247

7.17.5 Annexes [OTA\_BS\_testing-Perf] 248

7.17.6 Others [OTA\_BS\_testing-Perf] 248

7.18 2-step RACH for NR [NR\_2step\_RACH-Perf] 249

7.18.1 RRM core requirements maintenance (38.133) [NR\_2step\_RACH-Core] 249

7.18.2 RRM perf. requirements (38.133) [NR\_2step\_RACH-Perf] 250

7.18.2.1 General [NR\_2step\_RACH-Perf] 250

7.18.2.2 Test cases [NR\_2step\_RACH-Perf] 250

7.18.3 BS Demodulation requirements (38.104) [NR\_2step\_RACH-Perf] 251

7.18.4 Others [NR\_2step\_RACH-Perf] 252

7.19 R16 NR maintenance [WI code or TEI16] 252

7.19.1 UE transient period capability [TEI16] 252

7.19.2 Transmit diversity and power class related to UL MIMO [TEI16] 253

7.19.2.1 R16 support of transmit diversity [TEI16] 253

7.19.3 Other UE RF [WI code or TEI16] 256

7.19.4 BS RF [WI code or TEI16] 263

7.19.5 RRM [WI code or TEI16] 264

7.19.6 Demodulation and CSI [WI code or TEI16] 266

8 Rel-16 UE feature list 266

9 Rel-16 spectrum related Work Items for NR 267

9.1 29dBm UE Power Class for B41 and n41 [LTE\_NR\_B41\_Bn41\_PC29dBm] 267

9.1.1 General [LTE\_NR\_B41\_Bn41\_PC29dBm] 267

9.1.2 UE RF (36.101, 38.101-1, 38.101-3) [LTE\_NR\_B41\_Bn41\_PC29dBm] 267

9.1.3 Others [LTE\_NR\_B41\_Bn41\_PC29dBm] 268

9.2 Power Class 2 UE for EN-DC (1 LTE FDD band +1 NR TDD band) [ENDC\_UE\_PC2\_FDD\_TDD-Core] 268

9.2.1 General [ENDC\_UE\_PC2\_FDD\_TDD-Core] 268

9.2.2 UE RF requirement [ENDC\_UE\_PC2\_FDD\_TDD-Core] 269

9.2.3 Signaling [ENDC\_UE\_PC2\_FDD\_TDD-Core] 270

9.3 LTE/NR spectrum sharing in band 48/n48 frequency range [NR\_n48\_LTE\_48\_coex-Core] 270

9.3.1 General [NR\_n48\_LTE\_48\_coex-Core] 270

9.3.2 Channel raster, sync raster, and UL shift [NR\_n48\_LTE\_48\_coex-Core] 270

10 Rel-17 spectrum related Work Items for NR 271

10.1 NR intra band Carrier Aggregation for xCC DL/yCC UL including contiguous and non-contiguous spectrum (x>=y) [NR\_CA\_R17\_intra] 272

10.1.1 Rapporteur Input (WID/TR/CR) [NR\_CA\_R17\_intra-Core /Perf] 272

10.1.2 UE RF for FR1 [NR\_CA\_R17\_intra-Core] 273

10.1.3 UE RF for FR2 [NR\_CA\_R17\_intra-Core] 273

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] 274

10.2.1 Rapporteur Input (WID/TR/CR) [NR\_CADC\_R17\_2BDL\_xBUL-Core/Perf] 274

10.2.2 NR inter band CA without any FR2 band(s) [NR\_CADC\_R17\_2BDL\_xBUL-Core] 274

10.2.3 NR inter band CA with at least one FR2 band [NR\_CADC\_R17\_2BDL\_xBUL-Core] 279

10.3 DC of 1 LTE band and 1 NR band [DC\_R17\_1BLTE\_1BNR\_2DL2UL] 282

10.3.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core/Perf] 282

10.3.2 EN-DC without FR2 band [DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core] 283

10.3.3 EN-DC with FR2 band [DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core] 287

10.4 DC of 2 LTE band and 1 NR band [DC\_R17\_2BLTE\_1BNR\_3DL2UL] 289

10.4.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_2BLTE\_1BNR\_3DL2UL-Core/Perf] 289

10.4.2 EN-DC without FR2 band [DC\_R17\_2BLTE\_1BNR\_3DL2UL-Core] 290

10.4.3 EN-DC with FR2 band [DC\_R17\_2BLTE\_1BNR\_3DL2UL-Core] 299

10.5 DC of 3 LTE band and 1 NR band [DC\_R17\_3BLTE\_1BNR\_4DL2UL] 299

10.5.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_3BLTE\_1BNR\_4DL2UL-Core/Perf] 301

10.5.2 EN-DC without FR2 band [DC\_R17\_3BLTE\_1BNR\_4DL2UL-Core] 301

10.5.3 EN-DC with FR2 band [DC\_R17\_3BLTE\_1BNR\_4DL2UL-Core] 304

10.6 DC of 4 LTE band and 1 NR band [DC\_R17\_4BLTE\_1BNR\_5DL2UL] 304

10.6.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_4BLTE\_1BNR\_5DL2UL-Core/Perf] 305

10.6.2 EN-DC without FR2 band [DC\_R17\_4BLTE\_1BNR\_5DL2UL-Core] 306

10.6.3 EN-DC with FR2 band [DC\_R17\_4BLTE\_1BNR\_5DL2UL-Core] 306

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] 307

10.7.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_xBLTE\_2BNR\_yDL2UL-Core/Per] 10.7.2 EN-DC including NR inter CA without FR2 band [DC\_R17\_xBLTE\_2BNR\_yDL2UL-Core] 307

10.7.2 EN-DC including NR inter CA without FR2 band [DC\_R17\_xBLTE\_2BNR\_yDL2UL-Core] 307

10.7.3 EN-DC including NR inter CA with FR2 band [DC\_R17\_xBLTE\_2BNR\_yDL2UL-Core] 312

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] 312

10.8.1 Rapporteur Input (WID/TR/CR) [NR\_SUL\_combos\_R17-Core/Per] 312

10.8.2 UE RF [NR\_SUL\_combos\_R17-Core] 313

10.9 NR Inter-band Carrier Aggregation for 3 bands DL with 1 band UL [NR\_CA\_R17\_3BDL\_1BUL] 315

10.9.1 Rapporteur Input (WID/TR/CR) [NR\_CA\_R17\_3BDL\_1BUL-Core/Per] 315

10.9.2 UE RF [NR\_CA\_R17\_3BDL\_1BUL-Core] 315

10.10 NR Inter-band Carrier Aggregation for 4 bands DL with 1 band UL [NR\_CA\_R17\_4BDL\_1BUL] 317

10.10.1 Rapporteur Input (WID/TR/CR) [NR\_CA\_R17\_4BDL\_1BUL-Core/Per] 317

10.10.2 UE RF [NR\_CA\_R17\_4BDL\_1BUL-Core] 318

10.11 NR Inter-band Carrier Aggregation/Dual connectivity for 3 bands DL with 2 bands UL [NR\_CADC\_R17\_3BDL\_2BUL] 319

10.11.1 Rapporteur Input (WID/TR/CR) [NR\_CADC\_R17\_3BDL\_2BUL-Core/Per] 319

10.11.2 UE RF [NR\_CADC\_R17\_3BDL\_2BUL-Core] 320

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] 322

10.12.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_xBLTE\_yBNR\_3DL3UL-Core/Per] 322

10.12.2 UE RF [DC\_R17\_xBLTE\_yBNR\_3DL3UL-Core] 322

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] 323

10.13.1 Rapporteur Input (WID/TR/CR) [DC\_R17\_xBLTE\_3BNR\_yDL2UL -Core/Per] 323

10.13.2 UE RF [DC\_R17\_xBLTE\_3BNR\_yDL2UL-Core] 323

10.14 NR inter-band Carrier Aggregation and Dual connectivity for DL 4 bands and 2UL bands [NR\_CADC\_R17\_4BDL\_2BUL] 323

10.14.1 Rapporteur Input (WID/TR/CR) [NR\_CADC\_R17\_4BDL\_2BUL -Core/Per] 323

10.14.2 UE RF [NR\_CADC\_R17\_4BDL\_2BUL -Core] 324

10.15 NR inter-band CA for 5 bands DL with x bands UL (x=1, 2) [NR\_CADC\_R17\_5BDL\_xBUL\_3DL3UL] 324

10.15.1 Rapporteur Input (WID/TR/CR) [NR\_CADC\_R17\_5BDL\_xBUL -Core/Per] 324

10.15.2 UE RF [NR\_CADC\_R17\_5BDL\_xBUL -Core] 325

10.16 Power Class 2 UE for NR inter-band CA and SUL configurations with 2 bands UL [NR\_SAR\_PC2\_interB\_SUL\_2BUL] 325

10.16.1 Rapporteur Input (WID/TR/CR) [NR\_SAR\_PC2\_interB\_SUL\_2BUL-Core/Per] 325

10.16.2 PC2 for inter-band CA [NR\_SAR\_PC2\_interB\_SUL\_2BUL-Core] 326

10.16.3 PC2 for SUL [NR\_SAR\_PC2\_interB\_SUL\_2BUL-Core] 326

10.17 Adding channel bandwidth support to existing NR bands [NR\_BW\_Bands] 327

10.17.1 General and Rapporteur Input (WID/TR/CR) [NR\_BW\_Bands -Core/Per] 327

10.17.2 UE RF requirement [NR\_BW\_Bands -Core] 327

10.17.2.1 Reference sensitivity [NR\_BW\_Bands -Core] 328

10.17.2.2 MPR/A-MPR/NS signaling [NR\_BW\_Bands -Core] 328

10.17.2.3 others [NR\_BW\_Bands -Core] 328

10.17.3 BS RF requirement [NR\_BW\_Bands -Core] 329

10.18 Introduction of channel bandwidths 35MHz and 45MHz for NR [NR\_FR1\_35MHz\_45MHz\_BW] 330

10.18.1 General and Rapporteur Input (WID/TR/CR) [NR\_FR1\_35MHz\_45MHz\_BW-Core/Per] 330

10.18.2 Spectrum utilization [NR\_FR1\_35MHz\_45MHz\_BW-Core] 330

10.18.3 UE RF requirements [NR\_FR1\_35MHz\_45MHz\_BW-Core] 331

10.18.4 BS RF requirements [NR\_FR1\_35MHz\_45MHz\_BW-Core] 331

10.18.5 Others [NR\_FR1\_35MHz\_45MHz\_BW-Core] 332

10.19 Band combinations for Uu and V2X con-current operation [NR\_LTE\_V2X\_PC5\_combos] 332

10.19.1 General and Rapporteur Input (WID/TR/CR) [NR\_LTE\_V2X\_PC5\_combos-Core/Per] 332

10.19.2 UE RF requirement for concurrent operation between NR Uu band and NR PC5 band [NR\_LTE\_V2X\_PC5\_combos-Core] 332

10.19.3 UE RF requirement for concurrent operation between LTE Uu band and NR PC5 band [NR\_LTE\_V2X\_PC5\_combos-Core] 333

10.19.4 UE RF requirement for concurrent operation between NR Uu band and LTE PC5 band [NR\_LTE\_V2X\_PC5\_combos-Core] 333

10.19.5 UE RF requirement for concurrent operation of LTE/NR CA/DC band combinations + PC5 V2X [NR\_LTE\_V2X\_PC5\_combos-Core] 333

10.20 Introduction of FR2 FWA UE with maximum TRP of 23dBm for band n257 and n258 [NR\_FR2\_FWA\_Bn257\_Bn258] 333

10.20.1 UE RF (38.101-2) [NR\_FR2\_FWA\_Bn257\_Bn258-Core] 333

10.20.2 RRM Core requirements (38.133) [NR\_FR2\_FWA\_Bn257\_Bn258-Core] 334

10.20.3 RRM Perf. requirements (38.133) [NR\_FR2\_FWA\_Bn257\_Bn258-Perf] 335

10.20.4 Others [NR\_FR2\_FWA\_Bn257\_Bn258-Core/Perf] 335

10.21 Introduction of NR band n13 [NR\_n13] 335

10.21.1 UE RF (38.101-1) [NR\_n13-Core] 335

10.21.2 BS RF (38.104) [NR\_n13-Core] 336

10.21.3 RRM (38.133) [NR\_n13-Core] 336

10.21.4 Others [NR\_n13-Core/Perf] 336

10.22 Introduction of 1880-1920MHz SUL band for NR [NR\_SUL\_band\_1880\_1920MHz] 336

10.22.1 UE RF (38.101-1) [NR\_SUL\_band\_1880\_1920MHz-Core] 336

10.22.2 BS RF (38.104) [NR\_SUL\_band\_1880\_1920MHz -Core] 336

10.22.3 RRM (38.133) [NR\_SUL\_band\_1880\_1920MHz -Core] 340

10.22.4 Others [NR\_SUL\_band\_1880\_1920MHz -Core/Perf] 340

10.23 Introduction of 2300-2400MHz SUL band for NR [NR\_SUL\_band\_2300\_2400MHz] 340

10.23.1 UE RF (38.101-1) [NR\_SUL\_band\_2300\_2400MHz -Core] 340

10.23.2 BS RF (38.104) [NR\_SUL\_band\_2300\_2400MHz -Core] 340

10.23.3 RRM (38.133) [NR\_SUL\_band\_2300\_2400MHz -Core] 344

10.23.4 Others [NR\_SUL\_band\_2300\_2400MHz -Core/Perf] 344

10.24 Introduction of NR 47 GHz band [NR\_47GHz\_Band] 344

10.24.1 UE RF (38.101-2) [NR\_47GHz\_Band -Core] 344

10.24.2 BS RF (38.104) [NR\_47GHz\_Band -Core] 345

10.24.3 RRM (38.133) [NR\_47GHz\_Band -Core] 345

10.24.4 Others [NR\_47GHz\_Band -Core/Perf] 345

10.25 Introduction of NR band n24 [NR\_band\_n24] 346

10.25.1 UE RF (38.101-1) [NR\_band\_n24-Core] 346

10.25.2 BS RF (38.104) [NR\_band\_n24-Core] 346

10.25.3 RRM (38.133) [NR\_band\_n24-Core] 346

10.25.4 Others [NR\_band\_n24-Core/Perf] 346

10.26 Introduction of 1.6 GHz NR SUL band with same uplink frequency range of Band 24 [NR\_SUL\_UL\_n24] 347

10.26.1 UE RF (38.101-1) [NR\_SUL\_UL\_n24-Core] 347

10.26.2 BS RF (38.104) [NR\_SUL\_UL\_n24-Core] 347

10.26.3 RRM (38.133) [NR\_SUL\_UL\_n24-Core] 347

10.26.4 Others [NR\_SUL\_UL\_n24-Core/Perf] 347

10.27 LTE/NR spectrum sharing in Band 40/n40 [NR\_n40\_LTE\_40\_coex-Core] 347

10.27.1 General [NR\_n40\_LTE\_40\_coex-Core] 347

10.27.2 UL shift [NR\_n40\_LTE\_40\_coex-Core] 348

10.28 LTE/NR spectrum sharing in Band 38/n38 [NR\_n38\_LTE\_38\_coex-Core] 348

10.28.1 General [NR\_n38\_LTE\_38\_coex-Core] 349

10.28.2 UL shift [NR\_n38\_LTE\_38\_coex-Core] 349

11 Reply to ITU-R LS (RP-200042) 349

11.1 Study on IMT parameters for frequency ranges 6.425-7.125GHz and 10.0-10.5GHz [FS\_6425\_10500MHz \_NR] 349

11.1.1 UE parameters 349

11.1.2 BS parameters 350

11.1.3 Coexistence study 351

11.1.3.1 Simulation assumptions 351

11.1.3.2 Downlink 351

11.1.3.3 Uplink 352

11.1.4 Antenna characteristics 353

11.1.5 Relevant information for the sharing and compatibility studies 354

11.2 Reply of IMT parameters for other frequency ranges requested in RP-200042 354

12 Rel-17 non-spectrum related work items for NR 354

12.1 Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) requirements for NR UEs [NR\_MIMO\_OTA] 354

12.1.1 General [NR\_MIMO\_OTA] 354

12.1.2 Performance Requirements [NR\_MIMO\_OTA-Core] 355

12.1.2.1 Performance Requirements for FR1 [NR\_MIMO\_OTA-Core] 355

12.1.2.2 Performance Requirements for FR2 [NR\_MIMO\_OTA-Core] 355

12.1.3 Testing methodologies [NR\_MIMO\_OTA-Core] 356

12.1.3.1 Testing parameters for Performance [NR\_MIMO\_OTA-Core] 356

12.1.3.2 Optimization of test methodologies [NR\_MIMO\_OTA-Core] 356

12.1.3.3 Channel model validation [NR\_MIMO\_OTA-Core] 356

13 Rel-17 Study Items for NR 357

13.1 Study on enhanced test methods for FR2 in NR [FS\_FR2\_enhTestMethods] 357

13.1.1 Test methodology for high DL power and low UL power test cases 357

13.1.2 Polarization basis mismatch 358

13.1.3 Enhanced test methods for inter-band (FR1+FR2) CA 360

13.2 Study on supporting NR from 52.6 GHz to 71 GHz [FS\_NR\_52\_to\_71GHz] 360

13.2.1 General [FS\_NR\_52\_to\_71GHz] 360

13.2.2 Numerology, Channel BW [FS\_NR\_52\_to\_71GHz] 361

13.2.3 Others [FS\_NR\_52\_to\_71GHz] 363

14 Rel-17 Work Items for LTE 364

14.1 LTE inter-band Carrier Aggregation for 2 bands DL with 1 band UL [LTE\_CA\_R17\_2BDL\_1BUL] 364

14.1.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_2BDL\_1BUL-Core/Perf] 364

14.1.2 UE RF with harmonic, close proximity and isolation issues [LTE\_CA\_R17\_2BDL\_1BUL-Core] 364

14.1.3 UE RF without specific issues [LTE\_CA\_R17\_2BDL\_1BUL-Core] 364

14.2 LTE inter-band Carrier Aggregation for 3 bands DL with 1 band UL [LTE\_CA\_R17\_3BDL\_1BUL] 365

14.2.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_3BDL\_1BUL-Core/Perf] 366

14.2.2 UE RF with harmonic, close proximity and isolation issues [LTE\_CA\_R17\_3BDL\_1BUL-Core] 366

14.2.3 UE RF without specific issues [LTE\_CA\_R17\_3BDL\_1BUL-Core] 366

14.3 LTE inter-band Carrier Aggregation for x bands DL (x=4, 5) with 1 band UL [LTE\_CA\_R17\_xBDL\_1BUL] 368

14.3.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_xBDL\_1BUL-Core] 368

14.3.2 UE RF with 4 LTE bands CA [LTE\_CA\_R17\_xBDL\_1BUL-Core] 368

14.3.3 UE RF with 5 LTE bands CA [LTE\_CA\_R17\_xBDL\_1BUL-Core] 369

14.4 LTE inter-band Carrier Aggregation for 2 bands DL with 2 band UL [LTE\_CA\_R17\_2BDL\_2BUL] 369

14.4.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_2BDL\_2BUL-Core] 369

14.4.2 UE RF with harmonic, close proximity and isolation issues [LTE\_CA\_R17\_2BDL\_2BUL-Core] 369

14.4.3 UE RF without specific issues [LTE\_CA\_R17\_2BDL\_2BUL-Core] 369

14.5 LTE inter-band Carrier Aggregation for x bands DL (x= 3, 4, 5) with 2 band UL [LTE\_CA\_R17\_xBDL\_2BUL] 369

14.5.1 Rapporteur Input (WID/TR/CR) [LTE\_CA\_R17\_xBDL\_2BUL-Core] 369

14.5.2 UE RF with MSD [LTE\_CA\_R17\_xBDL\_2BUL-Core] 370

14.5.3 UE RF without MSD [LTE\_CA\_R17\_xBDL\_2BUL-Core] 370

14.6 RRM for LTE CA basket WIs [LTE\_CA\_R17\_xxxx] 371

14.6.1 RRM Core (36.133) [LTE\_CA\_R17\_xxxx-Core] 371

14.6.2 RRM Perf (36.133) [LTE\_CA\_R17\_xxxx-Perf] 371

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] 371

14.7.1 Rapporteur Input (WID/TR/CR) [LTE\_bands\_R17\_M1\_M2\_NB1\_NB2-Core] 371

14.7.2 RF [LTE\_bands\_R17\_M1\_M2\_NB1\_NB2-Core] 371

14.7.3 Others [LTE\_bands\_R17\_M1\_M2\_NB1\_NB2-Perf] 371

14.8 Modification of LTE Band 24 specifications to comply with updated regulatory emission limits [LTE\_B24\_mod] 371

14.8.1 General and rapporteur input [LTE\_B24\_mod-Core] 371

14.8.2 UE RF [LTE\_B24\_mod-Core] 371

14.8.3 BS RF [LTE\_B24\_mod-Core] 372

14.8.4 RRM and others [LTE\_B24\_mod-Core/Perf] 372

15 Rel-17 Study Items for LTE 372

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] 372

15.1.1 General 372

15.1.2 Coexistence study 373

15.1.3 UE RF 373

16 Liaison and output to other groups 373

17 Revision of the Work Plan 374

17.1 Simplification of band combinations in RAN4 specifications 374

17.2 R17 new proposals 375

17.2.1 Spectrum related 375

17.2.2 Non-spectrum related 376

17.3 Others 381

18 Any other business 381

19 Close of the E-meeting 382

## 1 Opening of the E-meeting

**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 (Futurewei), 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

### 4.3 UE EMC [NR\_newRAT-Core]

#### 4.3.1 General [NR\_newRAT-Core]

**R4-2012532 Email discussion summary for [96e][304] NR\_EMC**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012717 (from R4-2012532).**

**R4-2012717 Email discussion summary for [96e][304] NR\_EMC**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012575 WF on UE EMC requirements extensions**

*Type: other For: Approval  
 Source: Xiaomi*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010600 [UE EMC] CR to TS 38.124 combined correction R15**

*Type: CR For: Agreement  
 38.124 v15.3.0 CR-0025 Cat: F (Rel-15)  
  
 Source: Xiaomi*

**Abstract:**

1, Editorial corrections.

2, CISPR 16-1 is deleted in reference and table in subclause 7.

3, Abbreviations are added.

4, Note 4 is added to align with RF spec.

5, Max hold detector methods are deleted.

**Discussion:**

**Decision: Agreed.**

**R4-2012576 [UE EMC] CR to TS 38.124 combined correction R15**

*Type: CR For: Agreement  
 38.124 v15.3.0 CR-0025 Cat: F (Rel-15)  
  
 Source: Xiaomi*

**Abstract:**

1, Editorial corrections.

2, CISPR 16-1 is deleted in reference and table in subclause 7.

3, Abbreviations are added.

4, Note 4 is added to align with RF spec.

5, Max hold detector methods are deleted.

**Discussion:**

**Decision: Withdrawn.**

**R4-2010601 [UE EMC] CR to TS 38.124 combined correction R16**

*Type: CR For: Agreement  
 38.124 v16.0.0 CR-0026 Cat: A (Rel-16)  
  
 Source: Xiaomi*

**Discussion:**

**Decision: Agreed.**

**R4-2010604 [UE EMC] Discussion on RX exclusion band for CA and DC cases**

*Type: discussion For: (not specified)  
 Source: Xiaomi*

**Abstract:**

the RF core requirement has been differentiated into different CA and DC cases, similar concern has been raised regarding the UE EMC requirements and we believe it is needed to further discuss these requirements case by case.

**Discussion:**

**Decision: Noted.**

#### 4.3.2 Emission requirements [NR\_newRAT-Core]

**R4-2010602 [UE EMC] CR to TS38.124 additional EMC requirements for different features correction R15**

*Type: CR For: Agreement  
 38.124 v15.3.0 CR-0027 Cat: F (Rel-15)  
  
 Source: Xiaomi*

**Abstract:**

1, ?RIB,c for CA/SUL and V2X features is added for consideration for the ESD and RI test when establishing the communication link.

2, Description for RX exclusion band has been added for multi-carrier cases.

3, Additional radiated emission requirements ar

**Discussion:**

**Decision: Not pursued.**

**R4-2010603 [UE EMC] CR to TS38.124 additional EMC requirements for different features correction R16**

*Type: CR For: Agreement  
 38.124 v16.0.0 CR-0028 Cat: A (Rel-16)  
  
 Source: Xiaomi*

**Discussion:**

**Decision: Withdrawn.**

#### 4.3.3 Immunity requirements [NR\_newRAT-Core]

### 4.4 BS RF [NR\_newRAT-Core]

#### 4.4.1 General [NR\_newRAT-Core]

**R4-2012533 Email discussion summary for [96e][302] NR\_maintenance\_RF\_BS**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012718 (from R4-2012533).**

**R4-2012718 Email discussion summary for [96e][302] NR\_maintenance\_RF\_BS**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

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

**R4-2011186 CR to TS 38.817-02: Clarification on calculation of step frequencies for defining the Category B radiated Tx spurious emission limits in FR2**

*Type: CR For: Agreement  
 38.817-02 v15.8.0 CR-0068 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Clearly explain how to calculate the step frequencies for defining the Category B radiated Tx spurious emission limits in FR2 for future reference when the limits are applicable to other bands.

**Discussion:**

**Decision: Revised to R4-2012585 (from R4-2011186).**

**R4-2012585 CR to TS 38.817-02: Clarification on calculation of step frequencies for defining the Category B radiated Tx spurious emission limits in FR2**

*Type: CR For: Agreement  
 38.817-02 v15.8.0 CR-0068 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Clearly explain how to calculate the step frequencies for defining the Category B radiated Tx spurious emission limits in FR2 for future reference when the limits are applicable to other bands.

**Discussion:**

**Decision: Agreed.**

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

**R4-2010178 CR to TS 38.104: Correction of co-location requirement table in subclause 7.5.3**

*Type: CR For: Agreement  
 38.104 v15.10.0 CR-0221 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The table heading for wanted power signal leval is corected to apply for WA, MR and LA BS.

**Discussion:**

**Decision: Agreed.**

**R4-2010179 CR to TS 38.104: Correction of co-location requirement table in subclause 7.5.3**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0222 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The table heading for wanted power signal leval is corected to apply for WA, MR and LA BS.

**Discussion:**

**Decision: Agreed.**

**R4-2010326 CEPT/ECC work on recommendation for receiver parameters**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper summarizes the ongoing work on receiver parameters in CEPT/ECC for European regulation, where presently a new recommendation is being drafted.

**Discussion:**

**Decision: Noted.**

**R4-2010762 CR to TS 38.104: OTA receiver spurious requirements for EESS protection (rel-15)**

*Type: CR For: Agreement  
 38.104 v15.10.0 CR-0226 Cat: F (Rel-15)  
  
 Source: NEC*

**Abstract:**

Applicability of additional OTA receiver spurious requirements for BS type 2-O is not correct. Provided correction for that.

**Discussion:**

**Decision: Revised to R4-2012580 (from R4-2010762).**

**R4-2012580 CR to TS 38.104: OTA receiver spurious requirements for EESS protection (rel-15)**

*Type: CR For: Agreement  
 38.104 v15.10.0 CR-0226 Cat: F (Rel-15)  
  
 Source: NEC*

**Abstract:**

Applicability of additional OTA receiver spurious requirements for BS type 2-O is not correct. Provided correction for that.

**Discussion:**

**Decision: Agreed.**

**R4-2010763 CR to TS 38.104: OTA receiver spurious requirements for EESS protection (rel-16)**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0227 Cat: A (Rel-16)  
  
 Source: NEC*

**Abstract:**

Applicability of additional OTA receiver spurious requirements for BS type 2-O is not correct. Provided correction for that.

**Discussion:**

**Decision: Revised to R4-2012747 (from R4-2010763).**

**R4-2012747 CR to TS 38.104: OTA receiver spurious requirements for EESS protection (rel-16)**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0227 Cat: A (Rel-16)  
  
 Source: NEC*

**Abstract:**

Applicability of additional OTA receiver spurious requirements for BS type 2-O is not correct. Provided correction for that.

**Discussion:**

**Decision: Agreed.**

**R4-2010764 CR to 38.141-2: Additional requirements for EESS protection (rel-15)**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0213 Cat: F (Rel-15)  
  
 Source: NEC*

**Abstract:**

In the current specification, it looks protection of EESS for OTA receiver spurious requirements for BS type 2-O are mandatory. Protection of EESS shall not be mandated. Provided correction for not mandating EESS.

**Discussion:**

**Decision: Revised to R4-2012581 (from R4-2010764).**

**R4-2012581 CR to 38.141-2: Additional requirements for EESS protection (rel-15)**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0213 Cat: F (Rel-15)  
  
 Source: NEC*

**Abstract:**

In the current specification, it looks protection of EESS for OTA receiver spurious requirements for BS type 2-O are mandatory. Protection of EESS shall not be mandated. Provided correction for not mandating EESS.

**Discussion:**

**Decision: Agreed.**

**R4-2010765 CR to 38.141-2: Additional requirements for EESS protection (rel-16)**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0214 Cat: A (Rel-16)  
  
 Source: NEC*

**Abstract:**

In the current specification, it looks protection of EESS for OTA receiver spurious requirements for BS type 2-O are mandatory. Protection of EESS shall not be mandated. Provided correction for not mandating EESS.

**Discussion:**

**Decision: Revised to R4-2012748 (from R4-2010765).**

**R4-2012748 CR to 38.141-2: Additional requirements for EESS protection (rel-16)**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0214 Cat: A (Rel-16)  
  
 Source: NEC*

**Abstract:**

In the current specification, it looks protection of EESS for OTA receiver spurious requirements for BS type 2-O are mandatory. Protection of EESS shall not be mandated. Provided correction for not mandating EESS.

**Discussion:**

**Decision: Agreed.**

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

#### 4.5.1 General [NR\_newRAT-Perf]

**R4-2012534 Email discussion summary for [96e][303] NR\_NewRAT\_Conformance\_BS**

*Type: other For: Information  
 Source: Moderator (FUTUREWEI)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012719 (from R4-2012534).**

**RR4-2012719 Email discussion summary for [96e][303] NR\_NewRAT\_Conformance\_BS**

*Type: other For: Information  
 Source: Moderator (FUTUREWEI)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012589 WF on selecting CLTA height**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010729 Discussion on NR BS EVM equalizer averaging**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution, we discuss potential options and solutions discussed during RAN4#95-e meeting and captured in WF.

**Discussion:**

**Decision: Noted.**

**R4-2011285 CR to 38.104: Annex B and C clarification on equlisation calculation (B.6, C.6)**

*Type: CR For: Agreement  
 38.104 v15.10.0 CR-0232 Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz*

**Discussion:**

**Decision: Revised to R4-2012586 (from R4-2011285).**

**R4-2012586 CR to 38.104: Annex B and C clarification on equlisation calculation (B.6, C.6)**

*Type: CR For: Agreement  
 38.104 v15.10.0 CR-0232 Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz, Nokia*

**Discussion:**

**Decision: Agreed.**

**R4-2011286 CR to 38.141-1: Annex H clarification on equlisation calculation (H.6)**

*Type: CR For: Agreement  
 38.141-1 v15.6.0 CR-0149 Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz*

**Discussion:**

**Decision: Revised to R4-2012587 (from R4-2011286).**

**R4-2012587 CR to 38.141-1: Annex H clarification on equlisation calculation (H.6)**

*Type: CR For: Agreement  
 38.141-1 v15.6.0 CR-0149 Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz,Nokia*

**Discussion:**

**Decision: Agreed.**

**R4-2011287 CR to 38.141-2: Annex L clarification on equlisation calculation (L.6)**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0219 Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz*

**Discussion:**

**Decision: Revised to R4-2012588 (from R4-2011287).**

**R4-2012588 CR to 38.141-2: Annex L clarification on equlisation calculation (L.6)**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0219 Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz,Nokia*

**Discussion:**

**Decision: Agreed.**

**R4-2011288 CR to 38.104: Annex B and C clarification on equlisation calculation (B.6, C.6)**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0233 Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz,Nokia*

**Discussion:**

**Decision: Revised to R4-2012752 (from R4-2011288).**

**R4-2012752 CR to 38.104: Annex B and C clarification on equlisation calculation (B.6, C.6)**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0233 Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz,Nokia*

**Discussion:**

**Decision: Agreed.**

**R4-2011289 CR to 38.141-1: Annex H clarification on equlisation calculation (H.6)**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0150 Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz,Nokia*

**Discussion:**

**Decision: Revised to R4-2012753 (from R4-2011289).**

**R4-2012753 CR to 38.141-1: Annex H clarification on equlisation calculation (H.6)**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0150 Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz,Nokia*

**Discussion:**

**Decision: Agreed.**

**R4-2011290 CR to 38.141-2: Annex L clarification on equlisation calculation (L.6)**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0220 Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz,Nokia*

**Discussion:**

**Decision: Revised to R4-2012754 (from R4-2011290).**

**R4-2012754 CR to 38.141-2: Annex L clarification on equlisation calculation (L.6)**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0220 Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz,Nokia*

**Discussion:**

**Decision: Agreed.**

**R4-2011291 Further Analysis on EVM equalizer frequency domain calculation for NR BS conformance testing**

*Type: discussion For: Agreement  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz*

**Discussion:**

**Decision: Noted.**

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

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

**R4-2011187 CR to TS 37.145-2: Correction on procedure for spurious unwanted emissions measurement using orthogonal cut grid**

*Type: CR For: Agreement  
 37.145-2 v15.7.0 CR-0235 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Align the statement in Annex F.1 to TS 38.141-2 and TR 37.941 that no alignment is needed for spurious emissions using orthogonal cut grid.

**Discussion:**

**Decision: Agreed.**

**R4-2011188 CR to TS 37.145-2: Correction on procedure for spurious unwanted emissions measurement using orthogonal cut grid**

*Type: CR For: Agreement  
 37.145-2 v16.4.0 CR-0236 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Align the statement in Annex F.1 to TS 38.141-2 and TR 37.941 that no alignment is needed for spurious emissions using orthogonal cut grid.

**Discussion:**

**Decision: Agreed.**

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

**R4-2011407 CR to 37.141: Correction to applicability of additional BC3 requirement (Rel-15)**

*Type: CR For: Agreement  
 37.141 v15.11.0 CR-0947 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Agreed.**

**R4-2011408 CR to 37.141: Correction to applicability of additional BC3 requirement (Rel-16)**

*Type: CR For: Agreement  
 37.141 v16.6.0 CR-0948 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Agreed.**

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

**R4-2011301 Out of band CLTA maximum height and adjacent band site solutions**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discussion on Out of band CLTA definition and also adjacent band co-location site solutions.

**Discussion:**

**Decision: Noted.**

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

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

**R4-2010284 Clarification CR on NR-FR2-TM3.1**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0209 Cat: F (Rel-15)  
  
 Source: Samsung*

**Discussion:**

**Decision: Revised to R4-2012590 (from R4-2010284).**

**R4-2012590 Clarification CR on NR-FR2-TM3.1**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0209 Cat: F (Rel-15)  
  
 Source: Samsung*

**Discussion:**

**Decision: Agreed.**

**R4-2010285 Clarification CR on NR-FR2-TM3.1**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0210 Cat: A (Rel-16)  
  
 Source: Samsung*

**Discussion:**

**Decision: Agreed.**

**R4-2010492 CR for TS 38.141-2: NR FR2 test model 2**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0211 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012591 (from R4-2010492).**

**R4-2012591 CR for TS 38.141-2: NR FR2 test model 2**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0211 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2010493 CR for TS 38.141-2: NR FR2 test model 2**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0212 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011388 CR to TS 37.145-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 37.145-2 v15.7.0 CR-0240 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Revising the CLTA definition.

**Discussion:**

**Decision: Not pursued.**

**R4-2011389 CR to TS 37.145-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 37.145-2 v16.4.0 CR-0241 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Revising CLTA definition.

**Discussion:**

**Decision: Withdrawn.**

**R4-2011391 Discussions on CLTA maximum height**

*Type: other For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This document discusses the open issues and presents our views including possible solutions.

**Discussion:**

**Decision: Noted.**

**R4-2011392 CR to TS 38.141-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0221 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Revising CLTA definition.

**Discussion:**

**Decision: Not pursued.**

**R4-2011393 CR to TS 38.141-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0222 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Revising CLTA definition.

**Discussion:**

**Decision: Withdrawn.**

**R4-2011394 On correlation between wanted and in-band unwanted emissions**

*Type: other For: Discussion  
 38.141-2 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This document has addressed the suggestion to consider first nulls in the proposed approach that is used to determine whether unwanted emissions are correlated with the wanted radiation.

**Discussion:**

**Decision: Noted.**

**R4-2009779 Discussion on out of band CLTA maximum height**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009780 CR for 38.141-2: correction on half-power vertical beam width for the out of band CLTA**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0201 Cat: F (Rel-15)  
  
 Source: CATT*

**Discussion:**

**Decision: Not pursued.**

**R4-2009781 CR for 38.141-2: correction on half-power vertical beam width for the out of band CLTA**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0202 Cat: A (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Withdrawn.**

**R4-2009967 On the criteria for selecting a proper CLTA**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Co-location antenna physical size considerations

**Discussion:**

**Decision: Noted.**

**R4-2009968 CR to TS 38.141-2: Improvement of out-of-band CLTA characteristics**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0207 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Improvement on co-location test antenna characteristics

**Discussion:**

**Decision: Not pursued.**

**R4-2009969 CR to TS 38.141-2: Improvement of out-of-band CLTA characteristics**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0208 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Improvement on co-location test antenna characteristics

**Discussion:**

**Decision: Withdrawn.**

**R4-2010846 Increase of step size for FR2 in-band blocking conformance test**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0215 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Increases IBB frequency sweep step size for conformance testing to avoid excessive tests

Session Chair: Moved from AI 4.4.3

**Discussion:**

**Decision: Revised to R4-2012592 (from R4-2010846).**

**R4-2012592 Increase of step size for FR2 in-band blocking conformance test**

*Type: CR For: Agreement  
 38.141-2 v15.6.0 CR-0215 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Increases IBB frequency sweep step size for conformance testing to avoid excessive tests

**Discussion:**

**Decision: Agreed.**

**R4-2010847 Increase of step size for FR2 in-band blocking conformance test**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0216 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Increases IBB frequency sweep step size for conformance testing to avoid excessive tests

Session Chair: Moved from AI 4.4.3

**Discussion:**

**Decision: Agreed.**

### 4.6 BS EMC [NR\_newRAT-Core]

#### 4.6.1 Core requirements [NR\_newRAT-Core]

##### 4.6.1.1 Emission requirements [NR\_newRAT-Core]

##### 4.6.1.2 Immunity requirements [NR\_newRAT-Core]

#### 4.6.2 Performance requirements [NR\_newRAT-Perf]

**R4-2011264 CR to TS 38.113: direct field strength measurements for the EMC RE, Rel-15**

*Type: CR For: Agreement  
 38.113 v15.10.0 CR-0021 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

An updated CR for the direct field strength measurement method to measure the EMC radiated emissions from the enclosure port of BS equipped with the antenna connectors / TAB connectors. This version addresses additional feedback received during RAN4#95-e

**Discussion:**

**Decision: Revised to R4-2012577 (from R4-2011264).**

**R4-2012577 CR to TS 38.113: direct field strength measurements for the EMC RE, Rel-15**

*Type: CR For: Agreement  
 38.113 v15.10.0 CR-0021 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

An updated CR for the direct field strength measurement method to measure the EMC radiated emissions from the enclosure port of BS equipped with the antenna connectors / TAB connectors. This version addresses additional feedback received during RAN4#95-e

**Discussion:**

**Decision: Agreed.**

**R4-2011265 CR to TS 38.113: direct field strength measurements for the EMC RE, Rel-16**

*Type: CR For: Agreement  
 38.113 v16.0.0 CR-0022 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

An updated CR for the direct field strength measurement method to measure the EMC radiated emissions from the enclosure port of BS equipped with the antenna connectors / TAB connectors. This version addresses additional feedback received during RAN4#95-e

**Discussion:**

**Decision: Agreed.**

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

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

**R4-2012535 Email discussion summary for [96e][313] Demod\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012720 (from R4-2012535).**

**R4-2012720 Email discussion summary for [96e][313] Demod\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2010798 Reintroduction of missing FR1 RMC**

*Type: CR For: Agreement  
 38.101-4 v15.6.0 CR-0065 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Not pursued.**

**R4-2010799 Reintroduction of missing FR1 RMC**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0066 Cat: A (Rel-16)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Withdrawn.**

**R4-2011401 CR on Corrections in 38.101-4**

*Type: CR For: Agreement  
 38.101-4 v15.6.0 CR-0077 Cat: F (Rel-15)  
  
 Source: Qualcomm Incorporated*

**Session Chair note: Missing Rel-16 CAT A CR?**

**Discussion:**

**Decision: Revised to R4-2012593 (from R4-2011401).**

**R4-2012593 CR on Corrections in 38.101-4**

*Type: CR For: Agreement  
 38.101-4 v15.6.0 CR-0077 Cat: F (Rel-15)  
  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Agreed.**

**R4-2012595 CR on Corrections in 38.101-4**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-XXXX Cat: A (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Session Chair note: Check with MCC to get CR number**

**Discussion:**

**Decision: Agreed.**

**R4-2009540 CR to 2Rx PDSCH mapping type B**

*Type: CR For: Agreement  
 38.101-4 v15.6.0 CR-0060 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Since the reference channel R.PDSCH.1-1.4 was removed from Table A.3.2.1.1-1, there is a need to switch to another reference channel in clauses 5.2.2.1.3 and 5.2.3.1.3. R.PDSCH.1-1.3 FDD is applicable since PDSCH configuration length (L) is equal to 7 sam

**Discussion:**

**Decision: Agreed.**

**R4-2009541 CR to 2Rx PDSCH mapping type B**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0061 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Since the reference channel R.PDSCH.1-1.4 was removed from Table A.3.2.1.1-1, there is a need to switch to another reference channel in clauses 5.2.2.1.3 and 5.2.3.1.3. R.PDSCH.1-1.3 FDD is applicable since PDSCH configuration length (L) is equal to 7 sam

**Discussion:**

**Decision: Agreed.**

#### 4.9.2 CSI requirements [NR\_newRAT-Perf]

**R4-2009538 CR to ZP-CSI-RS configuration**

*Type: CR For: Agreement  
 38.101-4 v15.6.0 CR-0058 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

With the current test configuration, the test cannot be carried out as intended. Aperiodic ZP-CSI-RS is scheduled with DCI Format 1-1 (DL grant, i.e. with PDSCH) on slot#1, but Annex A.4 Note 2 says that PDSCH is not scheduled on slots containing CSI-RS.

**Discussion:**

**Decision: Revised to R4-2012594 (from R4-2009538).**

**R4-2012594 CR to ZP-CSI-RS configuration**

*Type: CR For: Agreement  
 38.101-4 v15.6.0 CR-0058 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

With the current test configuration, the test cannot be carried out as intended. Aperiodic ZP-CSI-RS is scheduled with DCI Format 1-1 (DL grant, i.e. with PDSCH) on slot#1, but Annex A.4 Note 2 says that PDSCH is not scheduled on slots containing CSI-RS.

**Discussion:**

**Decision: Agreed.**

**R4-2009539 CR to ZP-CSI-RS configuration**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0059 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

With the current test configuration, the test cannot be carried out as intended. Aperiodic ZP-CSI-RS is scheduled with DCI Format 1-1 (DL grant, i.e. with PDSCH) on slot#1, but Annex A.4 Note 2 says that PDSCH is not scheduled on slots containing CSI-RS.

**Discussion:**

**Decision: Agreed.**

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

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

**R4-2011414 Beam correspondence – SRS configuration corrections in section 5.2.1.3.7**

*Type: CR For: Agreement  
 38.810 v16.5.0 CR-0013 Cat: F (Rel-16)  
  
 Source: Keysight Technologies UK Ltd*

**Discussion:**

**Decision: Agreed.**

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

### 5.1 BS RF requirements [WI code or TEI]

**R4-2012536 Email discussion summary for [96e][301] LTE\_maintenance\_RF\_BS**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012721 (from R4-2012536).**

**R4-2012721 Email discussion summary for [96e][301] LTE\_maintenance\_RF\_BS**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012567 WF on the introducing the new testing methodology on EDT testing**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010731 On energy detection threshold for LAA and eLAA in conformance specification**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution, we further discuss issue of energy detection threshold in conformance tests for LAA/eLAA.

**Discussion:**

**Decision: Noted.**

**R4-2010732 CR to 37.107 with correction of EDT level Rel-15**

*Type: CR For: Agreement  
 37.107 v15.2.0 CR-0004 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Revised to R4-2012568 (from R4-2010732).**

**R4-2012568 CR to 37.107 with correction of EDT level Rel-15**

*Type: CR For: Agreement  
 37.107 v15.2.0 CR-0004 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Revised to R4-2012759 (from R4-2012568).**

**R4-2012759 CR to 37.107 with correction of references to TS 37.213 Rel-15**

*Type: CR For: Agreement  
 37.107 v15.2.0 CR-0004 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Agreed.**

**R4-2010733 CR to 37.107 with correction of references to TS 37.213 Rel-16**

*Type: CR For: Agreement  
 37.107 v16.0.0 CR-0005 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Agreed.**

**R4-2010734 CR to 36.141 with correction of EDT level Rel-13**

*Type: CR For: Agreement  
 36.141 v13.14.0 CR-1269 Cat: F (Rel-13)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Revised to R4-2012570 (from R4-2010734).**

**R4-2012570 CR to 36.141 with correction of EDT level Rel-13**

*Type: CR For: Agreement  
 36.141 v13.14.0 CR-1269 Cat: F (Rel-13)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Not pursued.**

**R4-2010735 CR to 36.141 with correction of EDT level Rel-14**

*Type: CR For: Agreement  
 36.141 v14.11.0 CR-1270 Cat: A (Rel-14)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Withdrawn.**

**R4-2010736 CR to 36.104 with correction of EDT level Rel-13**

*Type: CR For: Agreement  
 36.104 v13.13.0 CR-4905 Cat: F (Rel-13)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Revised to R4-2012571 (from R4-2010736).**

**R4-2012571 CR to 36.104 with correction of EDT level Rel-13**

*Type: CR For: Agreement  
 36.104 v13.13.0 CR-4905 Cat: F (Rel-13)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Not pursued.**

**R4-2010737 CR to 36.104 with correction of EDT level Rel-14**

*Type: CR For: Agreement  
 36.104 v14.9.0 CR-4906 Cat: A (Rel-14)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Discussion:**

**Decision: Withdrawn.**

**R4-2010741 CR to TS 37.106 with correction to referencies to TS 37.213 Rel-15**

*Type: CR For: Agreement  
 37.106 v15.0.0 CR-0002 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection of referencies to TS 37.213 specifications.

**Discussion:**

**Decision: Agreed.**

**R4-2010742 CR to TS 37.106 with correction to referencies to TS 37.213 Rel-16**

*Type: CR For: Agreement  
 37.106 v16.0.0 CR-0003 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces corrrection of referencies to TS 37.213 specifications.

**Discussion:**

**Decision: Agreed.**

**R4-2011189 CR to TS 36.141: Corrections of table note for shortened TTI test models**

*Type: CR For: Agreement  
 36.141 v15.9.0 CR-1272 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Void the inapplicable ’Note 1' in tables 6.1.1.6a-1 and 6.1.1.6b-1 for the shortened TTI test models.

**Discussion:**

**Decision: Agreed.**

**R4-2011190 CR to TS 36.141: Corrections of table note for shortened TTI test models**

*Type: CR For: Agreement  
 36.141 v16.6.0 CR-1273 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Void the inapplicable ’Note 1' in tables 6.1.1.6a-1 and 6.1.1.6b-1 for the shortened TTI test models.

**Discussion:**

**Decision: Agreed.**

**R4-2011191 CR to TS 37.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 37.141 v13.13.0 CR-0943 Cat: F (Rel-13)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Align the term to ‘NB-IoT carriers’ for the manufacturer’s declaration on the number of supported NB-IoT carriers.

**Discussion:**

**Decision: Revised to R4-2012573 (from R4-2011191).**

**R4-2012573 CR to TS 37.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 37.141 v13.13.0 CR-0943 Cat: F (Rel-13)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Align the term to ‘NB-IoT carriers’ for the manufacturer’s declaration on the number of supported NB-IoT carriers.

**Discussion:**

**Decision: Agreed.**

**R4-2011192 CR to TS 37.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 37.141 v14.11.0 CR-0944 Cat: A (Rel-14)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Align the term to ‘NB-IoT carriers’ for the manufacturer’s declaration on the number of supported NB-IoT carriers.

**Discussion:**

**Decision: Agreed.**

**R4-2011193 CR to TS 37.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 37.141 v15.11.0 CR-0945 Cat: A (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Align the term to ‘NB-IoT carriers’ for the manufacturer’s declaration on the number of supported NB-IoT carriers.

**Discussion:**

**Decision: Agreed.**

**R4-2011194 CR to TS 37.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 37.141 v16.6.0 CR-0946 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Align the term to ‘NB-IoT carriers’ for the manufacturer’s declaration on the number of supported NB-IoT carriers.

**Discussion:**

**Decision: Agreed.**

**R4-2011269 CR to TS 37.105 + motivation: Rel-13 non-AAS CRs mirroring to Rel-13 AAS**

*Type: CR For: Agreement  
 37.105 v13.10.0 CR-0188 Cat: F (Rel-13)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-13 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-13 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Revised to R4-2012574 (from R4-2011269).**

**R4-2012574 CR to TS 37.105 + motivation: Rel-13 non-AAS CRs mirroring to Rel-13 AAS**

*Type: CR For: Agreement  
 37.105 v13.10.0 CR-0188 Cat: F (Rel-13)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-13 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-13 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011270 CR to TS 37.105: Rel-13 non-AAS CRs mirroring to Rel-14 AAS**

*Type: CR For: Agreement  
 37.105 v14.6.0 CR-0189 Cat: A (Rel-14)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-13 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-14 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011271 CR to TS 37.105: Rel-13 non-AAS CRs mirroring to Rel-15 AAS**

*Type: CR For: Agreement  
 37.105 v15.9.0 CR-0190 Cat: A (Rel-15)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-13 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-15 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011272 CR to TS 37.105: Rel-13 non-AAS CRs mirroring to Rel-16 AAS**

*Type: CR For: Agreement  
 37.105 v16.4.0 CR-0191 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-13 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-16 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011273 CR to TS 37.105: Rel-14 non-AAS CRs mirroring to Rel-14 AAS**

*Type: CR For: Agreement  
 37.105 v14.6.0 CR-0192 Cat: F (Rel-14)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-14 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-14 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Revised to R4-2012755 (from R4-2011273).**

**R4-2012755 CR to TS 37.105: Rel-14 non-AAS CRs mirroring to Rel-14 AAS**

*Type: CR For: Agreement  
 37.105 v14.6.0 CR-0192 Cat: F (Rel-14)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-14 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-14 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011274 CR to TS 37.105: Rel-14 non-AAS CRs mirroring to Rel-15 AAS**

*Type: CR For: Agreement  
 37.105 v15.9.0 CR-0193 Cat: A (Rel-15)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-14 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-15 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011275 CR to TS 37.105: Rel-14 non-AAS CRs mirroring to Rel-16 AAS**

*Type: CR For: Agreement  
 37.105 v16.4.0 CR-0194 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-14 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-16 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011276 CR to TS 37.105: Rel-15 non-AAS CRs mirroring to Rel-15 AAS**

*Type: CR For: Agreement  
 37.105 v15.9.0 CR-0195 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-15 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-15 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011277 CR to TS 37.105: Rel-15 non-AAS CRs mirroring to Rel-16 AAS**

*Type: CR For: Agreement  
 37.105 v16.4.0 CR-0196 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-15 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-16 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

**R4-2011278 CR to TS 37.105: Rel-16 non-AAS CRs mirroring to Rel-16 AAS**

*Type: CR For: Agreement  
 37.105 v16.4.0 CR-0197 Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

This CR mirrors Rel-16 non-AAS BS CRs (e.g. EUTRA BS, MSR BS) into Rel-16 AAS BS core specification. This work was triggered by related task in ETSI TFES, where AAS BS HS is under construction and requires updated AAS BS test specification (and its baseli

**Discussion:**

**Decision: Agreed.**

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

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

**R4-2010460 Correction of OCNG configuration for LAA SDR requirements**

*Type: CR For: Agreement  
 36.101 v14.15.0 CR-5657 Cat: F (Rel-14)  
  
 Source: Ericsson*

**Abstract:**

This CR corrects OCNG configuration for LAA CC.

**Discussion:**

**Decision: Agreed.**

**R4-2010461 Correction of OCNG configuration for LAA SDR requirements**

*Type: CR For: Agreement  
 36.101 v15.11.0 CR-5658 Cat: A (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

This CR corrects OCNG configuration for LAA CC.

**Discussion:**

**Decision: Agreed.**

**R4-2010462 Correction of OCNG configuration for LAA SDR requirements**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5659 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR corrects OCNG configuration for LAA CC.

**Discussion:**

**Decision: Agreed.**

**R4-2010463 Addition of applicability for MTC UE capable of 64QAM DL**

*Type: CR For: Agreement  
 36.101 v15.11.0 CR-5660 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

This CR adds a note PDSCH demodulation requirements with 64QAM for MTC UE is applicable for MTC UE capable of ce-PDSCH-64QAM.

**Discussion:**

**Decision: Agreed.**

**R4-2012596 Addition of applicability for MTC UE capable of 64QAM DL**

*Type: CR For: Agreement  
 36.101 v15.11.0 CR-5660 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

This CR adds a note PDSCH demodulation requirements with 64QAM for MTC UE is applicable for MTC UE capable of ce-PDSCH-64QAM.

**Discussion:**

**Decision: Withdrawn.**

**R4-2010464 Addition of applicability for MTC UE capable of 64QAM DL**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5661 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR adds a note PDSCH demodulation requirements with 64QAM for MTC UE is applicable for MTC UE capable of ce-PDSCH-64QAM.

**Discussion:**

**Decision: Agreed.**

**~~R4-2010518 Introduction of LTE inter-band Carrier Aggregation for x bands DL (x=4, 5) with 1 band UL to TS36.101~~**

*~~Type: draftCR For: Endorsement  
 36.101 v16.6.0  
 Source: Nokia, Nokia Shanghai Bell~~*

**~~Abstract:~~**

~~This is a big CR for the basket work item on LTE CA 4DL/1UL and 5DL/1UL.~~

**~~Discussion:~~**

**~~Decision:~~** ~~The document was~~ **~~not treated.~~**

#### 5.4.2 BS demodulation requirements [WI code or TEI]

## 6 Rel-16 Work Items for LTE

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

#### 6.1.3 Demodulation and CSI requirements (36.101) [LTE\_eMTC5-Perf]

##### 6.1.3.1 UE demodulation requirements [LTE\_eMTC5-Perf]

**R4-2012537 Email discussion summary for [96e][314] LTE\_eMTC5\_Demod**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012722 (from R4-2012537).**

**R4-2012722 Email discussion summary for [96e][314] LTE\_eMTC5\_Demod**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2010471 Simulation results of MPDCCH with DMRS+CRS**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution shows the simulation results of MPDCCH with DMRS+CRS according to the simulation assumption.

**Discussion:**

**Decision: Noted.**

**R4-2010473 Introduction of enhanced MPDCCH demodulation requirements**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5662 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR introduces the enhanced MPDCCH demodulation requirements.

**Discussion:**

**Decision: Revised to R4-2012597 (from R4-2010473).**

**R4-2012597 Introduction of enhanced MPDCCH demodulation requirements**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5662 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR introduces the enhanced MPDCCH demodulation requirements.

**Discussion:**

**Decision: Agreed.**

**R4-2010475 Summary of simulation results for Rel-16 eMTC demodulation requirements**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This spread sheet summarizes the simulation results for Rel-16 eMTC demodulation performance.

**Discussion:**

**Decision: Noted.**

**R4-2010964 Simulation reuslts for MPDCCH**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

##### 6.1.3.2 CSI requirements [LTE\_eMTC5-Perf]

**R4-2010472 Simulation results of CSI-RS based PMI reporting test**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution shows the simulation results of CSI-RS based PMI reporting according to the simulation assumption.

**Discussion:**

**Decision: Noted.**

**R4-2010474 Introduction of CSI-RS based PMI reporting test for non-BL UEs**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5663 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR introduces the CSI-RS based PMI reporting test for non-BL UEs.

**Discussion:**

**Decision: Revised to R4-2012598 (from R4-2010474).**

**R4-2012598 Introduction of CSI-RS based PMI reporting test for non-BL UEs**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5663 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR introduces the CSI-RS based PMI reporting test for non-BL UEs.

**Discussion:**

**Decision: Agreed.**

**R4-2010965 Simulation results for PMI reporting test in eMTC**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

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

#### 6.2.3 Demodulation and CSI requirements (36.101/36.104) [NB\_IOTenh3-Perf]

##### 6.2.3.1 UE demodulation requirements [NB\_IOTenh3-Perf]

**R4-2012538 Email discussion summary for [96e][315] NB\_IOTenh3\_Demod**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012723 (from R4-2012538).**

**R4-2012723 Email discussion summary for [96e][315] NB\_IOTenh3\_Demod**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2010476 NPDSCH demodulation requirements with multi-TB transmission**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution provides our initial simulation results of NPDSCH with multi-TB transmission.

**Discussion:**

**Decision: Noted.**

**R4-2010969 Simulation results for NPDSCH with multi-TB interleaved transmission.**

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

**Discussion:**

**Decision: Noted.**

**R4-2010970 Discussions on test parameters for NPDSCH with multi-TB interleaved transmission.**

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

**Discussion:**

**Decision: Noted.**

**R4-2010971 CR for TS 36.101: Introduce NPDSCH performance requirements for muti-TB interleaved transmission**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5672 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012599 (from R4-2010971).**

**R4-2012599 CR for TS 36.101: Introduce NPDSCH performance requirements for muti-TB interleaved transmission**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5672 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2010975 Summary of simulation results for LTE NPDSCH with multi-TB interleaved transmission.**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

##### 6.2.3.2 BS demodulation requirements [NB\_IOTenh3-Perf]

**R4-2010276 Initial simulation results for Rel-16 NB-IoT**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010477 NPUSCH demodulation requirements with multi-TB transmission**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution provides our initial simulation results of NPUSCH format 1 with multi-TB transmission.

**Discussion:**

**Decision: Noted.**

**R4-2010968 Simulation results for NPUSCH format 1 with multi-TB interleaved transmission.**

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

**Discussion:**

**Decision: Noted.**

**R4-2010972 CR for TS 36.104: Introduce NPUSCH format1 performance requirements for multi-TB interleaved transmission**

*Type: CR For: Agreement  
 36.104 v16.6.0 CR-4909 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012600 (from R4-2010971).**

**R4-2012600 CR for TS 36.104: Introduce NPUSCH format1 performance requirements for multi-TB interleaved transmission**

*Type: CR For: Agreement  
 36.104 v16.6.0 CR-4909 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2010973 CR for TS 36.141: Introduce NPUSCH format1 conformance testing for multi-TB interleaved transmission**

*Type: CR For: Agreement  
 36.141 v16.6.0 CR-1271 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012601 (from R4-2010971).**

**R4-2012601 CR for TS 36.141: Introduce NPUSCH format1 conformance testing for multi-TB interleaved transmission**

*Type: CR For: Agreement  
 36.141 v16.6.0 CR-1271 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2010974 Summary of simulation results for LTE NPUSCH format 1 with multi-TB interleaved transmission.**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012751 (from R4-2010974).**

**R4-2012751 Summary of simulation results for LTE NPUSCH format 1 with multi-TB interleaved transmission.**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011504 NPUSCH format 1 performance for Multi-TB scheduling**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Contains simulation assumptions for NPUSCH Multi-TB scheduling.

**Discussion:**

**Decision: Revised to R4-2012750 (from R4-2011504).**

**R4-2012750 NPUSCH format 1 performance for Multi-TB scheduling**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Contains simulation assumptions for NPUSCH Multi-TB scheduling.

**Discussion:**

**Decision: Noted.**

**R4-2011505 NPUSCH format 1 performance for Multi-TB scheduling**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Revision with simulation results.

**Discussion:**

**Decision: Withdrawn.**

### 6.4 LTE-based 5G terrestrial broadcast [LTE\_terr\_bcast]

#### 6.4.1 Demodulation and CSI requirements (36.101) [LTE\_terr\_bcast -Perf]

**R4-2012539 Email discussion summary for [96e][316] LTE\_terr\_bcast\_Demod**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012724 (from R4-2012539).**

**R4-2012724 Email discussion summary for [96e][316] LTE\_terr\_bcast\_Demod**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012603 Summary of alignment and impairment results for 5G broadcast**

*Type: other For: Information  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2010966 Discussion and simulation results on LTE-based 5G terrestrial broadcast**

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

**Discussion:**

**Decision: Noted.**

**R4-2010967 CR addition on LTE-based 5G terrestrial broadcast**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5671 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012602 (from R4-2010967).**

**R4-2012602 CR addition on LTE-based 5G terrestrial broadcast**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5671 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011384 5G broadcast PMCH demod simulation result collection**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Noted.**

#### 6.4.2 Others [LTE\_terr\_bcast -Core/Perf]

**R4-2012540 Email discussion summary for [96e][312] LTE\_terr\_bcast\_Other**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012725 (from R4-2012540).**

**R4-2012725 Email discussion summary for [96e][312] LTE\_terr\_bcast\_Other**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012604 WF on the measurement interval and observation time for frequency/time correction for 2.5kHz and 0.37kHz**

*Type: other For: Approval  
 Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010730 Discussion on EVM measurement details for 2.5kHz and 0.37kHz SCSs**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we discuss further details and open issues on new subcarrier spacings 2.5 kHz and 0.37 kHz.

**Discussion:**

**Decision: Noted.**

**R4-2010943 Impacts on BS RF requirement of new introduced numerology**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2010944 CR to 36.104: Introduction of LTE based 5G terrestrial broadcast numerologies**

*Type: CR For: Agreement  
 36.104 v16.6.0 CR-4907 Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012605 (from R4-2010944).**

**R4-2012605 CR to 36.104: Introduction of LTE based 5G terrestrial broadcast numerologies**

*Type: CR For: Agreement  
 36.104 v16.6.0 CR-4907 Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Agreed.**

**R4-2010945 CR to 36.101: Introduction of LTE based 5G terrestrial broadcast numerologies**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5669 Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012606 (from R4-2010945).**

**R4-2012606 CR to 36.101: Introduction of LTE based 5G terrestrial broadcast numerologies**

*Type: CR For: Agreement  
 36.101 v16.6.0 CR-5669 Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Agreed.**

### 6.5 R16 LTE maintenance [WI code]

#### 6.5.1 BS RF requirements [WI code]

#### 6.5.4 Demodulation and CSI requirements [WI code]

##### 6.5.4.1 UE demodulation and CSI requirements [WI code]

##### 6.5.4.2 BS demodulation requirements [WI code]

## 7 Rel-16 UE feature list

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

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

**R4-2012541 Email discussion summary for [96e][305] NR\_unlic\_RF\_BS**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012726 (from R4-2012541).**

**R4-2012726 Email discussion summary for [96e][305] NR\_unlic\_RF\_BS**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012607 WF on BS Tx and Rx remaining requirements for NR-U**

*Type: other For: Approval  
 Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Session Chair Note: Agreements captured in slides 4, 6, and 9. NO agreements reached for slide 5, 7,8.**

**R4-2010738 CR to TS 38.104: Introduction of NR-U into BS core specification**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0225 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This is running Big CR with introduction of NR-U requirements to BS core specification TS 38.104.

**Discussion:**

**Decision: Revised to R4-2012608.**

**R4-2012608 CR to TS 38.104: Introduction of NR-U into BS core specification**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0225 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This is running Big CR with introduction of NR-U requirements to BS core specification TS 38.104.

**Discussion:**

**Decision: Return to.**

**R4-2010739 CR to TS 37.107 with introduction of NR-U feature – core part**

*Type: CR For: Agreement  
 37.107 v16.0.0 CR-0006 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces NR-U feature to specification TS 37.107.

**Discussion:**

**Decision: Return to.**

**R4-2010962 CR to 36.104:Introduction of Band n46 in 36.104**

*Type: CR For: Agreement  
 36.104 v16.6.0 CR-4908 Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2011409 CR to 36.104: Introduction of NR-U co-existence requirements**

*Type: CR For: Agreement  
 36.104 v16.6.0 CR-4910 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012768 (from R4-2011409).**

**R4-2012768 CR to 36.104: Introduction of NR-U co-existence requirements**

*Type: CR For: Agreement  
 36.104 v16.6.0 CR-4910 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2011410 CR to 37.104: Introduction of NR-U co-existence requirements**

*Type: CR For: Agreement  
 37.104 v16.6.0 CR-0906 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012766 (from R4-2011410).**

**R4-2012766 CR to 37.104: Introduction of NR-U co-existence requirements**

*Type: CR For: Agreement  
 37.104 v16.6.0 CR-0906 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2011411 CR to 37.105: Introduction of NR-U co-existence requirements**

*Type: CR For: Agreement  
 37.105 v16.4.0 CR-0198 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012767 (from R4-2011411).**

**R4-2012767 CR to 37.105: Introduction of NR-U co-existence requirements**

*Type: CR For: Agreement  
 37.105 v16.4.0 CR-0198 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

##### 7.1.4.1 Transmitter characteristics [NR\_unlic-Core]

**R4-2010959 Discussion on NR-U BS Tx requirements**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

##### 7.1.4.2 Receiver characteristics [NR\_unlic-Core]

**R4-2010743 Discussion on BS core specification drafting**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution, we discuss this drafting issue for NR-U BS Rx requirements.

**Discussion:**

**Decision: Noted.**

**R4-2010960 NR-U BS RX ACS, IBB, OOBB, IMD requirements**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2010961 CR to 38.104:Introduction of NR-U BS RX requirement into TS38.104**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0230 Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Merged (with R4-2010738).**

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

##### 7.1.6.1 General [NR\_unlic-Perf]

**R4-2012542 Email discussion summary for [96e][328] NR\_unlic\_Demod**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012746 (from R4-2012542).**

**R4-2012746 Email discussion summary for [96e][328] NR\_unlic\_Demod**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012609 Work Plan for NR-U Demodulation Performance Requirements**

*Type: Work Plan For: Approval  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012610 Way Forward on NR-U UE demodulation requirements**

*Type: other For: Approval  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012611 Way Forward on NR-U BS demodulation requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010904 General aspects of demodulation requirements for unlicensed bands**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

General discussion on NR-U demodulation aspects

**Discussion:**

**Decision: Noted.**

**R4-2009920 Definition of NR-U Demod Performance Tests**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

In this paper, we propose a set of parameters to be used in the definition of NR-U Performance Demodulation Tests

**Discussion:**

**Decision: Noted.**

##### 7.1.6.2 UE demodulation requirements [NR\_unlic-Perf]

**R4-2011020 Discusson on UE performance requirements for Rel-16 NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011373 Overview on NR-U features for UE performance requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper we provide an overview on UE performance requirements targeting NR-U operation

**Discussion:**

**Decision: Noted.**

##### 7.1.6.3 CSI requirements [NR\_unlic-Perf]

##### 7.1.6.4 BS demodulation requirements [NR\_unlic-Perf]

**R4-2010277 View on BS demodulation requirement for NR-U**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010613 overview of BS demodulation for NR-U**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

overview discussion on NR-U BS demodulation requirements.

**Discussion:**

**Decision: Noted.**

**R4-2010905 Discussion on NR-U BS demodulation requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion on the BS demodulation topics for unlicensed operation, including PUSCH, PUCCH, and PRACH

**Discussion:**

**Decision: Noted.**

**R4-2011021 Discusson on BS performance requirements for Rel-16 NR-U**

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

**Discussion:**

**Decision: Noted.**

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

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

##### 7.3.7.1 Work Scope [5G\_V2X\_NRSL-Perf]

**R4-2012543 Email discussion summary for [96e][326] V2X\_Demod**

*Type: other For: Information  
 Source: Moderator (LGE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012727 (from R4-2012543).**

**R4-2012727 Email discussion summary for [96e][326] V2X\_Demod**

*Type: other For: Information  
 Source: Moderator (LGE)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012612 WF on work scope and general assumptions for NR V2X demodulation performance**

*Type: other For: Approval  
 Source: LGE*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012758 (from R4-2012612).**

**R4-2012758 WF on work scope and general assumptions for NR V2X demodulation performance**

*Type: other For: Approval  
 Source: LGE*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012613 Simulation assumptions for NR V2X demodulation**

*Type: other For: Approval   
 Source: MediaTek*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012757 (from R4-2012613).**

**R4-2012757 Simulation assumptions for NR V2X demodulation**

*Type: other For: Approval   
 Source: MediaTek*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010010 Work plan for V2X demodulation performance**

*Type: Work Plan For: Approval  
 Source: LG Electronics Inc.*

**Discussion:**

**Decision: Approved.**

**R4-2010039 Discussion on NR V2X Demod test case**

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

**Discussion:**

**Decision: Noted.**

**R4-2011022 Discusson on work scope of performance requirements for Rel-16 sidelink**

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

**Discussion:**

**Decision: Noted.**

**R4-2011323 Discussion on NR V2X work scope**

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

**Discussion:**

**Decision: Noted.**

**R4-2011381 NR V2X Demod requirement**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Noted.**

**R4-2009831 On NR V2X demodulation performance requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

##### 7.3.7.2 Spec structure [5G\_V2X\_NRSL-Perf]

**R4-2010011 Discussion on Spec. structure for V2X demodulation**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Discussion:**

**Decision: Noted.**

**R4-2011023 Discusson on spec structure of performance requirements for Rel-16 sidelink**

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

**Discussion:**

**Decision: Noted.**

##### 7.3.7.3 Test scenarios [5G\_V2X\_NRSL-Perf]

**R4-2010012 Discussion on test cases for NR V2X performance**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Discussion:**

**Decision: Noted.**

**R4-2011024 Discusson on test scenarios of performance requirements for Rel-16 sidelink**

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

**Discussion:**

**Decision: Noted.**

**R4-2011324 Discussion on NR V2X test scenarios**

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

**Discussion:**

**Decision: Noted.**

**R4-2009830 On PSBCH demodulation performance requirement for NR V2X**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

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

#### 7.4.1 General [NR\_IAB-Core]

**R4-2012544 Email discussion summary for [96e][306] NR\_IAB\_General**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012728 (from R4-2012544).**

**R4-2012728 Email discussion summary for [96e][306] NR\_IAB\_General**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012545 Email discussion summary for [96e][307] NR\_IAB\_Featurelist**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012563    LS to RAN2 on IAB-MT feature list**

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

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012566 IAB TS spec update after RAN4 96e**

*Type: draft TS For: Agreement  
 38.174 v0.2.0*

*Source: QUALCOMM*

**Abstract:**

**Discussion:**

**Decision: For email approval**

##### 7.4.1.1 System parameters [NR\_IAB-Core]

**R4-2010223 TR 38.809 V0.3.0**

*Type: draft TR For: Agreement  
 38.809 v0.2.0  
 Source: Samsung*

**Discussion:**

**Decision: For email approval**

**R4-2009988 General requirements in IAB networks**

*Type: discussion For: Approval  
 Source: Qualcomm*

**Discussion:**

**Decision: Revised to R4-2012614 (from R4-2009988).**

**R4-2012614 General requirements in IAB networks**

*Type: discussion For: Approval  
 Source: Qualcomm*

**Discussion:**

**Decision: Approved.**

##### 7.4.1.2 IAB-MT class [NR\_IAB-Core]

**R4-2011299 TP to TS 38.174: IAB-MT class definitions**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Huawei*

**Abstract:**

Capture the IAB-MT class definition in the TS

**Discussion:**

**Decision: Noted.**

**R4-2011300 TP to TR 38.809 -IAB-MT Class definitions**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Huawei*

**Abstract:**

capture the IAB-MT class definition background

**Discussion:**

**Decision: Revised to R4-2012615 (from R4-2011300).**

**R4-2012615 TP to TR 38.809 -IAB-MT Class definitions**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Huawei*

**Abstract:**

capture the IAB-MT class definition background

**Discussion:**

**Decision: Noted.**

**R4-2009989 TP for IAB-MT classes**

*Type: discussion For: Approval  
 Source: Qualcomm*

**Discussion:**

**Decision: Noted.**

##### 7.4.1.3 IAB-MT feature list [NR\_IAB-Core]

**R4-2010494 Further discussion on R16 IAB MT features**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2010722 IAB-MT features**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this document conclusions for IAB-features are proposed.

**Discussion:**

**Decision: Noted.**

**R4-2010913 IAB-MT Tx Features**

*Type: other For: Approval  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2010949 Discussion on IAB MT feature list**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2011030 IAB-MT feature list remaining issue**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on the IAB feature remaining issue

**Discussion:**

**Decision: Noted.**

**R4-2009791 Discussion on IAB-MT feature list remaining issues**

*Type: other For: Approval  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

##### 7.4.1.4 Others [NR\_IAB-Core]

**R4-2010146 TP for TR38.809: IAB co-existence simulation**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Samsung*

**Discussion:**

**Decision: Approved.**

**R4-2010177 TP to TS 38.174: Addition of MT bandwidth definition in clause 3 and requirement applicability table in subclause 4.6**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Ericsson*

**Abstract:**

This contribution presents a text proposal for approval introducing IAB-MT RF bandwidth and the concept of requirement applicability for multiple requirement sets for NR IAB Node in TS 38.174.

**Discussion:**

**Decision: Noted.**

**R4-2012578 TP for TR 38.809 on IAB-MT transmission in DL**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Ericsson*

**Discussion:**

**Decision: Withdrawn.**

**R4-2012579 TP for TS 38.174 on IAB-MT transmission in DL**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Withdrawn.**

#### 7.4.2 RF requirements [NR\_IAB-Core]

**R4-2012546 Email discussion summary for [96e][308] NR\_IAB\_RF\_Part\_1**

*Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012729 (from R4-2012546).**

**R4-2012729 Email discussion summary for [96e][308] NR\_IAB\_RF\_Part\_1**

*Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012616 WF on IAB-MT Pcmax, power control and dynamic range**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012617 TP for TR 38.809: IAB-MT Pcmax and power control**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012618 TP for TS 38.174: IAB-MT Pcmax and power control**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012547 Email discussion summary for [96e][309] NR\_IAB\_RF\_Part\_2**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012730 (from R4-2012547).**

**R4-2012730 Email discussion summary for [96e][309] NR\_IAB\_RF\_Part\_2**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012745 WF on IAB-MT Tx requirements**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012548 Email discussion summary for [96e][310] NR\_IAB\_RF\_Part\_3**

*Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012731 (from R4-2012548).**

**R4-2012731 Email discussion summary for [96e][310] NR\_IAB\_RF\_Part\_3**

*Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012627 WF on remaining issue on Reference sensitivity and FRC for IAB-MT**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012630 WF on FR1 narrowband blocking and OBB for IAB-MT**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

##### 7.4.2.1 Transmitter characteristics [NR\_IAB-Core]

**R4-2010912 IAB-MT Tx Requirements**

*Type: other For: Approval  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

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

**R4-2010111 Discussion on IAB-MT Pcmax**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010147 Discussion on remaining issues for IAB-MT Tx power related requirements**

*Type: other For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010293 TP to TR 38.809 Completing IAB-MT power related requirements**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012619 (from R4-2010293).**

**R4-2012619 TP to TR 38.809 Completing IAB-MT power related requirements**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Approved.**

**R4-2010724 TP to TS 38.174: Output power requirements**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Text proposal to complete output power requirements

**Discussion:**

**Decision: Revised to R4-2012620 (from R4-2010724).**

**R4-2012620 TP to TS 38.174: Output power requirements**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Text proposal to complete output power requirements

**Discussion:**

**Decision: Approved.**

**R4-2010950 Further discussion on IAB-MT power requirement**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2011032 IAB-MT maximum output power for FR1**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

in this paper, the IAB-MT maximum output power is discussed.

**Discussion:**

**Decision: Noted.**

**R4-2011293 TP to TS 38.174 -IAB TX dynamic range**

*Type: pCR For: Approval  
 38.174 v0.0.1  
 Source: Huawei*

**Abstract:**

capture the IAB-MT Tx dynamic range agreements in the requirements specification

**Discussion:**

**Decision: Revised to R4-2012621 (from R4-2011293).**

**R4-2012621 TP to TS 38.174 -IAB TX dynamic range**

*Type: pCR For: Approval  
 38.174 v0.0.1  
 Source: Huawei*

**Abstract:**

capture the IAB-MT Tx dynamic range agreements in the requirements specification

**Discussion:**

**Decision: Approved.**

**R4-2009792 Discussion on IAB-MT power related issues**

*Type: other For: Approval  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

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

**R4-2010296 Discussion on IAB-MT transmit modulation quality**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Noted.**

**R4-2010951 Further discussion on IAB-MT transmitted signal quality**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2011031 IAB-MT Transmit signal quality**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on remaining issue on IAB-MT transmit signal quality

**Discussion:**

**Decision: Noted.**

**R4-2009789 TP for TR 38.809: IAB-MT Transmit signal quality**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: CATT*

**Discussion:**

**Decision: Revised to R4-2012623 (from R4-2009789).**

**R4-2012623 TP for TR 38.809: IAB-MT Transmit signal quality**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: CATT*

**Discussion:**

**Decision: Approved.**

**R4-2009790 TP for TS 38.174: IAB-MT Transmit signal quality**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: CATT*

**Discussion:**

**Decision: Revised to R4-2012622 (from R4-2009790).**

**R4-2012622 TP for TS 38.174: IAB-MT Transmit signal quality**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: CATT*

**Discussion:**

**Decision: Approved.**

###### 7.4.2.1.3 Unwanted emissions [NR\_IAB-Core]

**R4-2010298 TP to TR 38.809 IAB-MT unwanted emission requirements**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012625 (from R4-2010298).**

**R4-2012625 TP to TR 38.809 IAB-MT unwanted emission requirements**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Approved.**

**R4-2010725 TP to TS 38.174: Unwanted emissions requirements**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Text proposal to complete Unwanted emissions requirements

**Discussion:**

**Decision: Revised to R4-2012624 (from R4-2010725).**

**R4-2012624 TP to TS 38.174: Unwanted emissions requirements**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Text proposal to complete Unwanted emissions requirements

**Discussion:**

**Decision: Approved.**

E///: We need to align Rx side as Tx side for TP.

**R4-2010952 Further discussion on IAB-MT unwanted emission**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2011033 IAB-MT unwanted emission for FR2 and FR1**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we provide our view on the open issue of ACLR, OBUE and spurious requirement on IAB-MT.

**Discussion:**

**Decision: Noted.**

**R4-2011297 IAB-MT Emissions**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discuss the remaining open issues in the WF

**Discussion:**

**Decision: Noted.**

**R4-2009793 Discussion on IAB-MT unwanted emissions**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

###### 7.4.2.1.4 Others [NR\_IAB-Core]

**R4-2010148 TP for TR38.809: conclusion on IAB-MT BC requirement**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Samsung*

**Discussion:**

**Decision: Approved.**

**R4-2010953 TP to TS 38.174 on IAB TX IMD**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012626 (from R4-2010953).**

**R4-2012626 TP to TS 38.174 on IAB TX IMD**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Approved.**

Session Chair Note: “For OTA co-location requirement for IAB node further clarification will be discussed based on 4.9 of TS38.104 as maintenance.”

##### 7.4.2.2 Receiver characteristics [NR\_IAB-Core]

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

**R4-2010954 IAB-MT REFSENS and FRC design**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2011034 Proposals for REFSENS FRC and REFSENS requirement for IAB-MT**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

in this paper, we provide our proposals for REFSENS FRC and REFSENS requirement for IAB-MT. Simulation results of the proposed RFCs are also presented within.

**Discussion:**

**Decision: Noted.**

**R4-2011294 IAB-MT Sensitivity parameters**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

discussion o the IAB-MT FRC's and other open parameters.

**Discussion:**

**Decision: Noted.**

**R4-2011295 TP to TS 38.174 -IAB RX sensitivity and dynamic range**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Huawei*

**Abstract:**

capture the IAB-MT sensitivity and Rx dynamic range agreements in the requirements specification

**Discussion:**

**Decision: Revised to R4-2012628 (from R4-2011295).**

**R4-2012628 TP to TS 38.174 -IAB RX sensitivity and dynamic range**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Huawei*

**Abstract:**

capture the IAB-MT sensitivity and Rx dynamic range agreements in the requirements specification

**Discussion:**

**Decision: Approved.**

**R4-2011296 TP to TR 38.809 -IAB RX sensitivity**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Huawei*

**Abstract:**

capture the IAB-MT sensitivity agreements background in the TR

**Discussion:**

**Decision: Revised to R4-2012629 (from R4-2011296).**

**R4-2012629 TP to TR 38.809 -IAB RX sensitivity**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Huawei*

**Abstract:**

capture the IAB-MT sensitivity agreements background in the TR

**Discussion:**

**Decision: Approved.**

**R4-2009794 Discussion on IAB-MT REFSENS FRC**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

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

**R4-2010723 IAB-MT Rx interferer details**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this document the final details required to complete in-band blocking and ACS requirements are proposed.

**Discussion:**

**Decision: Noted.**

**R4-2010955 ACS and In-band blocking for IAB MT**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2011035 TP for TS ACS, inband blocking and out of band blocking**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Ericsson*

**Abstract:**

In this paper, the interference signal of ACS and IBB for wide area IAB-MT is discussed and TP is proposed

**Discussion:**

**Decision: Revised to R4-2012631 (from R4-2011035).**

**R4-2012631 TP for TS ACS, inband blocking and out of band blocking**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Ericsson*

**Abstract:**

In this paper, the interference signal of ACS and IBB for wide area IAB-MT is discussed and TP is proposed

**Discussion:**

**Decision: Approved.**

**R4-2011036 TP to TR 38.809: ACS and IBB**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Ericsson*

**Abstract:**

in this paper, TP for ACS and IBB to TR 38.809 are proposed

**Discussion:**

**Decision: Revised to R4-2012632 (from R4-2011036).**

**R4-2012632 TP to TR 38.809: ACS and IBB**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Ericsson*

**Abstract:**

in this paper, TP for ACS and IBB to TR 38.809 are proposed

**Discussion:**

**Decision: Approved.**

**R4-2011298 IAB-MT in band selectivity and blocking**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discuss the remaining open issues in the WF

**Discussion:**

**Decision: Noted.**

**R4-2009795 Discussion on LA IAB-MT ACS and IBB**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

###### 7.4.2.2.3 Others [NR\_IAB-Core]

**R4-2010149 IAB-MT Receiver FRC for QPSK**

*Type: other For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010956 TP to TR 38.809 IAB-MT RX IMD**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012756 (from R4-2010956).**

**R4-2012756 TP to TR 38.809 IAB-MT RX IMD**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Approved.**

**R4-2010957 TP to TS 38.174: IAB RX IM requirement (section 7.7 and 10.8)**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012633 (from R4-2010957).**

**R4-2012633 TP to TS 38.174: IAB RX IM requirement (section 7.7 and 10.8)**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Approved.**

**R4-2011037 TP to TR 38.809: RX spurious**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Ericsson*

**Abstract:**

in this paper, TP for RX spurious to TR 38.809 are proposed

**Discussion:**

**Decision: Revised to R4-2012634 (from R4-2011037).**

**R4-2012634 TP to TR 38.809: RX spurious**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Ericsson*

**Abstract:**

in this paper, TP for RX spurious to TR 38.809 are proposed

**Discussion:**

**Decision: Approved.**

**R4-2011038 TP to TS 38.174: RX spurious**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Ericsson*

**Abstract:**

in this paper, TP for RX spurious to TS 38.174 are proposed

**Discussion:**

**Decision: Revised to R4-2012635 (from R4-2011038).**

**R4-2012635 TP to TS 38.174: RX spurious**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Ericsson*

**Abstract:**

in this paper, TP for RX spurious to TS 38.174 are proposed

**Discussion:**

**Decision: Revised to R4-2012760 (from R4-2012635).**

**R4-2012760 TP to TS 38.174: RX spurious**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Ericsson*

**Abstract:**

in this paper, TP for RX spurious to TS 38.174 are proposed

**Discussion:**

**Decision: Approved.**

#### 7.4.4 EMC core requirements [NR\_IAB-Core]

**R4-2010647 Proposal on the skeleton of IAB EMC**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Approved.**

##### 7.4.4.1 General [NR\_IAB-Core]

**R4-2010649 References for IAB EMC**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012643 (from R4-2010649).**

**R4-2012643 References for IAB EMC**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Approved.**

**R4-2011267 IAB EMC specification: Exclusion bands (4.4)**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

In this contribution we provide discussion on the transmitter and receiver Exclusion bands for the purposes of the EMC RI testing of the NR IAB node. The proposed TP to the IAB EMC specification is attached.

**Discussion:**

**Decision: Revised to R4-2012640 (from R4-2011267).**

**R4-2012640 IAB EMC specification: Exclusion bands (4.4)**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

In this contribution we provide discussion on the transmitter and receiver Exclusion bands for the purposes of the EMC RI testing of the NR IAB node. The proposed TP to the IAB EMC specification is attached.

**Discussion:**

**Decision: Approved.**

**R4-2011282 TPs to TS on IAB EMC section 1 (Scope)**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

TP to TS on IAB EMC for chapter 1 (Scope)

**Discussion:**

**Decision: Revised to R4-2012636 (from R4-2011282).**

**R4-2012636 TPs to TS on IAB EMC section 1 (Scope)**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

TP to TS on IAB EMC for chapter 1 (Scope)

**Discussion:**

**Decision: Approved.**

##### 7.4.4.2 Emission requirements [NR\_IAB-Core]

**R4-2010648 Emission for IAB EMC**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012642 (from R4-2010648).**

**R4-2012642 Emission for IAB EMC**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Approved.**

**R4-2011266 IAB EMC specification: Emission (7.1)**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

In this contribution we provide discussion on the EMC emission requirements applicability of the NR IAB node. The proposed TP to the IAB EMC specification is attached.

**Discussion:**

**Decision: Revised to R4-2012641 (from R4-2011266).**

**R4-2012641 IAB EMC specification: Emission (7.1)**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

In this contribution we provide discussion on the EMC emission requirements applicability of the NR IAB node. The proposed TP to the IAB EMC specification is attached.

**Discussion:**

**Decision: Approved.**

**R4-2011283 TP to TR 38.809 on IAB EMC emission requirements**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Ericsson*

**Abstract:**

TP to TR 38.809 including text agreements on IAB EMC Emissions

**Discussion:**

**Decision: Revised to R4-2012637 (from R4-2011283).**

**R4-2012637 TP to TR 38.809 on IAB EMC emission requirements**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Ericsson*

**Abstract:**

TP to TR 38.809 including text agreements on IAB EMC Emissions

**Discussion:**

**Decision: Approved.**

##### 7.4.4.3 Immunity requirements [NR\_IAB-Core]

**R4-2011284 TPs to TS on IAB EMC section 9 (Immunity)**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

TP to TS on IAB EMC for chapters 9 (Immunity)

**Discussion:**

**Decision: Revised to R4-2012638 (from R4-2011284).**

**R4-2012638 TPs to TS on IAB EMC section 9 (Immunity)**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

TP to TS on IAB EMC for chapters 9 (Immunity)

**Discussion:**

**Decision: Approved.**

**R4-2011375 Definitions and immunity of IAB EMC**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

this document provides a text proposal to Sections 3 and 7.2 based on the TS skeleton [1].

**Discussion:**

**Decision: Revised to R4-2012639 (from R4-2011375).**

**R4-2012639 Definitions and immunity of IAB EMC**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

this document provides a text proposal to Sections 3 and 7.2 based on the TS skeleton [1].

**Discussion:**

**Decision: Approved.**

#### 7.4.5 Demodulation and CSI requirements [NR\_IAB-Perf]

##### 7.4.5.1 General [NR\_IAB-Perf]

**R4-2012549 Email discussion summary for [96e][327] NR\_IAB\_Demod**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012732 (from R4-2012549).**

**R4-2012732 Email discussion summary for [96e][327] NR\_IAB\_Demod**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012644 WF on Rel-16 NR IAB demodulation requirements**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010843 IAB demodulation general aspects**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion on general approach for IAB demod and IAB-DU

**Discussion:**

**Decision: Noted.**

**R4-2010917 Initial considerations on IAB performance requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2011326 On NR IAB general demodulation requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

this paper gives an overview of NR IAB and discussed in general the IAB-node perfomance demodulation requirements.

**Discussion:**

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

**R4-2011399 On NR IAB general demodulation requirements**

*Type: discussion For: Decision  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This paper gives an overview of NR IAB and discusses in general the IAB-node performance demodulation requirements.

**Discussion:**

**Decision: Noted.**

**R4-2011516 General discussion on IAB demodulation performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei Technologies France*

**Discussion:**

**Decision: Noted.**

##### 7.4.5.2 IAB-DU performance requirements [NR\_IAB-Perf]

**R4-2011327 On NR IAB-node UL demodulation requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The scope of IAB-node demodulation in UL BH direction is considered. Several simplifications in the existing BS performance requirements are proposed to address the IAB architecture and deployments.

**Discussion:**

**Decision: Noted.**

**R4-2011517 Initial discussion on IAB DU demodulation performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei Technologies France*

**Discussion:**

**Decision: Noted.**

##### 7.4.5.3 IAB-MT performance requirements [NR\_IAB-Perf]

**R4-2010844 IAB demodulation MT aspects**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion on IAB-MT demod considerations

**Discussion:**

**Decision: Noted.**

**R4-2011328 On NR IAB-node DL demodulation requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The scope of IAB-node demodulation in DL BH direction is considered. An approach how to formulate requirements that match the IAB architecture and deployment scenarios is proposed.

**Discussion:**

**Decision: Noted.**

**R4-2011518 Initial discussion on IAB MT demodulation performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei Technologies France*

**Discussion:**

**Decision: Noted.**

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

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

**R4-2012550 Email discussion summary for [96e][317] NR\_UE\_pow\_sav\_Demod**

*Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012733 (from R4-2012550).**

**R4-2012733 Email discussion summary for [96e][317] NR\_UE\_pow\_sav\_Demod**

*Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

|  |
| --- |
| **GTW session on Aug 25th**  **Issue 1-0: Whether to define a joint test case for PDCCH-WUS**   1. The testing time considering Pm-dsg (1% or 1.099% or 0.1% Pm-dsg) and error samples (100 or 1000) 2. Whether different UE behavior for detection of WUS-PDCCH need to be obviously distinguished during the test, and how to test.   Recommended WF:  Continue to discuss in 2nd round:   1. Whether error samples can be reduced to 100 in order to support 0.1% Pm-dsg? 2. Whether different UE behavior for detection of WUS-PDCCH need to be obviously distinguished during the test, and how to test.   Agreement:  RAN4 agree to introduce demodulation test cases for PDCCH-WUS in Rel-16.  The purpose of such test case was to verify UE supporting PDCCH-WUS feature/function designed in RAN1/RAN2.  Further discuss among option 1/option2 needed considering test time issue.  RAN4 also aware that with option 1/option 2, UE behaviour following PDCCH-WUS indication “0” not verified.  PDCCH-WUS indication bit 1 -> PDCCH in DRX on -> ACK/NACK/DTX  PDCCH-WUS indication bit 0-> PDCCH in DRX on -> ACK/NACK/DTX  Whether need to verify both PDCCH-WUS with indication “1” and “0” or “1” only？  Question 1: Test purpose?  Huawei: We verify PDCCH-WUS or jointly?  Intel: we would like to check whether below options meet test purpose. We would like to further discuss needed.  Huawei: op1 is jointly test cases. Which beyond test purpose.  ViVo: Option 1/option 2 only focused on WUS indication 1. Not covered WUS indication 0 case.  MTK: option 2 is similar as option with jointly test cases, option 2 with power boosting.  CATT: similar as view MTK. Option 1 following up PDCCH performance not degraded.  QC: similar comment as CATT, for demodulation performance we need to ensure PDCCH performance not degraded following PDCCH WUS indication.  Intel: For option 1/option 2 How we can ensure UE monitor PDCCH-WUS, UE can skip PDCCH-WUS and wake up in PDCCH on period and pass the test cases.  QC: we want to ensure operation mode with realistic reason to ensure performance. We don’t such cheating UE really exist.  Huawei: During test case, both PDCCH-WUS and normal PDCCH need to be configured for test procedure? Key point do we want to only verify PDCCH-WUS? Power boosting approach already applied in past test cases.  MTK: For both methods, PDCCH-WUS and PDCCH need to be decoding?  CMCC: In Our view, we are OK with op1 or op2. We want to ensure test time.  CATT: In our view, PDCCH WUS designed to support power saving mode. We just verify UE which declare this feature.  **Issue 1-2: Test metric**   * + Option 1 (Ericsson, CATT, MTK, CMCC, Qualcomm): * BLERPDCCH-JOINT = BLERPDCCH-WUS + (1 – BLERPDCCH-WUS) \* BLERPDCCH    + - BLERPDCCH: BLER of PDCCH for the case that only PDCCH transmission     - BLERPDCCH-WUS: BLER of PDCCH-WUS for the case that only PDCCH-WUS transmission     - BLERPDCCH-JOINT: BLER of PDCCH for the case that joint transmission of PDCCH-WUS and PDCCH (UE does not wake up when missing PDCCH-WUS in DRX-OFF period)   + Option 2 (Huawei, R4-2010995):     - Only focus on DCI format 2\_6 BLER instead of the joint BLER, i.e. set enough high power for the normal PDCCH to ensure 100% successful decoding and set the test metric as 0.1% BLER. By this way the performance of DCI format 2\_6 can be verified, but the normal PDCCH has no impact on BLER.     - From the simulation results we can see that the impact of normal PDCCH to the test can be negligible, i.e. one order of magnitude lower comparing to the target 10^-3 BLER for DCI format 2\_6, if normal PDCCH power boosting factor is greater than 5 dB.   + Option 3 (vivo):     - Only focus on DCI format 2\_6 BLER instead. The PUCCH on-power is used as test metric. If PDCCH-WUS indicates wakeup, UE should transmit CSI on PUCCH normally. If PDCCH-WUS indicates not wakeup or is not sent, UE does not start on-duration time and therefore UE should not transmit CSI on PUCCH. TE generates the “1” indication of PDCCH-WUS once per 2 DRX cycles and “0” indication once per 2 DRX cycle. Then TE checks whether UE uplink power is under expectation. By this way the performance of DCI format 2\_6 can be verified without any impact from normal PDCCHs.   Recommended WF:  Continue to discuss in 2nd round based on the above 3 options.  **Issue 1-3: BLER of PDCCH to be tested**  Recommended WF:  This issue is related to the test metric and procedure. Moderator suggests using following as baseline for further discussion.   * If option 1 in issue 1-2 is adopted, 1% or 1.099% is adopted. * If option 2 or option 3 in issue 1-2 is adopted, 1% or 0.1% is adopted.   **Issue 1-4: Test procedure**   * + Option 1 : (CMCC, MTK, Qualcomm, CATT)     - Configure UE not to wake up when missing DCI format 2\_6 in DRX-OFF period     - Transmit PDCCH-WUS in DRX-OFF period and PDCCH in DRX-ON period with the SNR reference value     - Verify that BLER of PDCCH meets the performance requirement.     - Pm-dsg\_total = PPDCCH-WUS + (1- PPDCCH-WUS) PPDCCH = 1.099% or 1%   + Option 2 (Huawei):     - *ps-WakeUp* is not configured and “Wake-up indication” in DCI format 2\_6 is set to ‘1’     - *drx-LongCycleStartOffset* is set to ms10.     - Two search space sets for transmission of DCI format 2\_6 is configured for UE, but there is only one position selected randomly to transmit DCI format 2\_6 before each DRX on duration.     - Avoid the impact of normal PDCCH to PDCCH-WUS by setting high enough power level for normal PDCCH during the test.     - Transmit PDCCH-WUS in DRX-OFF period (opportunity for DRX) and PDCCH in DRX-ON period (On duration).     - Verify that BLER of PDCCH meets the performance requirement. (0.1%)   + Option 3 (vivo):     - *“PSWakeUpOrNot” should be set as “UE not wakeup” or not configured.*     - *To minimize the test time needed, DRX cycle should be selected as the minimum value of 10ms.*     - *Before every DRX active time, TE sends “1” indication in PDCCH-WUS once per 2 DRX cycles and sends “0” indication in PDCCH-WUS once per 2 DRX cycles.*     - *TE check whether UE behavior in the next DRX on-duration is under expectation or not, i.e. if UE sends periodic CSI during On-duration after TE sends PDCCH-WUS indication, or if UE does not send periodic CSI during On-duration after TE cancel the PDCCH-WUS transmission, ACK\_WUS = ACK\_WUS + 1; otherwise NACK\_WUS = NACK\_WUS + 1.*     - *- Verify that BLER of PDCCH-WUS , i.e. NACK\_WUS / (ACK\_WUS + NACK\_WUS), equals to Pm-dsg(1% or 0.1%).*   **Agreement:** |

**R4-2012645 WF on power saving demodulation**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010101 Demodulation on UE power saving**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010478 Evaluation of WUS-PDCCH decoding performance**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the PDCCH-WUS decoding performance requirements.

**Discussion:**

**Decision: Noted.**

**R4-2010718 Discussion on performance requirements for PDCCH-WUS**

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

**Discussion:**

**Decision: Noted.**

**R4-2010995 Discussion on the performance requirements for NR power saving**

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

**Discussion:**

**Decision: Noted.**

**R4-2009721 Discussion on PDCCH-WUS requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2009811 Demodulation test for PDCCH-WUS**

*Type: discussion For: Discussion  
 38.101-4 v..  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

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

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

**R4-2012551 Email discussion summary for [96e][318] NR\_L1enh\_URLLC\_Demod\_Part1**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012734 (from R4-2012551).**

**R4-2012734 Email discussion summary for [96e][318] NR\_L1enh\_URLLC\_Demod\_Part1**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

|  |
| --- |
| **GTW session on Aug 25th**   1. **Topic 1(318): FR2 test for Ultra-BLER**   **Issue 1-1: Applicability of 10^-5 BLER in FR2 scenario**  Please provide further comments on the following reasons why it is suggested that the FR2 requirement is not realistic:   * Spatial and frequency selectivity and deep fades due to uncontrollable environment changes * Beam management impacts * Higher pathloss and CQI feedback * Evaluations done for FR1   It is suggested that the requirement may be realistic in an industrial environment. Please provide further argument why/why not  **Issue 1-2: Any issues for setting an FR2 requirement**  Please provide further comments on the following issues which have been identified in respect to FR2 requirements:   * AWGN cannot be used for realistic testing in FR2 (as it will not correlate with actual performance) * Beamforming mechanism and stability need to be considered for the requirement * RF impacts for FR2 may impact BLER performance more * OTA Test equipment setup ability to achieve complete fidelity for FR2 * TDD slot pattern lengthening test time   It is suggested that with locking of the beam direction (after beam setting before testing commences) will ensure FR2 testing works. Please comment further on this.  **Issue 1-3: Create FR2 requirements**  Based on the discussion of Issue 1-1 and 1-2, opinion on whether to create FR2 requirements:   * Option 1: Yes * Option 2: No   Agreement: Not introduce FR2 requirements in Rel-16 for URLLC with ultra-BLER.   1. **Topic 2-2(319): FR2 test for high reliability in UE side**   **Issue 2-2-1: Whether to define URLLC high reliability requirements for FR2**   * Proposals   + Option 1: Yes (Intel, DoCoMo, Ericsson, Samsung)   + Option 2: No (Apple, Huawei, QC)   + Option 3: Yes with test applicability rule. * Recommended WF   + TBD   Huawei: we don’t see the usage cases.  QC: we already not define test cases for 1e-05.  Intel: We just want to verify FR2 Device PDSCH repetition, not related high reliability.  Ericsson: It’s not ultra-reliability, high reliability, It’s different use cases. We already agree to define test cases in BS side.  NTT DoCoMO: similar view as E///.  Apple: the purpose to verify slot aggregation with low BLER. Test metric 1% BLER on PDSCH.  Intel: Test metric, we can further discuss.  E///: regarding test metric, we prefer using 1% BLER similar as FR1.  Samsung: similar view as E///.  Agreement:  *Introduce test cases with PDSCCH repetition in FR2 with 1% BLER as test metric*  **Issue 2-2-2: Test applicability rule for FR2 (only if FR2 is defined)**   * Proposals   + Option 1: The performance requirements are only applicable for UE supporting FR2 operating bands. (Ericsson, Huawei, Intel)   + Option 2: * Recommended WF   + TBD   Agreement: Option 1.  **Issue 2-2-3: Test applicability rule for FR1 and FR2 if UE support both (only if FR2 is defined)**   * Proposals   + Option 1: UE should be tested only for FR1 if UE support both FR1 and FR2.   + Option 2: UE should be tested for both FR1 and FR2 if UE support FR1 and FR2 (DoCoMo, Intel) * Recommended WF   + TBD   Agreement: Option 2   1. **Topic 2(318): CQI test with ultra-low BLER**   **Issue 2-1: Is the CQI test feasible if a lower confidence level is used than for the BLER test ?**   * Option 1: We are OK to define the requirement with 95% confidence * Option 2: We are OK with 99% confidence * Option 3: Yes, with 99.999% confidence * Option 4: We do not see the requirement as feasible with any confidence level * Please explain why you indicate the confidence level you do (or not feasible); what test time do you expect ?   Agreements:  Work assumption: Introduce ultra-BLER static CQI test cases under the assumption that test time is similar as Fixed MCS test cases ; further discuss how to ensure reasonable test time with below possible options:  -Decrease confidence level (from 99.999% ~95%)  -Early pass/fail criteria  Note both options adopted not excluded.  Apple: Whether such low confidence level will be applied for Fixed MCS test cases?  E///: We have high probability that early pass/fail not actual matched with real UE performance.  Apple: How we can introduce CQI test case with low confidence level?  E///: If we define low confidence level, UE can early pass/fail with shorted test time. In Fixed MCS, NW have confidence; but for CQI, NW not always rely on UE reporting.  QC: If not verified, UE maybe choose very pessimistic way to report CQI with low TP.  Intel: We have similar concern for test time; early pass/fail for Fixed MCS may not feasible for CQI test cases.  Apple: We have to avoid long test time; we propose fading CQI test cases without BLER requirements. With this we can meet test purpose, with less test time. Using same confidence level, we think not feasible to introduce static CQI test cases.  QC: Test time calculation assumes no early pass/fail in Intel paper, in our analysis we conclude achievable test time with early pass/fail. We don’ think fading CQI test case not meet test purpose.  E///: We share similar view as QC. We are also fine with same confidence level if test time still workable.  Apple: Follow CQI/Fixed median CQI in fading test cases, also have BLER requirements 0.02; but we are not going with 1e-5 BLER.  Intel: In 1st round discussion, we consider with early pass/fail, test time still not achievable without confidence level changes.  Huawei: If you don’t increase BLER, test purpose still not verified under fading CQI test cases. We are fine to discuss the confidence level. |

**R4-2012646 WF on ultra-low BLER requirement**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012552 Email discussion summary for [96e][319] NR\_L1enh\_URLLC\_Demod\_Part2**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012735 (from R4-2012552).**

**R4-2012735 Email discussion summary for [96e][319] NR\_L1enh\_URLLC\_Demod\_Part2**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012648 Way forward on NR URLLC UE performance requirements**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012649 Way forward on NR URLLC BS performance requirements**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010994 Work plan for Physical layer enhancements for NR ultra-reliable and low latency communication**

*Type: Work Plan For: Approval  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011340 draftCR for 38.104: High reliability and low latency BS demod requirements**

*Type: draftCR For: Endorsement  
 38.104 v16.4.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

- Created two new subsections in PUSCH BS demod requirements: Higher reliability and lower latency

- Added Requirements for PUSCH with ultra-low BLER target (1e-5)

- Added Requirements for PUSCH for mapping Type B with low number of symbols

- Added corres

**Discussion:**

**Decision: Revised to R4-2012659 (from R4-2011340).**

**R4-2012659 draftCR for 38.104: High reliability and low latency BS demod requirements**

*Type: draftCR For: Endorsement  
 38.104 v16.4.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

- Created two new subsections in PUSCH BS demod requirements: Higher reliability and lower latency

- Added Requirements for PUSCH with ultra-low BLER target (1e-5)

- Added Requirements for PUSCH for mapping Type B with low number of symbols

- Added corres

**Discussion:**

**Decision: Endorsed.**

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

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

**R4-2010193 On UE demod and CSI requirements for Ultra low BLER**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

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

**R4-2010976 Discussion on URLLC UE demodulation requirements with ultra-low BLER**

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

**Discussion:**

**Decision: Noted.**

**R4-2010977 Simulation results on URLLC UE demodulation requireemnts with ultra-low BLER**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2010986 CR to TS38.101-4 Applicability rules for URLLC UE demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0070 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012651 (from R4-2010986).**

**R4-2012651 CR to TS38.101-4 Applicability rules for URLLC UE demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0070 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Not pursued.**

**R4-2011370 Simulation on UE URLLC performance requirements for Ultra low BLER**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper we provide simulation results for Ultra low BLER requirements

**Discussion:**

**Decision: Noted.**

**R4-2011435 LS on Test Methodology for UE URLLC Ultra Low BLER Tests**

*Type: LS out For: Approval  
 to RAN WG5  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Revised to R4-2012647 (from R4-2011435).**

**R4-2012647 LS on Test Methodology for UE URLLC Ultra Low BLER Tests**

*Type: LS out For: Approval  
 to RAN WG5  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Revised to R4-2012769 (from R4-2012647).**

**R4-2012769 LS on Test Methodology for UE URLLC Ultra Low BLER Tests**

*Type: LS out For: Approval  
 to RAN WG5  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Revised to R4-2012770 (from R4-2012769).**

**R4-2012770 LS on Test Methodology for UE URLLC Ultra Low BLER Tests**

*Type: LS out For: Approval  
 to RAN WG5  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Approved.**

**R4-2011443 Views on URLLC Ultra-low BLER Demodulation Test Cases**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009611 On UE demod and CSI requirements for Ultra low BLER**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2009722 Discussion on UE demodulation requirements for Ultra-low BLER**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010980 Discussion on CSI requireements with ultra low-BLER**

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

**Discussion:**

**Decision: Noted.**

**R4-2011444 Views on URLLC Ultra-low BLER CSI Reporting Test Cases**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009723 Discussion on CSI requirements for Ultra-low BLER**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010836 Draft CR to 38.141-2: Introduction of URLLC 0.001% BLER requirement**

*Type: draftCR For: Endorsement  
 38.141-2 v16.4.0  
 Source: Ericsson*

**Abstract:**

Draft CR introducing URLLC according to work split

**Discussion:**

**Decision: Revised to R4-2012660 (from R4-2010836).**

**R4-2012660 Draft CR to 38.141-2: Introduction of URLLC 0.001% BLER requirement**

*Type: draftCR For: Endorsement  
 38.141-2 v16.4.0  
 Source: Ericsson*

**Abstract:**

Draft CR introducing URLLC according to work split

**Discussion:**

**Decision: Not pursued.**

**R4-2010837 Draft CR to 38.141-1 on test methodology and FRCs for URLLC and test requirements for 0.001% BLER**

*Type: draftCR For: Endorsement  
 38.141-1 v16.4.0  
 Source: Ericsson*

**Abstract:**

Draft CR introducing URLLC according to work split

**Discussion:**

**Decision: Revised to R4-2012654 (from R4-2010837).**

**R4-2012654 Draft CR to 38.141-1 on test methodology and FRCs for URLLC and test requirements for 0.001% BLER**

*Type: draftCR For: Endorsement  
 38.141-1 v16.4.0  
 Source: Ericsson*

**Abstract:**

Draft CR introducing URLLC according to work split

**Discussion:**

**Decision: Endorsed.**

**R4-2010840 Ultra-low BLER remaining issues for FR1 and FR2**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion on applicability for FR1 and the need for FR2

**Discussion:**

**Decision: Noted.**

**R4-2010841 Simulation results for URLLC ultra-low BLER requirements**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Simulation results

**Discussion:**

**Decision: Noted.**

**R4-2010978 Discussion on URLLC BS demodulation requireemnts with ultra-low BLER**

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

**Discussion:**

**Decision: Noted.**

**R4-2010979 Simulation results on URLLC BS demodulation requirements with ultra-low BLER**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2010990 CR to TS38.141-1 Test applicability for URLLC BS demodulation requirements**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0147 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012661 (from R4-2010990).**

**R4-2012661 CR to TS38.141-1 Test applicability for URLLC BS demodulation requirements**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0147 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Endorsed.**

**R4-2009700 Views on NR BS performance for ultra-low BLER**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2009724 Discussion on BS requirements for Ultra-low BLER**

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

**Discussion:**

**Decision: Noted.**

**R4-2009856 On NR Rel-16 ultra low BLER BS demodulation requirements and simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our views on various open ultra-low BLER URLLC issues. In particular, FR2 requirements, SCS test applicability, and test tolerances. Additionally, the simulation results were included.

**Discussion:**

**Decision: Noted.**

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

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

**R4-2010194 On UE demod and CSI requirements with higher BLER**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

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

**R4-2010720 Discussion on eMBB UE performance requirement with pre-emption**

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

**Discussion:**

**Decision: Noted.**

**R4-2010981 Discussion on URLLC UE demodulation requirements with higher BLER**

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

**Discussion:**

**Decision: Noted.**

**R4-2010982 Simulation results on URLLC UE demodulation requirements with higher BLER**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2010987 CR to TS38.101-4 Performance requirements for URLLC PDSCH repetitions over multiple slots**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0071 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012650 (from R4-2010987).**

**R4-2012650 CR to TS38.101-4 Performance requirements for URLLC PDSCH repetitions over multiple slots**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0071 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Endorsed.**

**R4-2010993 Summary of simulation results of NR UE demod (FR1)**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011046 Views on URLLC requirements with higher BLER**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2011280 Summary of simulation results of NR UE demod with higher BLER (FR1)**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011371 Discussion and simulation on UE URLLC demodulation performance requirements with higher BLER**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper we provide simulation results and our views on high BLER URLLC feature testing

**Discussion:**

**Decision: Noted.**

**R4-2011403 Draft CR on FR1 PDSCH Mapping Type B and Processing Capability 2 Requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Revised to R4-2012652 (from R4-2011403).**

**R4-2012652 Draft CR on FR1 PDSCH Mapping Type B and Processing Capability 2 Requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Endorsed.**

**R4-2011445 Views on URLLC High BLER Demodulation Test Cases**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009612 On UE demod and CSI requirements with higher BLER**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2009725 Discussion on UE demodulation requirements for URLLC**

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

**Discussion:**

**Decision: Revised to R4-2012564 (from R4-2009725).**

**R4-2012564 Discussion on UE demodulation requirements for URLLC**

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

**Discussion:**

**Decision: Noted.**

###### 7.8.1.2.2 CSI requirements [NR\_L1enh\_URLLC-Perf]

**R4-2010985 CR to TS38.101-4 Applicability rules for URLLC CSI requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0069 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012653 (from R4-2010985).**

**R4-2012653 CR to TS38.101-4 Applicability rules for URLLC CSI requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0069 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Not pursued.**

**R4-2011372 Discussion and simulation on URLLC UE CQI reporting requirements for CQI table 3**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper we provide our views on CQI table 3 performance requirements

**Discussion:**

**Decision: Noted.**

**R4-2011446 Views on URLLC High BLER CSI Reporting Test Cases**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009726 Discussion on CSI requirements for URLLC**

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

**Discussion:**

**Decision: Noted.**

###### 7.8.1.2.3 BS demodulation requirements [NR\_L1enh\_URLLC-Perf]

**R4-2010282 Discussion and simulation results for BS URLLC requirement**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010838 Remaining FR1 issues and FR2 issues for URLLC demod**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion on TDD pattern for FR1 and FR2 parameters

**Discussion:**

**Decision: Noted.**

**R4-2010839 Simulation results for URLLC “high BLER” requirements**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Simulation results

**Discussion:**

**Decision: Noted.**

**R4-2010983 Discussion on URLLC BS demodulation requirements with higher BLER**

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

**Discussion:**

**Decision: Noted.**

**R4-2010984 Simulation results on BS demodulation reuqirements with higher BLER**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2010988 CR to TS38.104 Performance requirements for URLLC PUSCH repetition Type A**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0231 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012655 (from R4-2010988).**

**R4-2012655 CR to TS38.104 Performance requirements for URLLC PUSCH repetition Type A**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0231 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Endorsed.**

**R4-2010989 CR to TS38.141-1 Performance requirements for URLLC BS demodulation requirements with higher BLER**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0146 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012656 (from R4-2010989).**

**R4-2012656 CR to TS38.141-1 Performance requirements for URLLC BS demodulation requirements with higher BLER**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0146 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Endorsed.**

**R4-2010991 CR to TS38.141-2 FRC for URLLC BS performance requirements**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0217 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012657 (from R4-2010991).**

**R4-2012657 CR to TS38.141-2 FRC for URLLC BS performance requirements**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0217 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Endorsed.**

**R4-2010992 Summary of simulation results of NR BS demod (FR1)**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011279 Summary of simulation results of NR BS demod with higher BLER (FR1)**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011396 Draft CR for TS 38.141-2: Introduction of performance requirements of PUSCH repetition type A and PUSCH mapping type B for URLLC**

*Type: draftCR For: Endorsement  
 38.141-2 v16.4.0  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Revised to R4-2012658 (from R4-2011396).**

**R4-2012658 Draft CR for TS 38.141-2: Introduction of performance requirements of PUSCH repetition type A and PUSCH mapping type B for URLLC**

*Type: draftCR For: Endorsement  
 38.141-2 v16.4.0  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Not pursued.**

**R4-2009701 Views on NR BS performance for high-reliability and low-latency**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2009727 Discussion on BS demodulation requirements for URLLC**

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

**Discussion:**

**Decision: Noted.**

**R4-2009857 On NR Rel-16 high reliability and low latency BS demodulation requirements and simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our views on various open high reliability and low latency (e)URLLC issues. In particular, PUSCH aggregation factors, safety statements, and test applicability rules (esp. for FR2). Additionally, we have presented the

**Discussion:**

**Decision: Noted.**

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

#### 7.9.3 Demodulation and CSI requirements (38.101-4) [NR\_eMIMO-Perf]

##### 7.9.3.1 General [NR\_eMIMO-Perf]

**R4-2012553 Email discussion summary for [96e][320] NR\_eMIMO\_Demod**

*Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012736 (from R4-2012553).**

**R4-2012736 Email discussion summary for [96e][320] NR\_eMIMO\_Demod**

*Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012662 WF for general and PDSCH requirements with Single-DCI SDM scheme and Multi-DCI transmission schemes (eMBB)**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Noted.**

|  |
| --- |
| **Agreement: The contents in R4-2012662 agreed with one typo in slide 5 corrected as following:**   * **Timing offset among multi-panel/TRP (FR1 only)**   + **FR1 FDD with 15kHz**     - **Positive timing offset: 2us**     - **Negative timing offset: -0.5us**   + **FR1 TDD with 30kHz**     - **Positive timing offset: 1us**     - **Negative timing offset: -0.25us** |

**R4-2012663 WF for PDSCH requirements with Single-DCI based multi-TRP/Panel transmission schemes (URLLC)**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Noted.**

|  |
| --- |
| Agreements: The contents of R4-2012663 except slide 4 agreed with additional agreements as following:   * Define performance requirement for URLLC transmission schemes with test applicability rule * Option 1: Only FDM  scheme A and inter-slot TDM scheme as baseline * FDM scheme is skipped if UE passes the multi-DCI based multi-TRP Tx requirements and TDM scheme is skipped if UE passes URLLC slot aggregation requirements and anyone of the other multi-TRP Tx requirements * Other options are not precluded * Interest companies are encouraged to provide the simulation results for URLLC transmission schemes in the next meeting at least for baseline transmission schemes (FDM scheme A and inter-slot TDM scheme) considering the PDSCH configuration in page 6 and test metric in page 7. |

**R4-2012664 Simulation assumption for PDSCH requirements with Single-DCI SDM scheme and Multi-DCI transmission schemes**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012665 Way forward on PMI reporting requirement for NR eMIMO**

*Type: other For: Approval  
 Source: Qualcomm, Ericsson*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012761 (from R4-2012665).**

**R4-2012761 Way forward on PMI reporting requirement for NR eMIMO**

*Type: other For: Approval  
 Source: Qualcomm, Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2011421 Views on test cases for eMIMO**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

##### 7.9.3.2 Demodulation requirements [NR\_eMIMO-Perf]

**R4-2010068 Simulation results for PDSCH requirements with Multi-DCI**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010140 Test case design for PDSCH requirements with Multi-TRP/Panel transmission**

*Type: discussion For: Approval  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010195 On PDSCH demodulation requirements for Multi TRP**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

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

**R4-2010481 PDSCH requirements for Multi-DCI/Single-DCI based transmission**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the PDSCH demodulation requirements for multi-TRP transmission.

**Discussion:**

**Decision: Noted.**

**R4-2010719 Discussion on PDSCH performance requirements for multi-DCI based multi-TRP transmission**

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

**Discussion:**

**Decision: Noted.**

**R4-2011012 Discussion on open issues of PDSCH performance requirements of multi-TRP in eMIMO**

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

**Discussion:**

**Decision: Noted.**

**R4-2011366 Evaluations of Rel-16 Type II PMI testing**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

in this paper we evaluate the novel MU-MIMO test setup for Rel-16 Type II PMI reporting requirements

**Discussion:**

**Decision: Noted.**

**R4-2009613 On PDSCH demodulation requirements for Multi TRP**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2009738 Views on UE demodulation requirements for NR eMIMO**

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

**Discussion:**

**Decision: Noted.**

##### 7.9.3.3 CSI requirements [NR\_eMIMO-Perf]

**R4-2010141 Test case design for PMI requirements with Rel-16 Type II codebook**

*Type: discussion For: Approval  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010196 On PMI reporting requirements with eType II codebook**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

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

**R4-2010805 Discussion on SP Type II PMI reporting requirements**

*Type: discussion For: Approval  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Noted.**

**R4-2011013 Discussion on test setup and parameter configuration for enhanced Type II codebook PMI reporting test**

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

**Discussion:**

**Decision: Noted.**

**R4-2009614 On PMI reporting requirements with eType II codebook**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2009858 On PMI reporting test case for eType II codebooks**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we discuss the technical reasons why only Option 2 can guarantee the PMI reporting requirements for eType II.

**Discussion:**

**Decision: Noted.**

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

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

**R4-2012554 Email discussion summary for [96e][321] NR\_DL256QAM\_FR2\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecomm)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012737 (from R4-2012554).**

**R4-2012737 Email discussion summary for [96e][321] NR\_DL256QAM\_FR2\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecomm)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012666 WF on UE demodulation and CSI reporting requirements for FR2 DL 256QAM**

*Type: other For: Approval  
 Source: China Telecomm*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012667 Updated work plan for FR2 DL 256QAM demodulation and CSI reporting requirements**

*Type: Work plan For: Approval  
 Source: China Telecomm*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2009584 UE demodulation and CSI reporting requirements for FR2 DL 256QAM**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Discussion:**

**Decision: Noted.**

##### 7.10.3.1 UE Demodulation requirements [NR\_DL256QAM\_FR2-Perf]

**R4-2010996 Discussion on PDSCH requirements for NR DL 256QAM for FR2**

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

**Discussion:**

**Decision: Noted.**

**R4-2011041 Views on 256QAM UE requirements for FR2**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2011374 UE demodulation requirements for FR2 DL 256QAM**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper we provide our views on FR2 256QAM UE demodulation requirements

**Discussion:**

**Decision: Noted.**

**R4-2011424 Views on FR2 DL 256QAM UE Demodulation Tests**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009728 Discussion on UE demodulation requirements for FR2 DL 256QAM**

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

**Discussion:**

**Decision: Noted.**

##### 7.10.3.2 SDR requirements [NR\_DL256QAM\_FR2-Perf]

**R4-2010997 Discussion on SDR requirements for NR DL 256QAM for FR2**

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

**Discussion:**

**Decision: Noted.**

**R4-2011042 Views on 256QAM SDR requirements for FR2**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2011425 Views on FR2 DL 256QAM SDR Tests**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009729 Discussion on SDR requirements for FR2 DL 256QAM**

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

**Discussion:**

**Decision: Noted.**

##### 7.10.3.3 CSI requirements [NR\_DL256QAM\_FR2-Perf]

**R4-2010998 Discussion on CQI reporting requirements for NR DL 256QAM for FR2**

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

**Discussion:**

**Decision: Noted.**

**R4-2011433 Views on FR2 DL 256QAM CSI Reporting Tests**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

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

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

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

**R4-2012555 Email discussion summary for [96e][322] NR\_HST\_Demod\_UE**

*Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012738 (from R4-2012555).**

**R4-2012738 Email discussion summary for [96e][322] NR\_HST\_Demod\_UE**

*Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

|  |
| --- |
| **GTW session Aug 25th**  **Issue 1-8: Whether to introduce test cases for DPS transmission scheme 1b**  If option1 is agreed, the applicability rule can be further discussed.  Option 1: Define performance requirements for DPS transmission scheme 1b with applicability rules   * Option 1a: with 2 active TCI states. * Option 1b: with 2 and more than 2 active TCI states.   Option 2: Do not introduce test case for DPS transmission scheme 1b  Agreement:  Introduce DPS transmission scheme 1b test cases with test applicable rules which can be further discussed among below options  Option 1:   * If UE declared supporting > 1 TCI states, UE will pass scheme 1b and skipped HST single tap test cases and scheme 1a test cases * If UE only support 1TCI state, UE need to pass both scheme 1a and HST single tap test cases and skip scheme 1b test cases   Option 2: If UE pass HST-SFN test cases, then UE can skip HST-DPS scheme 1a/1b  We didn’t any additional benefits compared existing RRM TCI state and HST single Taps demod test cases.  Apple: We share similar view as QC.  Intel: Transmission scheme 1b brings benefits compared to scheme 1a; also fading channel model not verified in RRM TCI state cases. No much additional work effort compared to agreed test 1a. Also following the comments from QC commented in power saving test cases, we should focus on realistic scenario.  Huawei: similar view as Intel. It’s to verify UE receiver performance not only functionality.  CMCC: Similar view as Intel, we can introduce test applicable rule among scheme 1a and 1b.  Apple: What’s the channel model between 1a and 1b? If same, only difference is UE tracking two TCI states with fast switch delay.  QC: We agree 1b have more benefits compared 1a; but no new UE behaviour verified. We have similar behaviour as single Tap test cases from demodulation aspect.  Intel: It’s up to UE implementation, we still see difference. We can apply test applicable rules among scheme 1a/1b and single tap test cases.  Huawei: We have different understanding on UE behaviour, we have specific UE feature for TCI state supporting.  **Issue 1-9: Test applicable rule among 1a/[1b] with HST-SFN requirements**  Whether to have applicability rule between HST-SFN and DPS.   * Option 1: Do not introduce applicability rule between DPS and HST-SFN requirement * Option 2: UE can skip HST-DPS test if UE can pass HST-SFN test   Whether to have applicability rule between DPS transmission scheme 1a and 1b assuming that transmission scheme 1b is introduced.   * Option 1: Applicability rule between 1a and 1b can be considered. * Option 2: If UE passed HST DPS requirements with more than 1 active TCI state it does not need to be tested in HST-DPS with smaller number of active TCI states.   Recommended WF  Continue to discuss in 2nd round whether to have applicability rule between HST-SFN and DPS.  Continue to discuss in 2nd round whether to have applicability rule between DPS transmission scheme 1a and 1b assuming that transmission scheme 1b is introduced.  Introduce Test cases for both test 1a and test 1b with 2 TCI state only  Pending on UE capability, if UE pass test 1b, then no need to test 1a  FFS whether test applicable rule will be applied among HST-SFN and HST-DPS schemes Test 1a/test 1b  RAN4 can further discuss whether test cases for HST-DPS schemes with larger than 2 TCI states needed or not in further release i.e. Rel-17 HST WI. |

**R4-2012668 WF on NR HST UE demodulation requirements**

*Type: other For: Approval  
 Source: CMCC*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010079 Further discussion on UE demodulation for NR HST**

*Type: discussion For: Approval  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2011044 Views on HST applicability rules**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

###### 7.15.3.1.1 Scenarios and transmission schemes [NR\_HST-Perf]

**R4-2010479 PDSCH demodulation requirements for HST-DPS**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the test setup of the PDSCH demodulation requirements for HST-DPS.

**Discussion:**

**Decision: Noted.**

**R4-2010911 CR to TS 38.101-4: Propagation conditions for HST scenarios**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0068 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Revised to R4-2012674 (from R4-2010911).**

**R4-2012674 CR to TS 38.101-4: Propagation conditions for HST scenarios**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0068 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Endorsed.**

**R4-2011003 Discussion on UE performance requirements for DPS transmission scheme**

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

**Discussion:**

**Decision: Noted.**

**R4-2011005 Summary of ideal and impairment results for NR HST demodulation requirements**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011006 CR on applicability rules for HST scenarios**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0073 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012675 (from R4-2011006).**

**R4-2012675 CR on applicability rules for HST scenarios**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0073 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Endorsed.**

**R4-2011434 Views on Tests for High Speed Train Scenarios**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009734 Views on NR UE demodulation requirements for DPS transmission scheme**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010069 Updated simulation results for HST-SFN**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010076 CR on HST-SFN requirements for TDD**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0062 Cat: B (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Revised to R4-2012669 (from R4-2010076).**

**R4-2012669 CR on HST-SFN requirements for TDD**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0062 Cat: B (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Endorsed.**

**R4-2010278 Simulation results for NR HST UE demodulation**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010910 CR to TS 38.101-4: HST-SFN FDD performance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0067 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Revised to R4-2012670 (from R4-2010910).**

**R4-2012670 CR to TS 38.101-4: HST-SFN FDD performance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0067 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Endorsed.**

**R4-2010999 Simulation results on NR UE HST performance requirements for SFN**

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

**Discussion:**

**Decision: Noted.**

**R4-2009735 Simulation results for HST-SFN**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010070 Updated simulation results for HST single tap**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2011000 Simulation results on NR UE HST performance requirements for single-tap**

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

**Discussion:**

**Decision: Noted.**

**R4-2011001 CR on HST single-tap and HST multi-path fading requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0072 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012671 (from R4-2011001).**

**R4-2012671 CR on HST single-tap and HST multi-path fading requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0072 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Endorsed.**

**R4-2011368 Simulation results for NR UE HST Single tap**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper we provide HST single tap simulation results

**Discussion:**

**Decision: Noted.**

**R4-2011369 Addition of Rel-16 HST FRCs**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0076 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In this paper we provide CR for agreement which was endorsed in RAN4#95-e

**Discussion:**

**Decision: Revised to R4-2012672 (from R4-2011369).**

**R4-2012672 Addition of Rel-16 HST FRCs**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0076 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In this paper we provide CR for agreement which was endorsed in RAN4#95-e

**Discussion:**

**Decision: Endorsed.**

**R4-2011419 Draft CR on FDD HST Single-Tap and Multipath Fading Requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Revised to R4-2012673 (from R4-2011419).**

**R4-2012673 Draft CR on FDD HST Single-Tap and Multipath Fading Requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Endorsed.**

**R4-2009736 Simulation results for HST Single Tap**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010071 Simulation results for multi-path fading channel**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2011002 Simulation results on NR UE HST performance requirements for multi-path fading channel**

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

**Discussion:**

**Decision: Noted.**

**R4-2009737 Simulation results for HST multi-path fading**

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

**Discussion:**

**Decision: Noted.**

###### 7.15.3.1.5 Network assistance and UE capability signalling [NR\_HST-Perf]

**R4-2010480 Release independence and applicability rule for NR HST demodulation requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the release independence requirements applicable for NR HST.

**Discussion:**

**Decision: Noted.**

**R4-2011004 Discussion on feature lists and applicability for different scenarios**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2012556 Email discussion summary for [96e][323] NR\_HST\_Demod\_BS**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012739 (from R4-2012556).**

**R4-2012739 Email discussion summary for [96e][323] NR\_HST\_Demod\_BS**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

|  |
| --- |
| **GTW session Aug 25th**  **Issue 1-2-3: Specification of multi-path fading channel under high Doppler**   * Option 1: Do not specify requirements for multi-path fading channel models with high Doppler values. * Option 4: If agreed to introduce PUSCH requirement with multi-path fading under high Doppler value, focus on the requirements with CP-OFDM waveform with test configuration − Doppler: 15 KHz for 600Hz, and 30KHz for 1200Hz − DMRS with 1+1+1 configuration − MCS 2. * Option 5a: If agreed to introduce PUSCH requirement with multi-path fading under high Doppler value, focus on the requirements with CP-OFDM waveform with test configuration • Scenario: HST open area • MCS: 2  • Waveform: CP-OFDM • Antenna configuration: 1Tx2Rx • Bandwidth: 5MHz for 15kHz SCS, 10MHz for 30kHz SCS • Doppler shift: 600Hz for 15kHz SCS, 1200Hz for 30kHz SCS * Option 6: For PUSCH requirements for HST multi-path fading channel under high Doppler, define limited cases that the same configuration as UE side, i.e. only MCS 13, 2T2R, rank 1 and the maximum Doppler shift of 600Hz and 1200Hz for 15kHz SCS and 30kHz SCS, respectively. * Option 7: Introduce PUSCH requirements for HST multi-path fading channel under high Doppler, with configuration - TDLC300-600 FO=0Hz (15kHz), TDLC300-1200 FO=0Hz (30kHz) - Scenario: HST open area - MCS: 2 - Waveform: CP-OFDM - DM-RS: 1+1+1 - Antenna: 1T2R - Bandwidth: 5MHz for 15kHz SCS, 10MHz for 30kHz SCS   *Recommendations for 2nd round:*   * Please evaluate the compromise proposal by the moderator (option 7).  Candidate for online discussion.   Agreement:  Agree option 7 with remove “- Scenario: HST open area”.  **Issue 1-2-1: Multi-path fading scenarios under consideration**   * Option 2: The following models are under consideration: * TDLC300-600 FO=0Hz TDLC300-1200 FO=0Hz * Option 3: An arbitrary Doppler spread is not an appropriate and the Doppler shift part, which is a separate value with respect to scenarios, requires further study.   *Recommendations for 2nd round:*   * Compromise to option 2 seems feasible. Please discuss in second round. Candidate for online discussion.   **Agreement: Option2**  **Issue 2-1-1: TDLC300-100 propagation conditions for long preamble formats**   * Option 1: Introduce TDLC300-100 FO=400Hz for PRACH restricted set type A and B. * Option 2: Do not introduce TDLC300-100 fading channel with frequency offset of 400Hz requirements for long preamble formats for HST requirements. * Option 3: Introduce this test case under non-HST section * Option 4: Align with PUSCH HST multi-path channel model for PRACH restricted set type A and B.   + - TDLC300-100 FO=0Hz   *Recommendations for 2nd round:*   * Continue discussion in 2nd round. Candidate for online discussion.   Agreement:  ZTE: The performance among restricted and non-restricted, we need to align PUSCH and PRACH. We prefer op2.  E///: It’s already verified in normal mode with unrestricted set. Restricted only applied for HST scenario. Short format only specified in normal mode. It’s better to include normal mode section.  Samsung: Two issues, issue 1 BS receiver processing: AWGN already there, in LTE we already similar test cases; we need to ensure test coverage. Prefer option1  Huawei: TDLC -300-100 FO not proper channel for HST. With HST, speed up to 350km/h~ 500km/h; 400Hz not proper value under HST. We also didn’t see much performance difference.  Nokia: We don’t think placed under non-HST section as it’s applied with restricted set which only applied to HST mode.  Gain pending Preamble selection, 0.5dB gain we observed.  NTT DoCoMo: we observed 1.6 dB performance differences as maximum, not marginable. Test coverage issue still exist.  ZTE: The proper modelling need to further discussed.  Samsung: Detection algorithm under restricted set still has difference; frequency offset still need to be there.  400Hz for PRACH designed for specific purpose assuming CFO error.  ZTE: There is no proper modelling with multi-path fading channel + frequency offset.  Go with option1, the actual meaning of such test cases?  Samsung: In case of multi-path model we only Doppler spread; in case HST we consider frequency offset/Doppler shift.  Agreements:  Introduce TDLC300-100 FO= 0Hz for PRACH with restricted set type A and B.  In Rel-16, no additional test cases for PRACH besides what we already agreed test case.  The test cases applied for BS if BS declared supporting corresponding restricted set A/B.  **Issue 3-1-1: Addition of scenario “X”**   * Option 1: Specify requirements for scenario X (“120km/h”) in NR\_HST-Perf as HST requirement. * Option 3: Do not specify requirements for scenario X (“120km/h”) in NR\_HST-Perf. * Option 4: If scenario X requirements has to be discussed together with Rel-16 HST requirements, adding it in non-HST sections/tables to avoid misleading. * Option 5: Discuss in plenary meeting to include scenario X in a different WI.   *Recommendations for 2nd round:*   * Continue the discussion in 2nd round. * Option 4 seems like a potentially agreeable compromise to introduce scenario X in Rel-16. Please consider compromising.   Agreement:  RAN4 agree to introduce scenario X requirements under rel-16 HST WI, adding it in non-HST sections/tables to avoid misleading.   * If BS pass Y/Z, then X can be skipped |

**R4-2012676 WF on NR HST BS demodulation requirements**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Approved.**

|  |
| --- |
| * Specification drafting of multi-path fading requirements   + Introduce multi-path fading channel requirements with high Doppler value in a separate table under section “8.2.4 Requirements for PUSCH for high speed train”   + This requirement only applicable for wide-area, medium-range BS which supporting HST |

**R4-2010080 Discussion on BS demodulation for NR HST**

*Type: discussion For: Approval  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2009782 Summary of ideal and impairment results for NR HST demodulation requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Revised to R4-2012749 (from R4-2009782).**

**R4-2012749 Summary of ideal and impairment results for NR HST demodulation requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

###### 7.15.3.2.1 PUSCH requirements [NR\_HST-Perf]

**R4-2010280 Discussion and simulation results for NR HST PUSCH**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010607 Discussion on HST PUSCH remain issues**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Open issue discussion on HST PUSCH

**Discussion:**

**Decision: Noted.**

**R4-2010608 simulation results for NR PUSCH HST**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

simulation results for additional BW for HST PUSCH

**Discussion:**

**Decision: Noted.**

**R4-2010612 draft CR for TS38141-2 additional BW test cases for HST PUSCH**

*Type: draftCR For: Endorsement  
 38.141-2 v16.4.0  
 Source: Ericsson*

**Abstract:**

draft CR for introducing additional BW requirements for HST PUSCH in TS38.141-2

**Discussion:**

**Decision: Revised to R4-2012681 (from R4-2010612).**

**R4-2012681 draft CR for TS38141-2 additional BW test cases for HST PUSCH**

*Type: draftCR For: Endorsement  
 38.141-2 v16.4.0  
 Source: Ericsson*

**Abstract:**

draft CR for introducing additional BW requirements for HST PUSCH in TS38.141-2

**Discussion:**

**Decision: Endorsed.**

**R4-2010786 Further discussion on NR HST BS demodulation performance**

*Type: discussion For: Discussion  
 Source: ZTE Wistron Telecom AB*

**Discussion:**

**Decision: Noted.**

**R4-2010787 Additional simulation results for NR HST BS demodulation performance**

*Type: discussion For: Information  
 Source: ZTE Wistron Telecom AB*

**Discussion:**

**Decision: Noted.**

**R4-2011007 Discussion on the NR HST PUSCH performance requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011397 Simulation results on the NR HST PUSCH performance requirements**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2009695 Views on NR PUSCH for high speed**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2009696 CR for TS 38.141-1: Updates of NR PUSCH performance requirements for HST**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0141 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Revised to R4-2012677 (from R4-2009696).**

**R4-2012677 CR for TS 38.141-1: Updates of NR PUSCH performance requirements for HST**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0141 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Agreed.**

**R4-2009697 CR for TS 38.141-1: Updates of NR PUSCH performance Annex including FRC and channel model for HST**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0142 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Revised to R4-2012678 (from R4-2009697).**

**R4-2012678 CR for TS 38.141-1: Updates of NR PUSCH performance Annex including FRC and channel model for HST**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0142 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Agreed.**

**R4-2009787 CR for 38.141-2: add maximum test system uncertainty for NR HST PUSCH with single port and AWGN**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0205 Cat: F (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Agreed.**

**R4-2009788 CR for 38.141-1: add maximum test system uncertainty for NR HST PUSCH with single port and AWGN**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0143 Cat: F (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Agreed.**

**R4-2009835 Discussion on remaining issues of NR HST PUSCH**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009851 On NR Rel-16 HST BS demodulation PUSCH requirements and simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our views on various open PUSCH HST issues. In particular, MCS configuration of 1T1R requirements for the tunnel scenario, dft-s-OFDM requirement introduction, multi-path fading channel under high Doppler values. Addi

**Discussion:**

**Decision: Noted.**

**R4-2009852 CR for 38.104: HST PUSCH demodulation requirements**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0218 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Additional tables to capture performance requirements for new HST PUSCH CBWs.

Amendment of older HST PUSCH tables to capture 1T1R requirements.

**Discussion:**

**Decision: Revised to R4-2012679 (from R4-2009852).**

**R4-2012679 CR for 38.104: HST PUSCH demodulation requirements**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0218 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Additional tables to capture performance requirements for new HST PUSCH CBWs.

Amendment of older HST PUSCH tables to capture 1T1R requirements.

**Discussion:**

**Decision: Agreed.**

**R4-2009853 CR for 38.104: HST PUSCH demodulation FRC and channel model annexes**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0219 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Additional colums in FRC tables of MCS2 and MC16 to capture new HST PUSCH CBWs.

**Discussion:**

**Decision: Revised to R4-2012680 (from R4-2009853).**

**R4-2012680 CR for 38.104: HST PUSCH demodulation FRC and channel model annexes**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0219 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Additional colums in FRC tables of MCS2 and MC16 to capture new HST PUSCH CBWs.

**Discussion:**

**Decision: Agreed.**

###### 7.15.3.2.2 PRACH requirements [NR\_HST-Perf]

**R4-2010611 Discussion on HST PRACH remain issues**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Open issue discussion on HST PRACH

**Discussion:**

**Decision: Noted.**

**R4-2011017 CR for 38.141-1 Introduction of measurement of performance requirements for NR HST PRACH**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0148 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012684 (from R4-2011017).**

**R4-2012684 CR for 38.141-1 Introduction of measurement of performance requirements for NR HST PRACH**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0148 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011018 CR for 38.141-2 Introduction of measurement of performance requirements for NR HST PRACH**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0218 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012685 (from R4-2011018).**

**R4-2012685 CR for 38.141-2 Introduction of measurement of performance requirements for NR HST PRACH**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0218 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011019 Discussion on open issues of NR HST PRACH**

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

**Discussion:**

**Decision: Noted.**

**R4-2009698 Views on NR PRACH for high speed**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2009836 Discussion on remaining issues of NR HST PRACH**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009837 CR for TS 38.141-1, Introduction of high speed support declaration for NR HST PRACH**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0144 Cat: B (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Revised to R4-2012682 (from R4-2009837).**

**R4-2012682 CR for TS 38.141-1, Introduction of high speed support declaration for NR HST PRACH**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0144 Cat: B (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Agreed.**

**R4-2009838 CR for TS 38.141-2, Introduction of high speed support declaration for NR HST PRACH**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0206 Cat: B (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Revised to R4-2012683 (from R4-2009838).**

**R4-2012683 CR for TS 38.141-2, Introduction of high speed support declaration for NR HST PRACH**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0206 Cat: B (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Agreed.**

**R4-2009854 On NR Rel-16 HST BS demodulation PRACH requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our views on various open PRACH HST issues. In particular, TDLC300-100, manufacturer declarations, and test applicability for short PRACH.

**Discussion:**

**Decision: Noted.**

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

**R4-2010279 Discussion and simulation results for NR HST UL timing adjustment**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010281 CR on UL timing adjustment conducted performance requirement for TS 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0145 Cat: B (Rel-16)  
  
 Source: Samsung*

**Discussion:**

**Decision: Revised to R4-2012686 (from R4-2010281).**

**R4-2012686 CR on UL timing adjustment conducted performance requirement for TS 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v16.4.0 CR-0145 Cat: B (Rel-16)  
  
 Source: Samsung*

**Discussion:**

**Decision: Agreed.**

**R4-2010609 Discussion on HST UL TA remain issues**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Open issue discussion on HST UL TA

**Discussion:**

**Decision: Noted.**

**R4-2010610 simulation results for NR PUSCH UL TA HST**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

simulation results for additional BW for HST UL TA

**Discussion:**

**Decision: Noted.**

**R4-2010781 CR for 38.104: Performance requirements for UL timing adjustment**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0228 Cat: F (Rel-16)  
  
 Source: ZTE Wistron Telecom AB*

**Discussion:**

**Decision: Agreed.**

**R4-2011008 Discussion on the UL timing adjustment**

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

**Discussion:**

**Decision: Noted.**

**R4-2011398 Simulation results on the UL timing adjustment**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2009699 Views on NR PUSCH for UL timing adjustment**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2009783 Simulation results for NR PUSCH UL timing adjustment demodulation requirement**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009784 Discussion on the remaining issues of NR HST PUSCH UL TA**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009785 CR for 38.141-2: Introduction of NR PUSCH UL timing adjustment performance requirement for scenario Z**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0203 Cat: B (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Agreed.**

**R4-2009786 CR for 38.141-2: appendix for NR PUSCH UL timing adjustment for scenario Z**

*Type: CR For: Agreement  
 38.141-2 v16.4.0 CR-0204 Cat: B (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Withdrawn.**

**R4-2009855 On NR Rel-16 HST BS demodulation UL timing adjustment requirements and simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our views on various open UL TA HST issues. In particular, the addition of scenario X and corresponding additional manufacturer declarations, as well as, the specification organization. Additionally, the simulation re

**Discussion:**

**Decision: Noted.**

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

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

**R4-2012557 Email discussion summary for [96e][324] NR\_perf\_enh\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecomm)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012740 (from R4-2012557).**

**R4-2012740 Email discussion summary for [96e][324] NR\_perf\_enh\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecomm)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

|  |
| --- |
| * **CA normal PDSCH issue 2-1:** Pcell configuration for TDD 15 kHz + TDD 30 kHz CA test   + Option 1: 15 kHz SCS cell as Pcell (CTC, CMCC, Intel, DCM)   + Option 2: 30 kHz SCS cell as Pcell (HW, QC, Intel)   Agreements: Option 1  Huawei: op2 more typical case, no performance difference; we already comprise a lot.  QC: Similar view Huawei  Intel: From requirements, we still need to cover both cases with applicable rules. Slightly prefer option 2.  CMCC: Pcell can be adjusted based on deployment scenarios. 15kHz Pcell can be used in LTE refarming band with better coverage. We prefer to cover such scenario.  China Telecomm: we already have applicable rules. In our network, current no such deployment.  Huawei/QC: We have concern on such demand from operators; we hope companies also consider comprise somewhere.   * **Power imbalance issue 4-2-4:** SCS for TDD EN-DC power imbalance   + Option 1: 30kHz (CMCC, DCM, E///, HW, QC)   + Option 2: 15kHz and 30kHz (Intel, CMCC, DCM)   Agreement: option 1  Intel: if with option 1, we worry about the test applicable rule and coverage issue.   * **Power imbalance issue 4-2-6:** Test applicability and special inter-band EN-DC   + Option 1 (HW, DCM, SoftBank, CMCC, E///)     - UE supports only intra-band contiguous EN-DC, i,e., if UE does not indicate “intraBandENDC-Support”,       * power imbalance requirement for intra-band contiguous EN-DC is applied     - UE supports only intra-band non-contiguous EN-DC, i.e., if UE indicates “non-contiguous” in “intraBandENDC-Support” or UE does not indicate “interBandContiguousMRDC”,       * power imbalance requirement for intra-band non-contiguous EN-DC is applied     - UE supports both intra-band contiguous and non-contiguous EN-DC, i.e., if UE indicates “both” in “intraBandENDC-Support” or UE indicates “interBandContiguousMRDC”,       * power imbalance requirement for FR1 intra-band contiguous EN-DC   + Option 2 (Intel, CMCC, HW)     - UE supports only intra-band contiguous EN-DC, i,e., if UE does not indicate “intraBandENDC-Support”,       * power imbalance requirement for intra-band contiguous EN-DC is applied     - UE supports only intra-band non-contiguous EN-DC, i.e., if UE indicates “non-contiguous” in “intraBandENDC-Support”       * power imbalance requirement for intra-band non-contiguous EN-DC is applied     - UE supports both intra-band contiguous and non-contiguous EN-DC, i.e., if UE indicates “both” in “intraBandENDC-Support”       * power imbalance requirement for FR1 intra-band contiguous EN-DC   + Discussion point: Is it common understanding RAN4 agreed that some inter-band EN-DC combinations like B42-n77 are treated as "intra-band EN-DC"? If yes, is it feasible to go with option 1 of test applicability?   Intel: we would like to check whether any impact on RF aspect with option 1.  NTT DoCoMO: such Inter-band EN-DC combos actually as intra-band EN-DC. RAN4 should apply same applicable rules.  SoftBank: In RF specification 38.101-1 already clear indicated such band combos applied intra-band EN-DC requirements.  Intel: In RF spec , which assumption applicable for such requirements. There is no discussion for this case.  E///: which part you refer to ? Section 5.5 in TS 38.101-3 or RX image requirements section?  Intel: I’m not mentioned current spec, what’s the assumption we can use for the requirements i.e. whether previous assumption agreed in RF session for intra-band EN-DC power imbalance requirements can be re-used for this case?   * Agreement: Companies are encouraged to further check this scenario in RF agenda in next meeting, with the confirmation in RF part, we can introduce requirements for such case (option 1). |

**R4-2012687 Way forward on release independent aspect for UE demodulation and CSI reporting requirements**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012688 Way forward on PDSCH CA normal demodulation requirements**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012689 Way forward on PMI reporting requirements for Tx ports larger than 8 and up to 32**

*Type: other For: Approval  
 Source: Ericsson, Samsung*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012762 (from R4-2012689).**

**R4-2012762 Way forward on PMI reporting requirements for Tx ports larger than 8 and up to 32**

*Type: other For: Approval  
 Source: Ericsson, Samsung*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012690 Simulation assumptions for NR PMI reporting requirements for more than 8 Tx ports**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012765 (from R4-2012690).**

**R4-2012765 Simulation assumptions for NR PMI reporting requirements for more than 8 Tx ports**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012691 Way forward on UE power imbalance requirements for FR1 CA and EN-DC**

*Type: other For: Approval  
 Source: NTT DoCoMo*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012692 Way forward on CA CQI reporting requirements**

*Type: other For: Approval  
 Source: China Telecomm*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010482 Release independent requirements for Rel-16 performance requirement enhancement**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the release independence and applicability of UE performance requirements defined in Rel-16 Performance enhancement WI.

**Discussion:**

**Decision: Noted.**

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

**R4-2010103 draftCR: Introduction of NR PDSCH FR1 CA 2Rx performance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0063 Cat: B (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010106 Test applicability rule for NR CA PDSCH normal demodulation**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010175 draftCR: Introduction of NR PDSCH FR1 CA 2Rx performance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0064 Cat: B (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010182 draftCR: Introduction of NR PDSCH FR1 CA 2Rx performance requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: CMCC*

**Discussion:**

**Decision: Revised to R4-2012693 (from R4-2010182).**

**R4-2012693 draftCR: Introduction of NR PDSCH FR1 CA 2Rx performance requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: CMCC*

**Discussion:**

**Decision: Endorsed.**

**R4-2011010 Discussion on PDSCH CA normal demodulation requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011011 draftCR for NR FR1 PDSCH CA normal demodulation requirements with 4Rx**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012694 (from R4-2011011).**

**R4-2012694 draftCR for NR FR1 PDSCH CA normal demodulation requirements with 4Rx**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Endorsed.**

**R4-2011043 Views on CA PDSCH requirements**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2011413 Draft CR on FR2 PDSCH CA Requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Revised to R4-2012695 (from R4-2011413).**

**R4-2012695 Draft CR on FR2 PDSCH CA Requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Endorsed.**

**R4-2011436 Views on NR CA PDSCH Demodulation Performance Tests**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009579 On NR CA PDSCH normal demodulation requirements**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Discussion:**

**Decision: Noted.**

**R4-2009730 Discussion on NR CA UE demodulation requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2009731 Draft CR on FRC for Normal NR CA demodulation requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Intel Corporation*

**Discussion:**

**Decision: Revised to R4-2012696 (from R4-2009731).**

**R4-2012696 Draft CR on FRC for Normal NR CA demodulation requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: Intel Corporation*

**Discussion:**

**Decision: Endorsed.**

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

**R4-2010104 Simulation results of NR UE PMI with 16, and 32Tx antennas**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010142 Views and simulation results for PMI test cases**

*Type: discussion For: Approval  
 Source: Samsung*

**Discussion:**

**Decision: Revised to R4-2012565 (from R4-2010142).**

**R4-2012565 Views and simulation results for PMI test cases**

*Type: discussion For: Approval  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010192 On PMI reporting requirements with larger number of TX ports**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

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

**R4-2011014 CR: Applicability for NR PMI requirements with Tx ports larger than 8 and up to 32**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0074 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011015 Simulaiton results for Type I codebook PMI reporting test**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011016 Discussion on Type II codebook based PMI reporting test**

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

**Discussion:**

**Decision: Noted.**

**R4-2011365 Evaluations of Rel-15 Type II PMI testing**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper we evaluate the novel MU-MIMO test setup for Rel-15 Type II PMI reporting requirements

**Discussion:**

**Decision: Noted.**

**R4-2011367 Addition of Rel-16 SP Type I PMI tests, FRCs, and spatial correlation matrices**

*Type: CR For: Agreement  
 38.101-4 v16.1.0 CR-0075 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

In this CR we provide a combination of 3 endorsed CRs from RAN4#95-e

**Discussion:**

**Decision: Agreed.**

**R4-2011437 Parameters and simulation results on PMI reporting requirements with larger number of Tx ports**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009580 On PMI reporting requirements for larger Tx ports**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Discussion:**

**Decision: Noted.**

**R4-2009581 Simulation results for 16 Tx sub-band PMI reporting requirements**

*Type: discussion For: Information  
 Source: China Telecom*

**Discussion:**

**Decision: Noted.**

**R4-2009610 On PMI reporting requirements with larger number of TX ports**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2009732 Simulation results for PMI Type I**

*Type: other For: Information  
 Source: Intel Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2012562 Summary of simulation results of NR UE CSI PMI with 16, and 32Tx antennas**

*Type: other             For: Information  
                                        Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Noted.**

##### 7.16.1.3 LTE-NR co-existence for TDD [NR\_perf\_enh-Perf]

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

**R4-2010102 Discussion on FR1 CA and EN-DC power imbalance requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2011025 Discusson on UE power imbalance performance requirements for FR1 CA and EN-DC**

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

**Discussion:**

**Decision: Noted.**

**R4-2011040 draft CR: FR1 CA and EN-DC power imbalance requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Revised to R4-2012697 (from R4-2011040).**

**R4-2012697 draft CR: FR1 CA and EN-DC power imbalance requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.1.0  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Endorsed.**

**R4-2011045 Views on FR1 power imbalance requirements**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2011438 Views on Power Imbalance Tests**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009582 On power imbalance requirements for FR1 CA and EN-DC**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Discussion:**

**Decision: Noted.**

**R4-2009733 Discussion on FR1 CA and EN-DC power imbalance requirements**

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

**Discussion:**

**Decision: Noted.**

##### 7.16.1.5 NR CA CQI reporting requirements [NR\_perf\_enh-Perf]

**R4-2010483 Setup for CA CQI reporting requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the test setup and test points for CA CQI reporting requirements.

**Discussion:**

**Decision: Noted.**

**R4-2011026 Discusson on CA CQI reporting requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011395 Views on CA CQI Reporting Tests**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009583 On NR CA CQI reporting requirements**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Discussion:**

**Decision: Noted.**

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

##### 7.16.2.1 30% TP test point [NR\_perf\_enh-Perf]

##### 7.16.2.2 Additional FR2 requirements [NR\_perf\_enh-Perf]

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

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

**R4-2012558 Email discussion summary for [96e][311] OTA\_BS\_testing**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012741 (from R4-2012558).**

**R4-2012741 Email discussion summary for [96e][311] OTA\_BS\_testing**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012764 (from R4-2012741).**

**R4-2012764 Email discussion summary for [96e][311] OTA\_BS\_testing**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2011257 CR to TR 37.941: editorial cleanup, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0007 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Cleanup corrections of the whole TR 37.941.

**Discussion:**

**Decision: Revised to R4-2012698 (from R4-2011257).**

**R4-2012698 CR to TR 37.941: editorial cleanup, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0007 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Cleanup corrections of the whole TR 37.941.

**Discussion:**

**Decision: Agreed.**

**R4-2011258 CR to TR 37.941: editorial cleanup, Rel-16**

*Type: CR For: Agreement  
 37.941 v16.0.1 CR-0008 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Cleanup corrections of the whole TR 37.941.

**Discussion:**

**Decision: Agreed.**

#### 7.17.2 OTA calibration and test method procedures [OTA\_BS\_testing-Perf]

#### 7.17.3 OTA BS measurements classification [OTA\_BS\_testing-Perf]

**R4-2009970 CR to TR 37.941: Clause 6 Measurement Types**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0001 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Definitions of EIRP/TRP are not inclusive of all test methods

**Discussion:**

**Decision: Revised to R4-2012699 (from R4-2009970).**

**R4-2012699 CR to TR 37.941: Clause 6 Measurement Types**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0001 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Definitions of EIRP/TRP are not inclusive of all test methods

**Discussion:**

**Decision: Agreed.**

**R4-2009972 CR to TR 37.941: Clause 6 Measurement Types**

*Type: CR For: Agreement  
 37.941 v16.0.1 CR-0003 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Mirrored CR

**Discussion:**

**Decision: Agreed.**

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

**R4-2011203 Plane Wave Synthesizer – Pending MU term**

*Type: discussion For: Discussion  
 37.941 v..  
 Source: ROHDE & SCHWARZ*

**Discussion:**

**Decision: Noted.**

**R4-2011215 CR to TR 37.941: Completion of MU terms for PWS.**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0005 Cat: F (Rel-15)  
  
 Source: ROHDE & SCHWARZ*

**Discussion:**

**Decision: Revised to R4-2012700 (from R4-2011215).**

**R4-2012700 CR to TR 37.941: Completion of MU terms for PWS.**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0005 Cat: F (Rel-15)  
  
 Source: ROHDE & SCHWARZ*

**Discussion:**

**Decision: Agreed.**

**R4-2011231 Mirror CR to TR 37.941: Completion of MU terms for PWS.**

*Type: CR For: Agreement  
 37.941 v16.0.1 CR-0006 Cat: A (Rel-16)  
  
 Source: ROHDE & SCHWARZ*

**Discussion:**

**Decision: Revised to R4-2012701 (from R4-2011231).**

**R4-2012701 Mirror CR to TR 37.941: Completion of MU terms for PWS.**

*Type: CR For: Agreement  
 37.941 v16.0.1 CR-0006 Cat: A (Rel-16)  
  
 Source: ROHDE & SCHWARZ*

**Discussion:**

**Decision: Agreed.**

#### 7.17.5 Annexes [OTA\_BS\_testing-Perf]

**R4-2011259 CR to TR 37.941: new Annex for Excel spreadsheets with MU derivation, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0009 Cat: B (Rel-15)  
  
 Source: Huawei*

**Abstract:**

This CR introduces new annex to the TR 37.941 in order to capture Excel spreadsheets used for the MU values derivation for OTA BS requirements.

**Discussion:**

**Decision: Revised to R4-2012702 (from R4-2011259).**

**R4-2012702 CR to TR 37.941: new Annex for Excel spreadsheets with MU derivation, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0009 Cat: B (Rel-15)  
  
 Source: Huawei*

**Abstract:**

This CR introduces new annex to the TR 37.941 in order to capture Excel spreadsheets used for the MU values derivation for OTA BS requirements.

**Discussion:**

**Decision: Revised to R4-2012763 (from R4-2012702).**

**R4-2012763 CR to TR 37.941: new Annex for Excel spreadsheets with MU derivation, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0009 Cat: B (Rel-15)  
  
 Source: Huawei*

**Abstract:**

This CR introduces new annex to the TR 37.941 in order to capture Excel spreadsheets used for the MU values derivation for OTA BS requirements.

**Discussion:**

**Decision: Agreed.**

**R4-2011260 CR to TR 37.941: new Annex for Excel spreadsheets with MU derivation, Rel-16**

*Type: CR For: Agreement  
 37.941 v16.0.1 CR-0010 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

This CR introduces new annex to the TR 37.941 in order to capture Excel spreadsheets used for the MU values derivation for OTA BS requirements.

**Discussion:**

**Decision: Agreed.**

#### 7.17.6 Others [OTA\_BS\_testing-Perf]

**R4-2011255 CR to TS 37.145-2: internal TR references corrections (wrt. TR 37.941 for OTA BS testing), Rel-15**

*Type: CR For: Agreement  
 37.145-2 v15.7.0 CR-0237 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

This CR provides correction to the internal TR references in TS 37.145-2. This CR is a fine-tuned version based on the agreed content of R4-2007454, which was not implemented into TS 37.145-2 due to comments received from MCC after RAN4#95-e meeting.

**Discussion:**

**Decision: Revised to R4-2012704 (from R4-2011255).**

**R4-2012704 CR to TS 37.145-2: internal TR references corrections (wrt. TR 37.941 for OTA BS testing), Rel-15**

*Type: CR For: Agreement  
 37.145-2 v15.7.0 CR-0237 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

This CR provides correction to the internal TR references in TS 37.145-2. This CR is a fine-tuned version based on the agreed content of R4-2007454, which was not implemented into TS 37.145-2 due to comments received from MCC after RAN4#95-e meeting.

**Discussion:**

**Decision: Agreed.**

**R4-2011256 CR to TS 37.145-2: internal TR references corrections (wrt. TR 37.941 for OTA BS testing), Rel-16**

*Type: CR For: Agreement  
 37.145-2 v16.4.0 CR-0238 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

This CR provides correction to the internal TR references in TS 37.145-2. This CR is a fine-tuned version based on the agreed content of R4-2007454, which was not implemented into TS 37.145-2 due to comments received from MCC after RAN4#95-e meeting.

**Discussion:**

**Decision: Agreed.**

**R4-2009971 CR to TR 37.941: Clause 6.3.3 Angular alignment in TRP measurements**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0002 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Improved wording in Section 6.3.3

**Discussion:**

**Decision: Revised to R4-2012703 (from R4-2009971).**

**R4-2012703 CR to TR 37.941: Clause 6.3.3 Angular alignment in TRP measurements**

*Type: CR For: Agreement  
 37.941 v15.0.0 CR-0002 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Improved wording in Section 6.3.3

**Discussion:**

**Decision: Agreed.**

**R4-2009973 CR to TR 37.941: Clause 6.3.3 Angular alignment in TRP measurements**

*Type: CR For: Agreement  
 37.941 v16.0.1 CR-0004 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Mirrored CR

**Discussion:**

**Decision: Agreed.**

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

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

**R4-2012559 Email discussion summary for [96e][325] NR\_2step\_RACH\_Demod**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012742 (from R4-2012559).**

**R4-2012742 Email discussion summary for [96e][325] NR\_2step\_RACH\_Demod**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012705 WF on BS demodulation requirements for 2-step RACH**

*Type: other For: Approval  
 Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Approved.**

Huawei: 1+1+1 in initial phase, then 1+1 in connected mode; bring complexity.

E///: DMRS configuration in connected mode can be different. 1+1+1 is default without signalling effort. TBS size and same RBs, no big difference.

Nokia: option 1 is more typical usage case and mandatory configuration for MSG3 in PRACH with less padding bits.

Samsung: Similar view as E/// and Nokia. Since no performance difference among option 1/2, option2 bring additional signalling effort. Test coverage for 1+1 already enough.

ZTE: Same view as Nokia/Samsung/E///. Signalling always required with option2.

Huawei: 1+1 widely used in current NR demod requirements. 1+1+1 is mandatory with capability signalling, how to deal UE with only support 1+1, BS always have choice.

Nokia: In msg3, 1+1+1 is already mandatory.

ZTE: This is special feature with 2step PRACH, enable this feature 1+1+1 is typical case. If UE support 2step RACH, then such UE need to support 1+1+1.

Intel: 1+1+1 is only mandatory with capability signalling for >1 ports; but for 1 port is mandatory without capability signalling.

E///: NO performance difference among op1 and op2. The default option is option 1.

Huawei: BS has the choice.

**R4-2010283 Discussion and simulation results for BS 2-step RACH requirement**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010783 Further discussion on BS demodulation performance requirements for 2-Step RACH**

*Type: discussion For: Discussion  
 Source: ZTE Wistron Telecom AB*

**Discussion:**

**Decision: Noted.**

**R4-2010784 Draft CR for 38.104: Performance requirements for 2-Step RACH**

*Type: draftCR For: Endorsement  
 38.104 v16.4.0  
 Source: ZTE Wistron Telecom AB*

**Discussion:**

**Decision: Revised to R4-2012706 (from R4-2010784).**

**R4-2012706 Draft CR for 38.104: Performance requirements for 2-Step RACH**

*Type: draftCR For: Endorsement  
 38.104 v16.4.0  
 Source: ZTE Wistron Telecom AB*

**Discussion:**

**Decision: Not pursued.**

**R4-2010785 Simulation results for 2-step RACH BS demodulation requirements**

*Type: discussion For: Information  
 Source: ZTE Wistron Telecom AB*

**Discussion:**

**Decision: Noted.**

**R4-2010842 2-step RACH demodulation requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Proposals for the remaining open issues

**Discussion:**

**Decision: Noted.**

**R4-2010906 2-step RACH BS demodulation simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

BS demodulation simulation results for 2-step RACH

**Discussion:**

**Decision: Noted.**

**R4-2010907 On 2-step RACH BS demodulation requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion on the open topics and simulation results for 2-step RACH demodulation.

**Discussion:**

**Decision: Noted.**

**R4-2011009 Discussion and simulation results on NR 2-step RACH BS performance requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2009739 Views on BS demodulation requirements for NR 2-Step RACH**

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

**Discussion:**

**Decision: Noted.**

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

### 7.19 R16 NR maintenance [WI code or TEI16]

#### 7.19.4 BS RF [WI code or TEI16]

**R4-2010834 Correction to NB-IoT Bands with n26**

*Type: CR For: Agreement  
 38.104 v16.4.0 CR-0229 Cat: F (Rel-16)  
  
 Source: Dish Network*

**Discussion:**

**Decision: Agreed.**

**R4-2011261 CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.105 v16.4.0 CR-0187 Cat: B (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Modifications to the TS 37.105 to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 version of the MSR BS core specification TS 37.104.

**Discussion:**

**Decision: Revised to R4-2012582 (from R4-2011261).**

**R4-2012582 CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.105 v16.4.0 CR-0187 Cat: B (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Modifications to the TS 37.105 to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 version of the MSR BS core specification TS 37.104.

**Discussion:**

**Decision: Postponed.**

**R4-2011262 CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.145-1 v16.4.0 CR-0216 Cat: B (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Modifications to the TS 37.145-1 to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 version of the MSR BS core specification TS 37.141.

**Discussion:**

**Decision: Revised to R4-2012583 (from R4-2011262).**

**R4-2012583 CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.145-1 v16.4.0 CR-0216 Cat: B (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Modifications to the TS 37.145-1 to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 version of the MSR BS core specification TS 37.141.

**Discussion:**

**Decision: Postponed.**

**R4-2011263 CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.145-2 v16.4.0 CR-0239 Cat: B (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Modifications to the TS 37.145-2 to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 version of the MSR BS core specification TS 37.141.

**Discussion:**

**Decision: Revised to R4-2012584 (from R4-2011263).**

**R4-2012584 CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.145-2 v16.4.0 CR-0239 Cat: B (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Modifications to the TS 37.145-2 to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 version of the MSR BS core specification TS 37.141.

**Discussion:**

**Decision: Postponed.**

#### 7.19.6 Demodulation and CSI [WI code or TEI16]

## 8 Rel-16 UE feature list

## 9 Rel-16 spectrum related Work Items for NR

## 10 Rel-17 spectrum related Work Items for NR

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

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

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

#### 12.1.1 General [NR\_MIMO\_OTA]

**R4-2012560 Email discussion summary for [96e][329] NR\_MIMO\_OTA**

*Type: other For: Information  
 Source: Moderator (CAICT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012743 (from R4-2012560).**

**R4-2012743 Email discussion summary for [96e][329] NR\_MIMO\_OTA**

*Type: other For: Information  
 Source: Moderator (CAICT)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012707 WF on MIMO OTA**

*Type: other For: Approval  
 Source: vivo,CAICT*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2010831 CR for 38.827 on editorial corrections**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0001 Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Discussion:**

**Decision:** The document was **not treated.**

**R4-2010832 Discussion on relevant work of NR MIMO OTA WI**

*Type: other For: Approval  
 Source: Huawei,HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011204 Work plan for Rel-17 NR MIMO OTA WI**

*Type: Work Plan For: Approval  
 Source: CAICT,vivo,OPPO*

**Discussion:**

**Session Chair Note: The detailed work plan in table is agreeable, revised to remove proposal1.**

**Decision: Revised to R4-2012710 (from R4-2011204).**

**R4-2012710 Work plan for Rel-17 NR MIMO OTA WI**

*Type: Work Plan For: Approval  
 Source: CAICT,vivo,OPPO*

**Discussion:**

**Decision: Approved.**

**R4-2011232 Reply LS to NGMN on 5G NR Over The Air test methodologies and performance requirements**

*Type: LS out For: Approval  
 to NGMN, cc RAN5, RAN Plenary  
 Source: vivo*

**Abstract:**

Reply LS to NGMN on 5G NR

**Discussion:**

**Decision: Revised to R4-2012708 (from R4-2011232).**

**R4-2012708 Reply LS to NGMN on 5G NR Over The Air test methodologies and performance requirements**

*Type: LS out For: Approval  
 to NGMN, cc RAN5, RAN Plenary  
 Source: vivo*

**Abstract:**

Reply LS to NGMN on 5G NR

**Discussion:**

**Decision: Approved.**

**R4-2011233 Views on NR MIMO OTA WI**

*Type: other For: Approval  
 Source: vivo, CAICT*

**Abstract:**

Proposals on NR MIMO OTA WI

**Discussion:**

**Decision: Noted.**

**R4-2011234 3GPP TS 38.1xy v0.0.1 skeleton**

*Type: other For: Approval  
 Source: vivo, CAICT*

**Discussion:**

Session chair Note: The content is agreeable, revised to add specification number.

**Decision: Revised to R4-2012709 (from R4-2011234).**

**R4-2012709 3GPP TS 38.151 v0.0.1 skeleton**

*Type: other For: Approval  
 Source: vivo, CAICT*

**Discussion:**

**Decision: Approved.**

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

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

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

**R4-2010775 FR2 MIMO OTA performance metrics**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2011335 Consideratons on performance requiremetns for FR2 MIMO OTA**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

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

**R4-2010833 MIMO OTA test methodology for the verification of multi-antenna reception performance of NR Ues**

*Type: other For: Approval  
 Source: Huawei,Hisilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011216 On FR2 NR MIMO OTA Testing Methodology**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

This contribution is addressing open topics from the SI and items that were missed and need further clarifications in the WI.

**Discussion:**

**Decision: Revised to R4-2012712 (from R4-2011216).**

**R4-2012712 On FR2 NR MIMO OTA Testing Methodology**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

This contribution is addressing open topics from the SI and items that were missed and need further clarifications in the WI.

**Discussion:**

**Decision: Withdrawn.**

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

**R4-2010201 Performance metric for FR2 MIMO OTA**

*Type: discussion For: Approval  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

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

**R4-2010774 3D-MPAC implementation of measurement probe and positioner**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

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

**R4-2010776 Uncertainty or deviation caused by the difference of the channel model**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2011202 Time domain techniques for FR1 Spatial Correlation validation**

*Type: other For: Approval  
 Source: Spirent Communications*

**Abstract:**

Proposal 1. Add the alternative spatial correlation validation based on time domain techniques.

**Discussion:**

**Decision: Revised to R4-2012711 (from R4-2011202).**

**R4-2012711 Time domain techniques for FR1 Spatial Correlation validation**

*Type: other For: Approval  
 Source: Spirent Communications*

**Abstract:**

Proposal 1. Add the alternative spatial correlation validation based on time domain techniques.

**Discussion:**

**Decision: Noted.**

## 13 Rel-17 Study Items for NR

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

**R4-2012561 Email discussion summary for [96e][330] FR2\_enhTestMethods**

*Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012744 (from R4-2012561).**

**R4-2012744 Email discussion summary for [96e][330] FR2\_enhTestMethods**

*Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2012713 WF on the high DL power and low UL power test cases objective**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012714 WF on the polarization mismatch objective**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2012715 WF on the inter-band CA within FR2 objective**

*Type: other For: Approval  
 Source: Anritsu*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2011236 On enhanced test methods for FR2 RF**

*Type: other For: Approval  
 Source: vivo, CAICT*

**Abstract:**

Proposals on the objective 1 and 2

**Discussion:**

**Decision: Noted.**

**R4-2009773 Beam sweeping and test time reduction in FR2**

*Type: discussion For: Discussion  
 Source: Fraunhofer HHI, Fraunhofer IIS*

**Discussion:**

**Decision:** The document was **not treated.**

**R4-2009959 FR2 test method enhancement informal email discussion summary**

*Type: other For: Information  
 Source: Apple Inc.*

**Discussion:**

**Decision: Noted.**

#### 13.1.1 Test methodology for high DL power and low UL power test cases

**R4-2010856 Summary and Further Results on Impact of phase variation on beam pattern for NF test method**

*Type: other For: Approval  
 Source: MVG Industries, Sony*

**Abstract:**

During RAN4#93, a WF was agreed [1] for AI – enhanced test methods for NR FR2. Specifically, for Objective 1 (define test methodology for high DL power and low UL power test cases) a list of questions was developed to clarify the scope of potential enhanc

**Discussion:**

**Decision: Noted.**

**R4-2011218 On Test methodology for high DL power and low UL power test cases**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

This contribution outlines our view on topic #1 (Test methodology for high DL power and low UL power test cases) of this SI [1].

**Discussion:**

**Decision: Noted.**

**R4-2011281 Views on test methods for high DL power and low UL power TCs**

*Type: discussion For: Approval  
 38.884 v..  
 Source: ROHDE & SCHWARZ*

**Discussion:**

**Decision: Noted.**

**R4-2011456 FR2 testability enhancement for UE emissions**

*Type: other For: Discussion  
 38.101-2 v..  
 Source: Qualcomm Incorporated*

**Abstract:**

View on need to continue evolution of test methods for regulatory facing requirements

**Discussion:**

**Decision: Noted.**

**R4-2009960 Remaining issues with the test methodology for high DL power and low UL power test cases**

*Type: discussion For: Discussion  
 Source: Apple Inc.*

**Discussion:**

**Decision: Noted.**

#### 13.1.2 Polarization basis mismatch

**R4-2010129 EIRP measurement for polarization mismatch**

*Type: discussion For: Approval  
 Source: LG Electronics Polska*

**Discussion:**

**Decision: Noted.**

**R4-2010202 Discussion on dual polarization transmission for UL TX test**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2011217 On minimizing the impact of polarization basis mismatch between the TE and DUT on the RF testing**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

This contribution outlines our view on topic #2 of this SI [1] to define solutions to minimize the impact of polarization basis mismatch between the TE and DUT on the RF testing.

**Discussion:**

**Decision: Noted.**

**R4-2011423 Views on testability enhancement for UE FR2 test**

*Type: other For: Discussion  
 Source: Sony, Ericsson*

**Discussion:**

**Decision: Noted.**

**R4-2011457 FR2 testability enhancement for polarization mismatch**

*Type: other For: Agreement  
 38.101-2 v..  
 Source: Qualcomm Incorporated*

**Abstract:**

We discuss need for dual pol receive in TE

**Discussion:**

**Decision: Noted.**

**R4-2009560 Views on testability enhancement for UE FR2 test**

*Type: other For: Discussion  
 Source: Sony*

**Discussion:**

**Decision: Noted.**

**R4-2009627 Views on FR2 SISO EIRP test enhancement**

*Type: discussion For: Approval  
 Source: MediaTek Beijing Inc.*

**Abstract:**

Proposal1: 2-port CSI-RS shall be provided in EIRP test procedure.

Proposal2: 2-port CSI-RS can be simultaneous or sequent.

Proposal3: Practical TPMI shall be provided in EIRP test procedure.

**Discussion:**

**Decision: Noted.**

**R4-2009961 Remaining issues with polarization basis mismatch**

*Type: discussion For: Discussion  
 Source: Apple Inc.*

**Discussion:**

**Decision: Noted.**

#### 13.1.3 Enhanced test methods for inter-band (FR1+FR2) CA

**R4-2010802 Discussion on open issues of inter-band CA testability**

*Type: discussion For: Approval  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Noted.**

**R4-2009962 Remaining issues with enhanced test methods for inter-band CA in FR2**

*Type: discussion For: Discussion  
 Source: Apple Inc.*

**Discussion:**

**Decision: Noted.**

## 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