**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 4

4 Rel-15 New radio access technology 5

4.7 RRM core requirements maintenance (38.133/36.133) [NR\_newRAT-Core] 5

4.7.1 UE measurement capability (38.133/36.133) [NR\_newRAT-Core] 5

4.7.2 Connected state mobility (38.133/36.133) [NR\_newRAT-Core] 8

4.7.3 Signaling characteristics (38.133/36.133) [NR\_newRAT-Core] 8

4.7.4 Other requirements [NR\_newRAT-Core] 12

4.8 RRM perf. requirements maintenance (38.133/36.133) [NR\_newRAT-Perf] 14

4.8.1 General [NR\_newRAT-Perf] 15

4.8.2 RRM test cases [NR\_newRAT-Perf] 17

4.10 Positioning specs maintenance (36.171, 37.171 and 38.171) [NR\_newRAT-Perf or TEI] 32

5 LTE maintenance (up to Rel15) [WI code or TEI] 33

5.3 RRM requirements [WI code or TEI] 33

6 Rel-16 Work Items for LTE 37

6.1 Additional MTC enhancements for LTE [LTE\_eMTC5] 37

6.1.1 Core requirements maintenance [LTE\_eMTC5-Core] 38

6.1.1.2 RRM [LTE\_eMTC5-Core] 38

6.1.2 RRM perf. requirements [LTE\_eMTC5-Perf] 39

6.1.2.1 General [LTE\_eMTC5-Perf] 39

6.1.2.2 Test cases [LTE\_eMTC5-Perf] 40

6.2 Additional enhancements for NB-IoT [NB\_IOTenh3] 41

6.2.1 Core requirements maintenance [NB\_IOTenh3-Core] 41

6.2.1.2 RRM [NB\_IOTenh3-Core] 41

6.2.2 RRM perf. requirements [NB\_IOTenh3-Perf] 42

6.2.2.1 General [LTE\_eMTC5-Perf] 42

6.2.2.2 Test cases [LTE\_eMTC5-Perf] 42

6.3 Even further Mobility enhancement in E-UTRAN [LTE\_feMob] 43

6.3.1 RRM core requirements maintenance [LTE\_feMob-Core] 43

6.3.2 RRM perf. requirements [LTE\_feMob-Perf] 44

6.3.2.1 General [LTE\_feMob-Perf] 44

6.3.2.2 Test cases [LTE\_feMob-Perf] 44

6.5 R16 LTE maintenance [WI code] 45

6.5.3 RRM [WI code] 45

7 Rel-16 Work Items for NR 45

7.1 NR-based access to unlicensed spectrum [NR\_unlic] 45

7.1.5 RRM core requirements (38.133) [NR\_unlic-Core] 47

7.1.5.1 General (specification structure, etc) [NR\_unlic-Core] 47

7.1.5.2 Cell re-selection [NR\_unlic-Core] 47

7.1.5.3 Handover [NR\_unlic-Core] 49

7.1.5.4 RRC connection mobility control [NR\_unlic-Core] 50

7.1.5.5 SCell activation/deactivation (delay and interruption) [NR\_unlic-Core] 51

7.1.5.6 Active TCI state switching [NR\_unlic-Core] 52

7.1.5.7 Active BWP switching [NR\_unlic-Core] 53

7.1.5.8 RLM [NR\_unlic-Core] 54

7.1.5.9 Beam management [NR\_unlic-Core] 56

7.1.5.10 Measurement requirements [NR\_unlic-Core] 57

7.1.5.11 Measurement capability and reporting criteria [NR\_unlic-Core] 59

7.1.5.12 Timing [NR\_unlic-Core] 59

7.1.5.13 Other requirements maintenance [NR\_unlic-Core] 60

7.1.6 Demodulation and CSI requirements (38.101-4/38.104) [NR\_unlic-Perf] 61

7.2 NR mobility enhancement [NR\_Mob\_enh] 61

7.2.1 RRM core requirements maintenance (38.133) [NR\_Mob\_enh-Core] 62

7.2.2 RRM perf. requirements (38.133) [NR\_Mob\_enh-Perf] 62

7.2.2.1 General [NR\_Mob\_enh-Perf] 62

7.2.2.2 Test cases [NR\_Mob\_enh-Perf] 62

7.3 5G V2X with NR sidelink [5G\_V2X\_NRSL] 64

7.3.5 RRM core requirements maintenance (38.133) [5G\_V2X\_NRSL-Core] 64

7.3.6 RRM perf. requirements (38.133) [5G\_V2X\_NRSL-Perf] 66

7.3.6.1 General [5G\_V2X\_NRSL-Perf] 66

7.3.6.2 Test cases [5G\_V2X\_NRSL-Perf] 67

7.4 Integrated Access and Backhaul for NR [NR\_IAB] 68

7.4.3 RRM core requirements (38.133) [NR\_IAB-Core] 68

7.4.3.1 RLM requirements [NR\_IAB-Core] 68

7.4.3.2 Other requirements maintenance [NR\_IAB-Core] 69

7.5 Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements [LTE\_NR\_DC\_CA\_enh] 70

7.5.3 RRM core requirements (38.133) [LTE\_NR\_DC\_CA\_enh-Core] 71

7.5.3.1 Early Measurement reporting [LTE\_NR\_DC\_CA\_enh-Core] 71

7.5.3.1.1 NR measurements for EMR [LTE\_NR\_DC\_CA\_enh-Core] 71

7.5.3.1.2 LTE NR Inter-RAT EMR [LTE\_NR\_DC\_CA\_enh-Core] 73

7.5.3.2 Efficient and low latency serving cell configuration, activation and setup [LTE\_NR\_DC\_CA\_enh-Core] 74

7.5.3.2.1 Direct SCell activation [LTE\_NR\_DC\_CA\_enh-Core] 74

7.5.3.2.2 SCell dormancy [LTE\_NR\_DC\_CA\_enh-Core] 75

7.5.3.3 Other requirements [LTE\_NR\_DC\_CA\_enh-Core] 78

7.6 UE power saving in NR [NR\_UE\_pow\_sav] 78

7.6.1 General [NR\_UE\_pow\_sav] 78

7.6.2 RRM core requirements maintenance (38.133) [NR\_UE\_pow\_sav-Core] 78

7.6.3 RRM perf. requirements (38.133) [NR\_UE\_pow\_sav-Perf] 80

7.6.3.1 General [NR\_UE\_pow\_sav-Perf] 80

7.6.3.2 Test cases [NR\_UE\_pow\_sav-Perf] 81

7.6.4 Demodulation and CSI requirements (38.101-4) [NR\_UE\_pow\_sav-Perf] 82

7.7 NR Positioning Support [NR\_pos] 82

7.7.1 General [NR\_pos-Core/Perf] 84

7.7.2 RRM core requirements (38.133) [NR\_pos-Core] 84

7.7.2.1 UE requirements [NR\_pos-Core] 84

7.7.2.1.1 PRS-RSTD measurement requirements [NR\_pos-Core] 84

7.7.2.1.2 PRS-RSRP measurement requirements [NR\_pos-Core] 86

7.7.2.1.3 UE Rx-Tx time difference measurement requirements [NR\_pos-Core] 88

7.7.2.1.4 Link simulation results for UE measurements [NR\_pos-Core] 90

7.7.2.2 New measurement gap patterns for positioning measurements [NR\_pos-Core] 91

7.7.2.3 gNB requirements [NR\_pos-Core] 94

7.7.2.4 Other requirements [NR\_pos-Core] 95

7.9 Enhancements on MIMO for NR [NR\_eMIMO] 96

7.9.2 RRM core requirements (38.133) [NR\_eMIMO-Core] 96

7.9.2.1 DL/UL beam indication with reduced latency and overhead [NR\_eMIMO-Core] 97

7.9.2.2 Multi-TRP transmission related requirements [NR\_eMIMO-Core] 98

7.9.2.3 Other requirements maintenance [NR\_eMIMO-Core] 100

7.11 RF requirements for NR frequency range 1 (FR1) [NR\_RF\_FR1] 101

7.11.2 RRM core requirements maintenance (38.133) [NR\_RF\_FR1-Core] 102

7.11.3 RRM perf. requirements (38.133) [NR\_RF\_FR1-Perf] 102

7.11.3.1 General [NR\_RF\_FR1-Perf] 102

7.11.3.2 Test cases [NR\_RF\_FR1-Perf] 102

7.12 NR RF requirement enhancements for frequency range 2 (FR2) [NR\_RF\_FR2\_req\_enh] 102

7.12 NR RF requirement enhancements for frequency range 2 (FR2) [NR\_RF\_FR2\_req\_enh] 103

7.12.1 RF core requirements [NR\_RF\_FR2\_req\_enh-Core] 103

7.12.1.1 FR2 MPE [NR\_RF\_FR2\_req\_enh-Core] 103

7.12.2 RRM core requirements (38.133) [NR\_RF\_FR2\_req\_enh-Core] 103

7.12.2.1 Inter-band DL CA MRTD [NR\_RF\_FR2\_req\_enh-Core] 103

7.13 NR RRM requirement enhancement [NR\_RRM\_Enh\_Core] 106

7.13.1 RRM core requirements (38.133) [NR\_RRM\_Enh\_Core] 108

7.13.1.1 SRS carrier switching requirements [NR\_RRM\_Enh\_Core] 108

7.13.1.2 CGI reading requirements with autonomous gap [NR\_RRM\_Enh\_Core] 109

7.13.1.3 BWP switching on multiple CCs [NR\_RRM\_Enh\_Core] 112

7.13.1.4 Spatial relation switch for uplink [NR\_RRM\_Enh\_Core] 115

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] 117

7.13.1.6 Other requirements maintenance [NR\_RRM\_Enh\_Core] 119

7.14 NR RRM requirements for CSI-RS based L3 measurement [NR\_CSIRS\_L3meas] 121

7.14.1 RRM core requirements (38.133) [NR\_CSIRS\_L3meas-Core] 122

7.14.1.1 CSI-RS measurement bandwidth [NR\_CSIRS\_L3meas-Core] 123

7.14.1.2 CSI-RS based intra-frequency and inter-frequency measurements definition [NR\_CSIRS\_L3meas-Core] 125

7.14.1.3 Measurement capability [NR\_CSIRS\_L3meas-Core] 126

7.14.1.4 Intra-frequency and inter-frequency measurement requirements [NR\_CSIRS\_L3meas-Core] 128

7.14.1.5 Other requirements [NR\_CSIRS\_L3meas-Core] 131

7.15 NR support for high speed train scenario [NR\_HST] 133

7.15.1 RRM core requirements maintenance (38.133) [NR\_HST-Core] 133

7.15.2 RRM perf. requirements (38.133) [NR\_HST-Perf] 136

7.15.2.1 General [NR\_HST-Perf] 136

7.15.2.2 Test cases [NR\_HST-Perf] 137

7.15.3 Demodulation and CSI requirements (38.101-4 / 38.104) [NR\_HST-Perf] 137

7.18 2-step RACH for NR [NR\_2step\_RACH-Perf] 138

7.18.1 RRM core requirements maintenance (38.133) [NR\_2step\_RACH-Core] 138

7.18.2 RRM perf. requirements (38.133) [NR\_2step\_RACH-Perf] 138

7.18.2.1 General [NR\_2step\_RACH-Perf] 138

7.18.2.2 Test cases [NR\_2step\_RACH-Perf] 139

7.18.3 BS Demodulation requirements (38.104) [NR\_2step\_RACH-Perf] 140

7.18.4 Others [NR\_2step\_RACH-Perf] 140

7.19 R16 NR maintenance [WI code or TEI16] 140

7.19.5 RRM [WI code or TEI16] 140

7.19.6 Demodulation and CSI [WI code or TEI16] 143

10 Rel-17 spectrum related Work Items for NR 143

10.20 Introduction of FR2 FWA UE with maximum TRP of 23dBm for band n257 and n258 [NR\_FR2\_FWA\_Bn257\_Bn258] 143

10.20.2 RRM Core requirements (38.133) [NR\_FR2\_FWA\_Bn257\_Bn258-Core] 144

10.20.3 RRM Perf. requirements (38.133) [NR\_FR2\_FWA\_Bn257\_Bn258-Perf] 145

10.20.4 Others [NR\_FR2\_FWA\_Bn257\_Bn258-Core/Perf] 145

## 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.

## 4 Rel-15 New radio access technology

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

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

**Email discussion: [96e][201] NR\_NewRAT\_RRM\_Core**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][201] NR\_NewRAT\_RRM\_Core | R15 NR | RRM Core maintenance | 4.7 |

**R4-2012032 Email discussion summary for [95e][201] NR\_NewRAT\_RRM\_Core** *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012202 (from R4-2012032).**

**R4-2012202 Email discussion summary for [95e][201] NR\_NewRAT\_RRM\_Core** *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: UE measurement capability**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011093 | Return to |
| R4-2011094 | Return to |
| R4-2009904 | Revised. |
| R4-2009905 | Return to |
| R4-2010030 | Agreed. |
| R4-2010031 | Agreed. |
| R4-2011130 | Agreed. |
| R4-2011131 | Agreed. |
| R4-2011134 | Agreed. |
| R4-2011135 | Agreed. |

**Topic #2: Signaling characteristics: Scell activation/de-activation**

Issue 2-2: Whether and how RAN4 would specify the starting point and ending point of interruption range for SCell de-activation

Agreement:

* No ACK/NACK is needed for the case of timer-based deactivation, and hence the deactivation timelines can be different for the two cases.
* Update SCell deactivation requirements as in Table 1.

Table 1: Suggested SCell deactivation requirements

|  |  |  |
| --- | --- | --- |
|  | Delay | Start of interruption window |
| MAC CE based | n+THARQ+3ms | Between (n+1+ THARQ) and (n+1+ THARQ+3ms) |
| Timer based | n+3ms | Between (n+1) and (n+1+3ms) |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011137 | Return to |
| R4-2011138 | Return to |
| R4-2009902 | Merged into R4-2011137. Need reply to companies’ questions. |
| R4-2009903 | Merged into R4-2011138. Need reply to companies’ questions. |
| R4-2010116 | Return to |
| R4-2010206 | Agreed. |
| R4-2010207 | Agreed |
| R4-2009803 | Return to.  Chair: The CR is for Rel-16 and treated under Rel-15 maintenance. The Rel-15 spec has same text and further clarifications should be provided. Should the similar Rel-15 CR be provided? |

**Topic #3: Signaling characteristics: BWP switching**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011139 | Return to  Chair: allocated a new Cat A CR. |
| R4-2010183 | Return to. |
| R4-2010184 | Return to. |
| R4-2010032 | Return to. |
| R4-2010033 | Return to. |
| R4-2011306 | Revised |
| R4-2011307 | Return to. |

**Topic #4: Signaling characteristics: TCI switching**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010208 | Return to |
| R4-2010209 | Return to |
| R4-2011304 | Return to |
| R4-2011305 | Return to |

**Topic #5: Others**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009804 | Agreed.  According to moderator understanding, one editorial CR per spec per company is allowed. And the wording is incorrect in the equation. So we wonder if company has strong view on agreeing the CR  Chair: Not completely editorial and some changes (e.g. remove inter-band are technical corrections). Recommend to combine changes in the future. |
| R4-2009805 | Agreed. |
| R4-2011109 | Return to. |
| R4-2011110 | Return to. |
| R4-2011132 | Agreed. |
| R4-2011133 | Agreed. |
| R4-2011308 | Revised. |
| R4-2011309 | Return to. |

2nd round email discussion conclusions

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

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

**R4-2010030 CR on RSTD**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0962 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Agreed.**

**R4-2010031 CR on RSTD**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0963 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Agreed.**

**R4-2011092 Discussion on reporting criteria in 38.133**

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

**Discussion:**

**Decision: Noted.**

**R4-2011093 CR on reporting criteria for EN-DC in 38.133 R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1047 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011094 CR on reporting criteria for EN-DC in 38.133 R16 (Cat-A)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1048 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011130 Correction on UE measurement capability in NR idle mode R15**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6940 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011131 Correction on UE measurement capability in NR idle mode R16**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6941 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011134 CR to measurement capability for NE-DC in 36133 R15**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6942 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011135 CR to measurement capability for NE-DC in 36133 R16**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6943 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2009904 CR on FR2 measurement capability for R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0955 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

**Decision: Revised to R4-2012066 (from R4-2009904).**

**R4-2012066 CR on FR2 measurement capability for R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0955 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

**R4-2009905 CR on FR2 measurement capability for R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0956 Cat: A (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

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

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

**R4-2010032 CR on active BWP switch**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0964 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2010033 CR on active BWP switch**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0965 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2010034 Remaining issues on signalling characteristics**

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

**Discussion:**

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

**R4-2010116 CR to T parameters in 8.3.2 of 38.133**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0977 Cat: F (Rel-15)  
  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Postponed.**

**R4-2012064 CR to T parameters in 8.3.2 of 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-TBA Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Withdrawn.**

**R4-2012240 WF on Restriction of Rel-15 FR1 SCell activation delay requirement**

*Type: other For: Approval  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Return to.**

**R4-2010183 CR on Active BWP switch and Active TCI State Switching requirements - Rel15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0978 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

**R4-2010184 CR on Active BWP switch and Active TCI State Switching requirements - Rel16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0979 Cat: A (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

**R4-2010206 CR for SCell activation delay in FR2 in R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0985 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Agreed.**

**R4-2010207 CR for SCell activation delay in FR2 in R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0986 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Agreed.**

**R4-2010208 CR on TCI state switch delay in R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0987 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Revised to R4-2012239 (from R4-2010208).**

**R4-2012239 CR on TCI state switch delay in R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0987 Cat: F (Rel-15)  
  
 Source: MediaTek inc., ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2010209 CR on TCI state switch delay in R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0988 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2011136 Discussion on remaining issues in SCell activation and BWP switching**

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

**Discussion:**

**Decision: Noted.**

**R4-2011137 CR on SCell activation requirements R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1071 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012241 (from R4-2011137).**

**R4-2012241 CR on SCell activation requirements R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1071 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011138 CR on SCell activation requirements R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1072 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011139 CR on BWP switching delay requirements R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1073 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012242 (from R4-2011139).**

**R4-2012242 CR on BWP switching delay requirements R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1073 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2012232 CR on BWP switching delay requirements R15**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-TBA Cat: A (Rel-16)***Discussion:**

**Decision: Return to.**

**R4-2011304 CR to 38.133 correction to TCI state switch delay requirements**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1094 Cat: F (Rel-15)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2011305 CR to 38.133 correction to TCI state switch delay requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1095 Cat: A (Rel-16)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2011306 CR to 38.133 correction to RRC based BWP switch delay requirements**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1096 Cat: F (Rel-15)  
  
 Source: ZTE*

**Discussion:**

**Decision: Revised to R4-2012243 (from R4-2011306).**

**R4-2012243 CR to 38.133 correction to RRC based BWP switch delay requirements**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1096 Cat: F (Rel-15)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2011307 CR to 38.133 correction to RRC based BWP switch delay requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1097 Cat: A (Rel-16)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2009601 CR on Active BWP switch and Active TCI State Switching requirements - Rel15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0915 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

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

**R4-2009602 CR on Active BWP switch and Active TCI State Switching requirements - Rel16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0916 Cat: A (Rel-16)  
  
 Source: Apple*

**Discussion:**

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

**R4-2009803 CR for TS38.133 Rel-16, Corrction for SCell activation delay requirement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0931 Cat: F (Rel-16)  
  
 Source: CATT*

**Discussion:**

Chair: The CR is for Rel-16 and treated under Rel-15 maintenance. The Rel-15 spec has same text and further clarifications should be provided. Should the similar Rel-15 CR be provided?

**Decision: Return to.**

**R4-2009902 CR on SCell deactivation requirement for R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0953 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

**Decision: Merged.**

**R4-2009903 CR on SCell deactivation requirement for R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0954 Cat: F (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Merged.**

**R4-2009906 Further discussion on R15 BWP switching delay requirement**

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

**Discussion:**

**Decision: Noted.**

#### 4.7.4 Other requirements [NR\_newRAT-Core]

**R4-2011109 Correction to inter-RAT measurement on NR serving carrrier**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1061 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011110 Correction to inter-RAT measurement on NR serving carrrier\_r16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1062 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011132 CR on correction to CSSF within gap R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1069 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011133 CR on correction to CSSF within gap R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1070 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011308 CR to 38.133 correction to interruption requirements for per-FR gap in FR2**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1098 Cat: F (Rel-15)  
  
 Source: ZTE*

**Discussion:**

**Decision: Revised to R4-2012065 (from R4-2011308).**

**R4-2012065 CR to 38.133 correction to interruption requirements for per-FR gap in FR2**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1098 Cat: F (Rel-15)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2011309 CR to 38.133 correction to interruption requirements for per-FR gap in FR2**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1099 Cat: A (Rel-16)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2009804 CR for TS38.133 Rel-15, Correction for RRM core requirements**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0932 Cat: F (Rel-15)  
  
 Source: CATT*

**Discussion:**

**Decision: Agreed.**

**R4-2009805 CR for TS38.133 Rel-16, Correction for RRM core requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0933 Cat: A (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Agreed.**

**R4-2013033 [CR] Replacing x in references with correct numbers (Core R15 Cat F)**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1110 Cat: F (Rel-15)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2013036 [CR] Replacing x in references with correct numbers (Core R16 Cat A)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1113 Cat: A (Rel-16)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

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

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

**Email discussion: [96e][202] NR\_NewRAT\_RRM\_Perf**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][202] NR\_NewRAT\_RRM\_Perf | R15 NR | RRM Perf. maintenance | 4.8 |

**R4-2012033 Email discussion summary for [96e][202] NR\_NewRAT\_RRM\_Perf** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012203 (from R4-2012033).**

**R4-2012203 Email discussion summary for [96e][202] NR\_NewRAT\_RRM\_Perf** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

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

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009573 | Agreed (cat F) |
| R4-2009574 | Agreed (cat A) |
| R4-2010857 | Agreed (cat F) |
| R4-2010858 | Agreed (cat A) |
| R4-2011099 | Revised (Cat F) |
| R4-2011140 | Revised (Cat F) |
| R4-2009569 | Agreed (cat F) |
| R4-2009570 | Agreed (cat A) |
| R4-2009552 | Agreed (cat F) |
| R4-2009553 | Agreed (cat A) |

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

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009542 | Agreed (Cat F) |
| R4-2009543 | Agreed (Cat A) |
| R4-2009544 | Agreed (Cat F) |
| R4-2009545 | Agreed (Cat A) |
| R4-2009548 | Revised (cat F) |
| R4-2009550 | Agreed (Cat F) |
| R4-2009551 | Agreed (Cat A) |
| R4-2009554 | Noted |
| R4-2009558 | Agreed (Cat F) |
| R4-2009559 | Agreed (Cat A) |
| R4-2009563 | Agreed (Cat F) |
| R4-2009564 | Agreed (Cat A) |
| R4-2009565 | Agreed (Cat F) |
| R4-2009566 | Agreed (Cat A) |
| R4-2009567 | Agreed (Cat F) |
| R4-2009568 | Agreed (Cat A) |
| R4-2009571 | Revised (cat F) |
| R4-2009575 | Agreed (Cat F) |
| R4-2009576 | Agreed (Cat A) |
| R4-2009603 | Noted (cat F) |
| R4-2009604 | Withdrawn (cat F) |
| R4-2009605 | Noted (cat F) |
| R4-2009606 | Withdrawn (cat F) |
| R4-2009668 | Agreed (Cat F) |
| R4-2009669 | Agreed (Cat A) |
| R4-2009806 | Revised (cat F) |
| R4-2009887 | Revised (cat F) |
| R4-2009889 | Agreed (Cat F) |
| R4-2009890 | Agreed (Cat A) |
| R4-2010035 | Noted (cat F) |
| R4-2010036 | Withdrawn (cat F) |
| R4-2010382 | Revised (cat F). Tdoc and CR numbers are needed for corresponding Rel-16 cat A CR.  Chair: Cat A CR R4-2010382 allocated |
| R4-2010779 | Agreed (Cat F) |
| R4-2010780 | Agreed (Cat A) |
| R4-2010859 | Agreed (Cat F) |
| R4-2010860 | Agreed (Cat A) |
| R4-2010861 | Agreed (Cat F) |
| R4-2010862 | Agreed (Cat A) |
| R4-2010863 | Agreed (Cat F) |
| R4-2010864 | Agreed (Cat A) |
| R4-2011047 | Revised (cat F) |
| R4-2011095 | Revised (cat F) |
| R4-2011101 | Revised (cat F) |
| R4-2011103 | Revised (cat F) |
| R4-2011105 | Revised (cat F) |
| R4-2011107 | Revised (cat F) |
| R4-2011142 | Agreed (Cat F) |
| R4-2011143 | Agreed (Cat A) |

2nd round email discussion conclusions

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

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

**R4-2010857 CR to TS 38.133: Corrections to CSI-RS configurations in A.3.14 (Rel-15)**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1024 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Agreed.**

**R4-2010858 CR to TS 38.133: Corrections to CSI-RS configurations in A.3.14 (Rel-16)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1025 Cat: A (Rel-16)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Agreed.**

**R4-2011099 Addition of new default configurations for RMC scheduling**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1051 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012067 (from R4-2011099).**

**R4-2012067 Addition of new default configurations for RMC scheduling**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1051 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011100 Addition of new default configurations for RMC scheduling\_r16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1052 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011140 CR on UL BWP configuration for RRM test cases R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1074 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012068 (from R4-2011140).**

**R4-2012068 CR on UL BWP configuration for RRM test cases R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1074 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011141 CR on UL BWP configuration for RRM test cases R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1075 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2009573 Update to FR2 Annex B RRM side conditions**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0910 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) Update formulae and Table notes to use per-band relaxation factors.

b) Correct formula to calculate Minimum SSB\_RP values for angle of arrival within Spherical coverage

**Discussion:**

**Decision: Agreed.**

**R4-2009574 Update to FR2 Annex B RRM side conditions**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0911 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) Update formulae and Table notes to use per-band relaxation factors.

b) Correct formula to calculate Minimum SSB\_RP values for angle of arrival within Spherical coverage

**Discussion:**

**Decision: Agreed.**

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

**R4-2010035 CR on active TCI state switch test case**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0966 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Merged.**

**R4-2010036 CR on active TCI state switch test case**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0967 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010185 CR on Requirement for MAC-CE based TCI State Switch-EN-DC-Rel15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0980 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010186 CR on Requirement for MAC-CE based TCI State Switch-EN-DC-Rel16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0981 Cat: A (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010187 CR on Requirement for MAC-CE based TCI State Switch-SA-Rel15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0982 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010188 CR on Requirement for MAC-CE based TCI State Switch-SA-Rel16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0983 Cat: A (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010382 Fine/rough beam assumption for idle mode and measurement procedure test case**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1002 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Capture beam assumption for idle mode and for measurement procedure test cases in line with the agreed way forward R4-2008538

**Discussion:**

**Decision: Revised to R4-2012073 (from R4-2010382).**

**R4-2012073 Fine/rough beam assumption for idle mode and measurement procedure test case**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1002 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Capture beam assumption for idle mode and for measurement procedure test cases in line with the agreed way forward R4-2008538

**Discussion:**

**Decision: Return to.**

**R4-2012074 Fine/rough beam assumption for idle mode and measurement procedure test case**

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

**Discussion:**

**Decision: Return to.**

**R4-2010779 Clarification of SNR values in RLM Test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1022 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Add note clarifying which SNR values include allowance of up to 1dB degradation from applied SNR to UE baseband. This is essential information for RAN5 to implement the test cases reliably.

**Discussion:**

**Decision: Agreed.**

**R4-2010780 Clarification of SNR values in RLM Test cases**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1023 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Add note clarifying which SNR values include allowance of up to 1dB degradation from applied SNR to UE baseband. This is essential information for RAN5 to implement the test cases reliably.

**Discussion:**

**Decision: Agreed.**

**R4-2010859 CR to TS 38.133: Corrections to event triggered test cases (Rel-15)**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1026 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Agreed.**

**R4-2010860 CR to TS 38.133: Corrections to event triggered test cases (Rel-16)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1027 Cat: A (Rel-16)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Agreed.**

**R4-2010861 CR to TS 38.133: Corrections to inter-RAT test cases (Rel-15)**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1028 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Agreed.**

**R4-2010862 CR to TS 38.133: Corrections to inter-RAT test cases (Rel-16)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1029 Cat: A (Rel-16)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Agreed.**

**R4-2010863 CR to TS 38.133: Corrections to AoA setup information in some test cases (Rel-15)**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1030 Cat: F (Rel-15)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Agreed.**

**R4-2010864 CR to TS 38.133: Corrections to AoA setup information in some test cases (Rel-16)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1031 Cat: A (Rel-16)  
  
 Source: Rohde & Schwarz*

**Discussion:**

**Decision: Agreed.**

**R4-2011047 CR on maintaining handover tests in Rel-15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1032 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012075 (from R4-2011047).**

**R4-2012075 CR on maintaining handover tests in Rel-15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1032 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011048 CR on maintaining handover tests in Rel-16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1033 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011095 CR on test cases for Active TCI state switch delay R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1049 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012076 (from R4-2011095).**

**R4-2012076 CR on test cases for Active TCI state switch delay R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1049 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011096 CR on test cases for Active TCI state switch delay R16 (Cat-A)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1050 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011101 Correction to beam failure detection and link recovery test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1053 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012077 (from R4-2011101).**

**R4-2012077 Correction to beam failure detection and link recovery test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1053 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011102 Correction to beam failure detection and link recovery test cases\_r16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1054 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011103 Correction to BWP switching delay test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1055 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012078 (from R4-2011103).**

**R4-2012078 Correction to BWP switching delay test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1055 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011104 Correction to BWP switching delay test cases\_r16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1056 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011105 Correction to FR1 intra-frequency measurement with gap test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1057 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012079 (from R4-2011105).**

**R4-2012079 Correction to FR1 intra-frequency measurement with gap test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1057 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011106 Correction to FR1 intra-frequency measurement with gap test cases\_r16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1058 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011107 Correction to inter-RAT HO test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1059 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012080 (from R4-2011107).**

**R4-2012080 Correction to inter-RAT HO test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1059 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011108 Correction to inter-RAT HO test cases\_r16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1060 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011142 CR to add UE beam assumption for TC in A.5.6 R15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1076 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011143 CR to add UE beam assumption for TC in A.5.6 R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1077 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2009542 CR to Redirection from NR in FR1 to E-UTRAN**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0888 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Test Configuration IDs 4, 5, 6 are missing in cell specific test parameters in Test case A.6.3.2.3.2 Redirection from NR in FR1 to E-UTRAN. This CR adds Test Configuration IDs 4, 5 and 6 for each parameter.

**Discussion:**

**Decision: Agreed.**

**R4-2009543 CR to Redirection from NR in FR1 to E-UTRAN**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0889 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Test Configuration IDs 4, 5, 6 are missing in cell specific test parameters in Test case A.6.3.2.3.2 Redirection from NR in FR1 to E-UTRAN. This CR adds Test Configuration IDs 4, 5 and 6 for each parameter.

**Discussion:**

**Decision: Agreed.**

**R4-2009544 CR to timing advance adjustment accuracy in FR1**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0890 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

SRS schedule is configured to a slot which is not an UL slot. This CR changes the SRSPerioicityAndOffset in Table A.4.4.3.1.2-4 and Table A.6.4.3.1.2-4 so that SRS is configured to a UL slot.

**Discussion:**

**Decision: Agreed.**

**R4-2009545 CR to timing advance adjustment accuracy in FR1**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0891 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

SRS schedule is configured to a slot which is not an UL slot. This CR changes the SRSPerioicityAndOffset in Table A.4.4.3.1.2-4 and Table A.6.4.3.1.2-4 so that SRS is configured to a UL slot.

**Discussion:**

**Decision: Agreed.**

**R4-2009548 CR to SA event triggered reporting tests with per-UE gaps**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0892 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Update the specified CSI-RS parameters to be compatible with the specified SSB.

This is a resubmission of R4-2006073. Cell 1 is configured with RLM-RS = CSI-RS, and the General test parameters Table includes CSI-RS parameters so the detail of the paramete

**Discussion:**

**Decision: Revised to R4-2012069 (from R4-2009548).**

**R4-2012069 CR to SA event triggered reporting tests with per-UE gaps**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0892 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Update the specified CSI-RS parameters to be compatible with the specified SSB.

This is a resubmission of R4-2006073. Cell 1 is configured with RLM-RS = CSI-RS, and the General test parameters Table includes CSI-RS parameters so the detail of the paramete

**Discussion:**

**Decision: Return to.**

**R4-2009549 CR to SA event triggered reporting tests with per-UE gaps**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0893 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Update the specified CSI-RS parameters to be compatible with the specified SSB.

This is a resubmission of R4-2006073. Cell 1 is configured with RLM-RS = CSI-RS, and the General test parameters Table includes CSI-RS parameters so the detail of the paramete

**Discussion:**

**Decision: Return to.**

**R4-2009550 CR to SS-RSRQ Intra-Frequency and Inter-frequency FR1 measurement accuracy**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0894 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

TRS configuration is missing for RSRQ Test cases, now added.

**Discussion:**

**Decision: Agreed.**

**R4-2009551 CR to SS-RSRQ Intra-Frequency and Inter-frequency FR1 measurement accuracy**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0895 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

TRS configuration is missing for RSRQ Test cases, now added.

**Discussion:**

**Decision: Agreed.**

**R4-2009552 Update to FR2 240kHz SSB Configurations**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0896 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

The SSB Configurations in A.3.10 have a parameter “RB numbers containing SSBs within channel BW”, which is based on the assumption that the SSB SCS is the same as the data SCS. For 240kHs SSB SCS this is not possible.

For 240kHz SSB Patterns SSB.2 FR2, SS

**Discussion:**

**Decision: Agreed.**

**R4-2009553 Update to FR2 240kHz SSB Configurations**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0897 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

The SSB Configurations in A.3.10 have a parameter “RB numbers containing SSBs within channel BW”, which is based on the assumption that the SSB SCS is the same as the data SCS. For 240kHs SSB SCS this is not possible.

For 240kHz SSB Patterns SSB.2 FR2, SS

**Discussion:**

**Decision: Agreed.**

**R4-2009554 FR2 PRACH Test cases in 38.133 Annex A**

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

**Abstract:**

FR2 PRACH Test cases in Annex A of TS 38.133 are incomplete, and not in a form that RAN5 could implement.

This discussion document looks at the main issues and proposes principles for test case updates:

a) A fixed value for rsrp-ThresholdSSB is not practi

**Discussion:**

**Decision: Noted.**

**R4-2009558 Update of FR2 Random Access Test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0898 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

1) Define ss-PBCH-BlockPower

2) define exceptions for values of rsrp-ThresholdSSB and preambleReceivedTargetPower.

3) Change AoA setup to 1 (Rx Beam Peak)

4) Add Es values for SSB with index 0 (above threshold) and SSB with index 1 (below threshold)

5) Ad

**Discussion:**

**Decision: Agreed.**

**R4-2009559 Update of FR2 Random Access Test cases**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0899 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

1) Define ss-PBCH-BlockPower

2) define exceptions for values of rsrp-ThresholdSSB and preambleReceivedTargetPower.

3) Change AoA setup to 1 (Rx Beam Peak)

4) Add Es values for SSB with index 0 (above threshold) and SSB with index 1 (below threshold)

5) Ad

**Discussion:**

**Decision: Agreed.**

**R4-2009563 Update to FR2 event-triggered reporting RRM Test cases in A.5.6 and A.7.6**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0900 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) Update FR2 Event-triggered reporting Test cases to specify SSB with one SSB per SS-burst.

b) Specify the #RBs in the channel BW for FR2 Intra-frequency Event-triggered reporting Test cases.

**Discussion:**

**Decision: Agreed.**

**R4-2009564 Update to FR2 event-triggered reporting RRM Test cases in A.5.6 and A.7.6**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0901 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

a) Update FR2 Event-triggered reporting Test cases to specify SSB with one SSB per SS-burst.

b) Specify the #RBs in the channel BW for FR2 Intra-frequency Event-triggered reporting Test cases.

**Discussion:**

**Decision: Agreed.**

**R4-2009565 Update to FR2 SS-RSRP RRM Test cases in A.5.7 and A.7.7**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0902 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Update the allowance made in the SS-RSRP test cases for multi-band relaxation factors. This also affects test case parameter settings related to the side conditions in Annex B for the intra-frequency test cases.

**Discussion:**

**Decision: Agreed.**

**R4-2009566 Update to FR2 SS-RSRP RRM Test cases in A.5.7 and A.7.7**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0903 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Update the allowance made in the SS-RSRP test cases for multi-band relaxation factors. This also affects test case parameter settings related to the side conditions in Annex B for the intra-frequency test cases.

**Discussion:**

**Decision: Agreed.**

**R4-2009567 CR to EN-DC timing advance adjustment accuracy in FR2**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0904 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Changes the SRS-PeriodicityAndOffset in Table A.5.4.3.1.2-4 so that SRS is configured to an UL slot.

**Discussion:**

**Decision: Agreed.**

**R4-2009568 CR to EN-DC timing advance adjustment accuracy in FR2**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0905 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Changes the SRS-PeriodicityAndOffset in Table A.5.4.3.1.2-4 so that SRS is configured to an UL slot.

**Discussion:**

**Decision: Agreed.**

**R4-2009569 CR to configuration of CSI-RS for tracking**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0906 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Add note that if active BWP is larger than 52RBs, BW of TRS is configured as 52RBs, to avoid contradiction with 38.214.

**Discussion:**

**Decision: Agreed.**

**R4-2009570 CR to configuration of CSI-RS for tracking**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0907 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Add note that if active BWP is larger than 52RBs, BW of TRS is configured as 52RBs, to avoid contradiction with 38.214.

**Discussion:**

**Decision: Agreed.**

**R4-2009571 Update of RRC-based Active BWP Switch test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0908 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Clarify how the BWP is switched in the “Test Purpose and Environment” section.

**Discussion:**

**Decision: Revised to R4-2012070 (from R4-2009571).**

**R4-2012070 Update of RRC-based Active BWP Switch test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0908 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Clarify how the BWP is switched in the “Test Purpose and Environment” section.

**Discussion:**

**Decision: Return to.**

**R4-2009572 Update of RRC-based Active BWP Switch test cases**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0909 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Clarify how the BWP is switched in the “Test Purpose and Environment” section.

**Discussion:**

**Decision: Return to.**

**R4-2009575 Add UE Beam assumption for RRM Test cases in A.5.5**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0912 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Add the assumption about the type of beam used by the UE for RRM test cases in A.5.5 following R4-2008538.

**Discussion:**

**Decision: Agreed.**

**R4-2009576 Add UE Beam assumption for RRM Test cases in A.5.5**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0913 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Add the assumption about the type of beam used by the UE for RRM test cases in A.5.5 following R4-2008538.

**Discussion:**

**Decision: Agreed.**

**R4-2009603 CR on Requirement for MAC-CE based TCI State Switch-EN-DC-Rel15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0917 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

**Decision: Merged.**

**R4-2009604 CR on Requirement for MAC-CE based TCI State Switch-EN-DC-Rel16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0918 Cat: A (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Withdrawn.**

**R4-2009605 CR on Requirement for MAC-CE based TCI State Switch-SA-Rel15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0919 Cat: F (Rel-15)  
  
 Source: Apple*

**Discussion:**

**Decision: Merged.**

**R4-2009606 CR on Requirement for MAC-CE based TCI State Switch-SA-Rel16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0920 Cat: A (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Withdrawn.**

**R4-2009668 Add UE Beam assumption for RRM Test cases in A.7.5 Rel-15**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0921 Cat: F (Rel-15)  
  
 Source: Samsung*

**Discussion:**

**Decision: Agreed.**

**R4-2009669 Add UE Beam assumption for RRM Test cases in A.7.5 Rel-16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0922 Cat: A (Rel-16)  
  
 Source: Samsung*

**Discussion:**

**Decision: Agreed.**

**R4-2009806 CR for TS38.133 Rel-15, Correction for test cases of BWP switching**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0934 Cat: F (Rel-15)  
  
 Source: CATT*

**Discussion:**

**Decision: Revised to R4-20 (from R4-2009806).**

**R4-2012071 CR for TS38.133 Rel-15, Correction for test cases of BWP switching**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0934 Cat: F (Rel-15)  
  
 Source: CATT*

**Discussion:**

**Decision: Return to.**

**R4-2009807 CR for TS38.133 Rel-15, Correction for test cases of BWP switching**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0935 Cat: A (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Return to.**

**R4-2009887 CR on TS38.133 for handover test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0945 Cat: F (Rel-15)  
  
 Source: MediaTek inc., Intel*

**Discussion:**

**Decision: Revised to R4-2012072 (from R4-2009887).**

**R4-2012072 CR on TS38.133 for handover test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0945 Cat: F (Rel-15)  
  
 Source: MediaTek inc., Intel*

**Discussion:**

**Decision: Return to.**

**R4-2009888 CR on TS38.133 for handover test cases**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0946 Cat: A (Rel-16)  
  
 Source: MediaTek inc., Intel*

**Discussion:**

**Decision: Return to.**

**R4-2009889 CR on TS38.133 for introducing the PDSCH RMC configuration in cell re-selection test cases**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-0947 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Agreed.**

**R4-2009890 CR on TS38.133 for introducing the PDSCH RMC configuration in cell re-selection test cases**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0948 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Agreed.**

**R4-2013035 [CR] Replacing x in references with correct numbers (Perf R15 Cat F)**

*Type: CR For: Agreement  
 38.133 v15.10.0 CR-1112 Cat: F (Rel-15)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2013037 [CR] Replacing x in references with correct numbers (Core R16 Cat A)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1114 Cat: A (Rel-16)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

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

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

**Email discussion: [96e][205] NR\_NewRAT\_Positioning**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][205] NR\_NewRAT\_Positioning | R15 NR | Maintenance of the Positioning specs (36.171, 37.171 and 36.171) | 4.10 |

**R4-2012036 Email discussion summary for [96e][205] NR\_NewRAT\_Positioning** *Type: other For: Information  
 Source: Moderator (Spirent)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

1st round email discussion conclusions

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2010918](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010918.zip) | Agreed |

2nd round email discussion conclusions

Chair: no 2nd round discussion needed.

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

**R4-2010918 Changes to TS 37.171 title removing references to individual RATs**

*Type: CR For: Agreement  
 37.171 v13.1.0 CR-0033 Cat: F (Rel-13)  
  
 Source: NextNav*

**Discussion:**

**Decision: Agreed.**

**R4-2010933 Changes to TS 37.171 title removing references to individual RATs**

*Type: CR For: Agreement  
 37.171 v14.6.0 CR-0034 Cat: A (Rel-14)  
  
 Source: NextNav*

**Discussion:**

**Decision: Agreed.**

**R4-2010934 Changes to TS 37.171 title removing references to individual RATs**

*Type: CR For: Agreement  
 37.171 v15.3.0 CR-0035 Cat: A (Rel-15)  
  
 Source: NextNav*

**Discussion:**

**Decision: Agreed.**

**R4-2010935 Changes to TS 37.171 title removing references to individual RATs**

*Type: CR For: Agreement  
 37.171 v16.0.0 CR-0036 Cat: A (Rel-16)  
  
 Source: NextNav*

**Discussion:**

**Decision: Agreed.**

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

### 5.3 RRM requirements [WI code or TEI]

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

**Email discussion: [96e][203] LTE\_RRM\_maintenance**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][203] LTE\_RRM\_maintenance | Misc | RRM maintenance | 5.3 6.5.3 |

**R4-2012034 Email discussion summary for [96e][203] LTE\_RRM\_maintenance** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012204 (from R4-2012034).**

**R4-2012204 Email discussion summary for [96e][203] LTE\_RRM\_maintenance** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: euCA**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009891 | Revised |
| R4-2010562 | Revised |
| R4-2010565 | Revised. |

**Topic #2: CE Mode-A maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009534 | Agreed |

**Topic #3: NB-IoT maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011097 | Revised |

2nd round email discussion conclusions

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

**R4-2010561 Search threshold applicability in euCA**

*Type: discussion For: Approval  
 36.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Noted.**

**R4-2010562 CR clarifying S-measure thresholds for EMR carriers**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6926 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012083 (from R4-2010562).**

**R4-2012083 CR clarifying S-measure thresholds for EMR carriers**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6926 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2010563 CR clarifying S-measure thresholds for EMR carriers**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6927 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2010564 Measurement Performance Requirements test for euCA**

*Type: discussion For: Approval  
 36.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Noted.**

**R4-2010565 CR on performance requirements tests for euCA**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6928 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012084 (from R4-2010565).**

**R4-2012084 CR on performance requirements tests for euCA**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6928 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2010566 CR on performance requirements tests for euCA**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6929 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2011097 CR on NB-IoT Intra frequency with serving cell measurement relaxation test case 4.2.38 R15**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6935 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012085 (from R4-2011097).**

**R4-2012085 CR on NB-IoT Intra frequency with serving cell measurement relaxation test case 4.2.38 R15**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6935 Cat: F (Rel-15)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011098 CR on NB-IoT Intra frequency with serving cell measurement relaxation test case 4.2.38 R16 (Cat A)**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6936 Cat: A (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2009534 Correction to intra-frequency event triggered reporting test case in CEModeA**

*Type: CR For: Agreement  
 36.133 v13.19.0 CR-6913 Cat: F (Rel-13)  
  
 Source: ANRITSU LTD*

**Abstract:**

In eMTC RLM DRX test cases, the sr-ConfigIndex is defined as 10 which means a SR periodicity of 10 ms. This short period is causing practical issue for the test implementation. In Tests A.8.1.28 the sr-ConfigIndex changed from 10 ms periodicity to 30ms fo

**Discussion:**

**Decision: Agreed.**

**R4-2009535 Correction to intra-frequency event triggered reporting test case in CEModeA**

*Type: CR For: Agreement  
 36.133 v14.15.0 CR-6914 Cat: A (Rel-14)  
  
 Source: ANRITSU LTD*

**Abstract:**

In eMTC RLM DRX test cases, the sr-ConfigIndex is defined as 10 which means a SR periodicity of 10 ms. This short period is causing practical issue for the test implementation. In Tests A.8.1.28 the sr-ConfigIndex changed from 10 ms periodicity to 30ms fo

**Discussion:**

**Decision: Agreed.**

**R4-2009536 Correction to intra-frequency event triggered reporting test case in CEModeA**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6915 Cat: A (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

In eMTC RLM DRX test cases, the sr-ConfigIndex is defined as 10 which means a SR periodicity of 10 ms. This short period is causing practical issue for the test implementation. In Tests A.8.1.28 the sr-ConfigIndex changed from 10 ms periodicity to 30ms fo

**Discussion:**

**Decision: Agreed.**

**R4-2009537 Correction to intra-frequency event triggered reporting test case in CEModeA**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6916 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

In eMTC RLM DRX test cases, the sr-ConfigIndex is defined as 10 which means a SR periodicity of 10 ms. This short period is causing practical issue for the test implementation. In Tests A.8.1.28 the sr-ConfigIndex changed from 10 ms periodicity to 30ms fo

**Discussion:**

**Decision: Agreed.**

**R4-2009891 CR on TS36.133 for measurement capability of IDLE mode CA measurement**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6920 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Revised to R4-2012082 (from R4-2009891).**

**R4-2012082 CR on TS36.133 for measurement capability of IDLE mode CA measurement**

*Type: CR For: Agreement  
 36.133 v15.10.0 CR-6920 Cat: F (Rel-15)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2009892 CR on TS36.133 for measurement capability of IDLE mode CA measurement**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6921 Cat: A (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

## 6 Rel-16 Work Items for LTE

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

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

**Email discussion: [96e][228] LTE\_eMTC5\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][228] LTE\_eMTC5\_RRM | R16 LTE eMTC | RRM requirements (Core maintenance and Perf) | 6.1.1.2 6.1.2 |

**R4-2012059 Email discussion summary for [96e][228] LTE\_eMTC5\_RRM**  *Type: other For: Information  
 Source: Moderator (Ericsson )*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012228 (from R4-2012059).**

**R4-2012228 Email discussion summary for [96e][228] LTE\_eMTC5\_RRM**  *Type: other For: Information  
 Source: Moderator (Ericsson )*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: Core requirements maintenance: RSS**

Issue 1-1: Correction to serving cell RSS measurement period in normal coverage in IDLE mode

Agreement: For serving cell measurement in NC, RSS measurement period is defined as 3 DRX cycles, and the requirements are only applicable for DRX cycle of 320ms and 640ms.

Issue 1-2: Correction to serving cell RSS measurement period in enhanced coverage in IDLE mode

Agreement: For serving cell measurement in EC, RSS measurement period is defined as 5 DRX cycles, and the requirements are only applicable for DRX cycle of 320ms and 640ms.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009886 | Not pursued |
| R4-2011178 | Revised |

**Topic #2: Core requirements maintenance: PUR**

Issue 2-1: PUR and relaxed serving cell montoring

Agreement: For RSRP1 and RSRP2 in PUR requirements in clause 4.7.4.3, N=1 if relaxed serving cell monitoring is not in use.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011180 | Revised |

**Topic #3: Core requirements maintenance: MPDCCH improvement**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011179 | Revised |

**Topic #4: Core requirements maintenance: DL quality reporting**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011208 | Revised |

**Topic #5: Performance: RSS measurement accuracy**

Agreement: RF margin to use for RSS measurement for BL UE is 4 dB.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011207 | Revised |
| R4-2011182 | Not pursued |

**Topic #6: Performance: Test cases**

Issue 6-1: Test for DL channel quality reporting

Agreement: RAN4 to define RRM tests for DL channel quality reporting for both Msg3 based reporting in idle mode and MAC CE based reporting in connected mode.

Issue 6-2: Test parameters for DL channel quality reporting

Agreement: RAN4 to specify performance tests for DL channel quality reporting in 4-bit reporting mode according to Table 1.

Table 1 4-bit DL channel quality reporting tests for idle and connected states

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Index | State | Mode | Test | Note |
| 1 | Idle | A | AL = 24, RP > 1 | Tests for FDD/HD-FDD/TDD, AWGN |
| 2 | Idle | B | AL = 24, RP > 1 | Tests for FDD/HD-FDD/TDD, AWGN |
| 3 | Connected | A | AL < 24, RP = 1 | Tests for FDD/HD-FDD/TDD, AWGN |
| 4 | Connected | B | AL = 24, RP > 1 | Tests for FDD/HD-FDD/TDD, AWGN |

Issue 6-4: Test for MPDCCH improvement

Agreement: RAN4 to specify performance test for MPDCCH performance improvement when RLM out-of-sync is triggered.

**Issue 6-5: Test for mobility enhancement**

Agreement: RAN4 to define RRM tests for relaxed serving cell monitoring.

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012192 | WF on RRM performance requirements for MTC | Ericsson |

2nd round email discussion conclusions

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

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

##### 6.1.1.2 RRM [LTE\_eMTC5-Core]

**R4-2011177 Discussion on remaining issues in eMTC RRM requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011178 CR on RSS based measurement requriements**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6949 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012187 (from R4-2011178).**

**R4-2012187 CR on RSS based measurement requriements**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6949 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011179 CR on RLM requriements based on enhanced MPDCCH**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6950 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012189 (from R4-2011179).**

**R4-2012189 CR on RLM requriements based on enhanced MPDCCH**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6950 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011180 CR on PUR related requirements**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6951 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012188 (from R4-2011180).**

**R4-2012188 CR on PUR related requirements**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6951 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011208 Correction of eMTC DL channel quality report mapping table and RSS measurement requirements**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6954 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Maintenance CR for RSS measurement requirements and DL quality reporting requirements.

**Discussion:**

**Decision: Revised to R4-2012190 (from R4-2011208).**

**R4-2012190 Correction of eMTC DL channel quality report mapping table and RSS measurement requirements**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6954 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Maintenance CR for RSS measurement requirements and DL quality reporting requirements.

**Discussion:**

**Decision: Return to.**

**R4-2009886 CR\_Corrections to RSS based RSRP measurement requirements in R16 eMTC**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6919 Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Corrections to RSS-based RSRP measurement requirements

**Discussion:**

**Decision: Not pursued.**

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

**R4-2012192 WF on RRM performance requirements for MTC**

*Type: other For: Approval  
 Source: Ericsson*

**Discussion:**

**Decision: Return to.**

##### 6.1.2.1 General [LTE\_eMTC5-Perf]

**R4-2011181 Discussion on accuracy requirements for RSS based measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2011182 CR for accuracy requirements for RSS based measurement**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6952 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Not pursued.**

**R4-2011206 Discussions on RSS measurement accuracy for Rel-16 MTC**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The RSS based RSRP measurement accuracy is discussed in this contribution. We look at previous agreements, provide our view on the open issues and then make our proposals.

**Discussion:**

**Decision: Noted.**

**R4-2011207 Introduction of RSS measurement accuracy for Rel-16 MTC**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6953 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR to introduce RSS measurement accuracy requirements.

**Discussion:**

**Decision: Revised to R4-2012191 (from R4-2011207).**

**R4-2012191 Introduction of RSS measurement accuracy for Rel-16 MTC**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6953 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR to introduce RSS measurement accuracy requirements.

**Discussion:**

**Decision: Return to.**

**R4-2009872 On performance tests of RRM features in R16 MTC**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

##### 6.1.2.2 Test cases [LTE\_eMTC5-Perf]

**R4-2011183 Discussion on test cases for Rel-16 eMTC RRM**

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

**Discussion:**

**Decision: Noted.**

**R4-2011205 Discussions on test cases for Rel-16 MTC**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss the test cases for Rel-16 MTC.

**Discussion:**

**Decision: Noted.**

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

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

**Email discussion: [96e][229] NB\_IOTenh3\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][229] NB\_IOTenh3\_RRM | R16 NB-IOT | RRM requirements (Core maintenance and Perf) | 6.2.1.2 6.2.2 |

**R4-2012060 Email discussion summary for [96e][229] NB\_IOTenh3\_RRM**  *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012229 (from R4-2012060).**

**R4-2012229 Email discussion summary for [96e][229] NB\_IOTenh3\_RRM**  *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: Core requirements maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011088 | Agreed |
| R4-2011089 | Revised |

**Topic #2: Performance requirements**

Issue 2-1-1: DL channel quality reporting in non-anchor carrier

Agreement: RAN4 to specify performance tests for MSG3 DL channel quality reporting in non-anchor carrier

Issue 2-1-2: Channel quality reporting in connected mode

Agreement: RAN4 to specify test cases for channel quality reporting in connected mode.

Issue 2-1-3: Group WUS

Agreement: RAN4 to not specify performance tests for group WUS

Issue 2-1-5: New introduced short DRX cycles

Agreement: RAN4 to define test cases for the new introduced short DRX cycles length.

Issue 2-1-6: NRSRP Measurement on non-anchor carrier

Agreement: RAN4 to not specify performance tests for NRSRP measurements on the non-anchor carrier.

Issue 2-2-1: DL channel quality reporting in non-anchor carrier

Agreement: AWGN channel using 4-bit table

Issue 2-2-2: Channel quality reporting in connected mode

Agreement: The test must ensure that the channel condition (i.e., SNR) is different in the evaluation period compared to the time prior to it so that UE only relies on the specified evaluation period for estimation of DL quality.

Agreement: 4-bit version in AWGN channel should be tested.

Issue 2-2-4: RMCs and OCNGs

Agreement: Take the existing RMC/OCNG as baseline

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012194 | WF on Rel-16 NB-IoT RRM performance requirements | Huawei, HiSilicon |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011091 | Revised |

2nd round email discussion conclusions

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

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

##### 6.2.1.2 RRM [NB\_IOTenh3-Core]

**R4-2011088 CR on NRSRP measurement on non-anchor carrier for Rel-16 NB-IoT**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6933 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

**R4-2011089 CR on PUR requirements for NB-IoT**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6934 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012193 (from R4-2011089).**

**R4-2012193 CR on PUR requirements for NB-IoT**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6934 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

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

**R4-2012194 WF on Rel-16 NB-IoT RRM performance requirements**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

##### 6.2.2.1 General [LTE\_eMTC5-Perf]

**R4-2011090 Discussion on performance part of Rel-16 NB-IoT**

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

**Discussion:**

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

**R4-2009873 On performance tests of RRM features in R16 NB-IoT**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

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

##### 6.2.2.2 Test cases [LTE\_eMTC5-Perf]

**R4-2011091 Test cases list for Rel-16 NB-IoT**

*Type: other For: Approval  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012195 (from R4-2011091).**

**R4-2012195 Test cases list for Rel-16 NB-IoT**

*Type: other For: Approval  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011209 Discussions on test cases for Rel-16 NB-IOT**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss the test cases for Rel-16 NB-IOT.

**Discussion:**

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

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

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

**Email discussion: [96e][230] LTE\_feMob\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][230] LTE\_feMob\_RRM | R16 LTE Mob Enh | RRM Core requirements | 6.3.1 6.3.2 |

**R4-2012061 Email discussion summary for [96e][230] LTE\_feMob\_RRM**  *Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012230 (from R4-2012061).**

**R4-2012230 Email discussion summary for [96e][230] LTE\_feMob\_RRM**  *Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: Core requirements**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011127 | Agreed |

**Topic #2: Performance requirements**

Issue 2-3: whether CHO and inter-freq DAPS HO test cases should be defined only for FDD cases

Agreement: CHO and inter-freq DAPS HO test cases should be defined for both TDD and FDD cases.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009885 | Revised |
| R4-2011129 | Revised |
| R4-2011432 | Revised |

2nd round email discussion conclusions

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

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

**R4-2011127 CR on DAPS handover**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6938 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

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

##### 6.3.2.1 General [LTE\_feMob-Perf]

**R4-2011128 Discussion on DAPS handover test cases**

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

**Discussion:**

**Decision: Noted.**

##### 6.3.2.2 Test cases [LTE\_feMob-Perf]

**R4-2011129 Test cases for inter-frequency DAPS**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6939 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012197 (from R4-2011129).**

**R4-2012197 Test cases for inter-frequency DAPS**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6939 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011432 CR on 36133 LTE CHO TCs**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6961 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Test cases for LTE CHO.

**Discussion:**

**Decision: Revised to R4-2012198 (from R4-2011432).**

**R4-2012198 CR on 36133 LTE CHO TCs**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6961 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Test cases for LTE CHO.

**Discussion:**

**Decision: Return to.**

**R4-2009885 CR\_ Introduction of intrafrequency sync and async LTE DAPS HO test cases**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6918 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces test cases for intra-frequency DAPS HO in sync and async modes

**Discussion:**

**Decision: Revised to R4-2012196 (from R4-2009885).**

**R4-2012196 CR\_ Introduction of intrafrequency sync and async LTE DAPS HO test cases**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6918 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces test cases for intra-frequency DAPS HO in sync and async modes

**Discussion:**

**Decision: Return to.**

### 6.5 R16 LTE maintenance [WI code]

#### 6.5.3 RRM [WI code]

## 7 Rel-16 Work Items for NR

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

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

**Email discussion: [96e][206] NR\_unlic\_RRM\_1**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][206] NR\_unlic\_RRM\_1 | R16 NR-U | RRM Core: General (spec structure, applicability), HO, RRC connection mobility, Scell activation/deactivation, PSCell addition/release, Active TCI state switching | 7.1.5.1 7.1.5.3 7.1.5.4 7.1.5.5 7.1.5.6 7.1.5.13 (related papers) |

**R4-2012037 Email discussion summary for [96e][206] NR\_unlic\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012206 (from R4-2012037).**

**R4-2012206 Email discussion summary for [96e][206] NR\_unlic\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (Aug 21st)

**SSB monitoring capabilities**

Q1: RAN4 assumption on signalling of UE SSB monitoring capabilities

Agreement: In NR-U work, RAN4 assumes that no explicit or signalled UE capabilities will be defined for the number of candidate SS/PBCH block indexes corresponding to the same SS/PBCH block index the UE should monitor in a given discovery burst transmission window (for RRM) or within the set of configured resources (for RLM/CBD/BFD).

Q2: Differentiation between UE in FBE and LBE modes

Agreements

* No differentiation between UE in FBE and LBE modes in NR-U RRM Core requirements.
* Different test case will be defined for UE in FBE and LBE modes in NR-U RRM Performance requirements.

Q3: Whether to capture the number of candidate SSB positions in NR-U core requirements

Agreements

* RRM core requirements are defined under assumption what UE monitors the first 2 successive QCL’ed candidate SSB positions (i.e. N1 = N2 = 2)
  + FFS if same values apply for cell detection
    - Option 1: For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst
    - Option 2: Same value applies as for other RRM measurements
  + The total number of candidate SSBs indexes and number of cell UE shall monitor remains unchanged

**NR-U terminology**

Issue 1-2-1: Further clarification for “X not available at the UE”

* Proposals
  + Proposal 1 (Ericsson): For each NR-U requirement using the term “X not available at the UE”, add a clarification in the introduction, general part or in the beginning of the NR-U requirement according to the format:
    - The term “X not available at the UE” refers to when the X is configured by gNB but may not be received at the UE during the corresponding … period due to the absence of the necessary radio signals from the cell because of DL CCA failure at the gNB,

where X shall be replaced depending on the requirement with:

* + - RLM-RS SSB in RLM requirements,
    - BFD-RS SSB in BFD requirements,
    - CBD-RS SSB in CBD requirements,
    - SSB in L1-RSRP measurement requirements,
    - SMTC in measurement requirements other than RSSI requirements and L1-RSRP,
    - SSB in TCI state switching requirements,
    - SMTC in SCell activation, PSCell addition/release, HO, RRC re-establishment, RRC release with redirection requirements, etc.

and … shall be replaced with what is appropriate:

* + - evaluation,
    - detection,
    - identification,
    - activation, etc.

Issue 1-2-2: Minimum number of candidate SSB positions in the definition of “X not available at the UE”

* Proposals
  + Proposal 1 (Ericsson): No need to explicitly define the minimum number of candidate SSB positions in the definition of “X not available at the UE”.

Issue 1-2-3: Further clarification for “Y unavailable for transmission”

* Proposals
  + Proposal 1 (Ericsson): For each NR-U requirement using the term “Y unavailable for transmission”, add a clarification in the introduction, general part or in the beginning of the NR-U requirement according to the format:
    - The term “Y unavailable for transmission” refers to when the Y is configured by gNB but may not be transmitted by the UE during the corresponding period due to UL CCA failure at the UE,
    - where Y shall be replaced depending on the requirement with:
    - PRACH, HARQ, etc.

**Sub-topic 4-2: Applicability of SCell activation/deactivation requirements when sCellDeactivationTimer is not configured**

Issue 4-2-1: Do the SCell activation requirements apply for the case when sCellDeactivationTimer is not configured?

* Proposals
  + Proposal 1 (Qualcomm, Ericsson): The SCell activation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured.
  + Proposal 2 (Nokia): In NR-U, the sCell activation delay requirement applies regardless of the sCellDeactivationTimer being configured or not.

Issue 4-2-2: Do the SCell deactivation requirements apply for the case when *sCellDeactivationTimer* is not configured?

* Proposals
  + Proposal 1 (Ericsson): The SCell deactivation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured.
  + Proposal 2 (Qualcomm): No new specification is needed for SCell deactivation requirements when SCellDeactivationTimer is not configured.
  + Proposal 3 (Nokia): In NR-U, the sCell deactivation delay requirement applies regardless of the sCellDeactivationTimer being configured or not.

Issue 4-2-3: UE behaviour with respect to a configured *sCellDeactivationTimer* in SCell activation/deactivation

* Proposals
  + Proposal 1 (Huawei): If RAN4 is to define requirements only when sCellDeactivationTimer is configured, necessary clarification is needed that UE shall not stop sCellDeactivationTimer before UE successfully transmits the HARQ feedback for the deactivation command.

1st round email discussion conclusions

**Topic #1: General**

Chair: discuss the remaining issues in the 2nd round taking into account GTW agreements

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010380 | Return to |
|  |  |

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012090 | WF on NR-U RRM part 1 | Ericsson |

Chair: capture email thread conclusions in WF including agreements on SSB monitoring capabilities

**Topic #2: Handover requirements**

Agreement

* + The delay uncertainty (TIU) due to RACH transmission in HO (same approach is proposed also for RRC re-establishment and RRC release with redirection) is defined as follows:

TIU = (1+ L3)\*TSSB,RO + 10 ms

where:

* + - TSSB,RO is the SSB to PRACH occasion association period as defined on TS 38.213.
    - L3 is the number of consecutive SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failure.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010593 | Revised |
| R4-2011242 | Merged |
| R4-2011243 | Agreed |

**3 Topic #3: RRC connection mobility control**

Issue 3-1-1: Delay uncertainty (TPRACH\_CCA) due to RACH transmission in RRC re-establishment

Agreement

* + The delay uncertainty (TPRACH\_CCA) due to RACH transmission in RRC re-establishment (same approach is proposed also in HO and RRC release with redirection) is defined as follows:

TPRACH\_CCA = (1+ K3)\*TSSB,RO + 10 ms

where:

* + - TSSB,RO is the SSB to PRACH occasion association period as defined on TS 38.213.
    - K3 is the number of consecutive SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failure.

Issue 3-1-2: Carriers to identify

Agreement: The requirements for the RRC re-establishment delay shall consider the time for identification on carriers with and without CCA.

Issue 3-2-1: Delay uncertainty (TRACH\_CCA) due to RACH transmission in RRC connection release with redirection

Agreement

* + The delay uncertainty (TRACH\_CCA) due to RACH transmission in RRC connection release with redirection (same approach is proposed also in HO and RRC re-establishment) is defined as follows:

TRACH\_CCA = (1+ L2)\*TSSB,RO + 10 ms

where:

* + - TSSB,RO is the SSB to PRACH occasion association period as defined on TS 38.213.
    - L2 is the number of consecutive SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failure.

Issue 3-2-2: Delay uncertainty (TRACH\_CCA) due to RACH transmission in RRC connection release with redirection, with Type 2C UL channel access procedure

Agreement

* + The following is also included in the RACH delay uncertainty in RRC release with redirection:
* - L2 = 0 for Type 2C UL channel access procedure as defined in TS 37.213.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011077 | Revised |
| R4-2011244 | Agreed |
| R4-2011245 | Agreed |

**Topic #4: SCell Activation and Deactivation**

Issue 4-1-1: Interruption window length

Agreement: For a single interruption, interruption window length at SCell activation does not depend on LBT failures.

Issue 4-1-2: Interruption window starting point

Agreement

* The starting point of an interruption window on PCell or any activated SCell in MCG for NR standalone mode, or on PSCell or any activated SCell in SCG for EN-DC mode, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:
* - TFirstSSB + (L1)\* Trs, for known SCell activation when SCell measurement cycle is equal to, or smaller than, 160ms;
* - TFirstSSB\_MAX + L2,1\* TSMTC\_MAX for known SCell activation when SCell measurement cycle is greater than 160ms;
* - TFirstSSB\_MAX + L3,1\* TSMTC\_MAX for unknown SCell activation

Issue 4-1-3: Multiple interruption windows

Agreement

* For intra-band CA, while the SCell being activated is unknown or known with measurement cycle >160ms, up to (1+L) interruption windows are allowed during SCell activation, where L is the number of occasions that at least one SSB from SCells already activated or SCell being activated in the same band is not available before the first successful SSB transmissions subject to TSMTC\_max
* For inter-band CA: FFS

Issue 4-4-1: Conditions for CSI reporting during SCell activation

Agreement: When P/SP-CSI-RS is used for CSI report during the SCell activation, it is assumed one of the RRC parameters CO-DurationPerCell-r16, SlotFormatIndicator, and CSI-RS-ValidationWith-DCI-r16 is configured for a UE and the UE supports the corresponding capability

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009880 | Revised |

**Topic #5: Active TCI state switching**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011073 | Revised |
| R4-2010213 | Merged |

2nd round email discussion conclusions

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

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

**Email discussion: [96e][207] NR\_unlic\_RRM\_2**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][207] NR\_unlic\_RRM\_2 | R16 NR-U | RRM Core: Cell re-selection, Interruptions, Active BWP switching, RLM, Beam management, Timing | 7.1.5.2 7.1.5.7 7.1.5.8 7.1.5.9 7.1.5.12 7.1.5.13 (related papers) |

**R4-2012038 Email discussion summary for [96e][207] NR\_unlic\_RRM\_2** *Type: other For: Information  
 Source: Moderator (MediaTek)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012207 (from R4-2012038).**

**R4-2012207 Email discussion summary for [96e][207] NR\_unlic\_RRM\_2** *Type: other For: Information  
 Source: Moderator (MediaTek)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012091 | WF on NR-U RRM part 2 | MediaTek |

**Topic #1: Cell re-selection**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011076 | Revised |
| R4-2011213 | Revised |
| R4-2011214 | Not pursued |

**Topic 2: Active BWP switching (AI 7.1.5.7)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011075 | Return to  Note: The CR aligns with the tentative agreement which is pending on companies’ further check. |
| R4-2011240 | Not pursued. |

**Topic 3: RLM (AI 7.1.5.8)**

UE assumption on transmit power

Agreement: Define the RLM requirements, taking into account that the UE can assume that NZP CSI-RS or SS/PBCH block (for L1-RSRP, RLM, BFD, CBD and RRM) is transmitted with the same transmit power across different occasions during the measurement period, as in Rel-15.

Whether to define CSI-RS based RLM requirements in Rel-16

Agreement: Do not define CSI-RS based RLM requirements in Rel-16

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011352 | Revised |

**Topic 4: Beam management (AI 7.1.5.9)**

Evaluation period for SSB based BFD

Agreement: The Evaluation period for SSB based BFD follows the same approach as that in the OOS evaluation period for SSB based RLM

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010470 | Revised |

**Topic 5: Timing (AI 7.1.5.12)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010216 | Revised |
| R4-2010597 | Not pursued |
| R4-2011247 | Not pursued |

GTW session (Aug 24th)

**Issue 1-1: Max number of unavailable SMTC occasions during measurement before UE detects the cell again**

* Background from last meeting (R4-2008567)
  + For a cell that is already identified, after N unsuccessful measurement attempts due to exceeding the max number of unavailable SMTC occasions, UE needs to detect the cell again
    - N = 2 or 3
* Proposals
  + Option 1: N=2 (Qualcomm, Huawei)
  + Option 2: N=3 (ZTE, Ericsson)
* Recommended WF:
  + Need more discussion
* 1st round status:
  + 4 companies support Option 1 (N=2): Huawei, Qualcomm, Apple, Nokia
  + 3 companies support Option 2 (N=3): ZTE, MTK, Ericsson

Discussion:

* MTK/E///: fine with Option 1

Agreement: N=2

**Issue 3-4: Definition of SNREST**

* Background from last meeting (R4-2008567): SINREST is the estimated SINR at the UE side. 3 Options:
  + Filtered SINR estimate over evaluation period
  + Current SSB SINR estimate
  + last available SSB SINR
* Proposals
  + Option 1: Last available SSB before the evaluation period starts (ZTE)
  + Option 2: Current SSB SINR estimate (Qualcomm, Huawei)
  + Option 3: Filtered SINR estimate over the evaluation period at UE side (Apple, MediaTek, Nokia)
  + Option 4: The smallest SSB SINR (Es/Iot) value over the evaluation period for the corresponding SSB. SINREST is denoted by the SSB Es/Iot in the RLM requirements in TS 38.133. (Ericsson)
* 1st round summary:
  + Question A: Purpose of this SNR
    - Option A1) Determine which requirement (fix or dynamic) should be followed by UE (MTK, Apple, E///, QC, ZTE)
    - Option A2) Determine whether the SSB is transmitted by gNB (Huawei, QC)
  + Question B: SNR side condition or estimated SNR
    - Option B1) The SNR side condition Es/Iot (MTK, Apple, Huawei, E///, QC)
    - Option B2) The estimated SNR at UE side (ZTE)
  + Question C: How to deal with multiple samples (with and without LBT failure)
    - Option C1) Last available SSB before the evaluation period starts (ZTE)
    - Option C2) Current SSB SINR estimate (Huawei, QC)
    - Option C3) Averaged SINR over the evaluation period at UE side (MTK, Apple)
    - Option C4) The smallest SINR value over the evaluation period (E///)
* Discussion:
  + MTK: A1, B1, C3
    - Apple: same view
  + Huawei: Prefer A2. For A1 we use SNR in the past to decide the set of requirements. C2
  + E///: Question C depends on other issues.
  + QC: Question A – answers are not mutually exclusive
  + ZTE: Question A – A1 and A2 are very similar

* Agreement
  + SNREST
    - SNREST is the side condition Es/Iot

**Issue 3-7: OOS evaluation period when Es/Iot > X dB (X is based on the conclusion of Issue 3-5)**

* Background from last meeting (R4-2008567): FFS
* Proposals
  + Option 1: depends on Lout (Lout ≤ Lout,max), where Lout is the number of SSBs not available at the UE during TEvaluate\_out\_SSB (ZTE, Nokia, Ericsson)
    - Lout,max = 14 for max(TSSB, TDRX) ≤ 40 where TDRX=0 for non-DRX,
    - Lout,max = 10 for 40 <Max(TSSB, TDRX)≤320
    - Lout,max = 6 for TDRX >320.
  + Option 2: Extend the evaluation period using a fixed factor L (Apple)
    - L = 7 for max(TSSB, TDRX) ≤ 40,
    - L = 5 for 40 <Max(TSSB, TDRX)≤320
    - L = 3 for TDRX >320.
  + Option 3: Proposal 2 in R4-2011084 (Huawei)

|  |  |
| --- | --- |
| Configuration | TEvaluate\_out\_SSB,CCA (ms) |
| no DRX | Max(200, Ceil((10-Lout,available) ×K× P) × TSSB) |
| DRX cycle≤320 | Max(200, Ceil((15-Lout,available) ×K × P) × Max(TDRX,TSSB)) |
| DRX cycle>320 | Ceil((10-Lout,available) × K × P) × TDRX |
| NOTE 4: Lout,avaiable is the number of available SSB RLM-RS at UE, where Es/Iot > [-7] dB. | |

* 1st round summary:
  + Option 1: ZTE, MTK (compromise), Ericsson, Nokia
  + Option 2: MTK, QC, Apple, Intel, Huawei
  + Option 3: HW
* Discussion:
  + E///: Prefer Option 1. For another Es/Iot < -7 we can compromise to Option 2.
  + Nokia: Option 1.
  + Huawei: For Option 1 what is the definition of the SNR?
  + Apple: Option 2.
  + E///: Object to Option 2.
  + Apple, Huawei: Object to Option 1.
  + Chair: if we cannot choose, then we may decide not to define the requirements
  + Nokia: prefer to define the requirements. can compromise to Option 2.
  + ZTE: prefer to define the requirements.
* Agreement
  + Option 1: depends on Lout (Lout ≤ Lout,max), where Lout is the number of SSBs not available at the UE during TEvaluate\_out\_SSB (ZTE, Nokia, Ericsson)
    - Lout,max = 14 for max(TSSB, TDRX) ≤ 40 where TDRX=0 for non-DRX,
    - Lout,max = 10 for 40 <Max(TSSB, TDRX)≤320
    - Lout,max = 6 for TDRX >320.
  + Option 2: Extend the evaluation period using a fixed factor L (MTK, QC, Apple, Intel, Huawei, [Nokia])
    - L = 7 for max(TSSB, TDRX) ≤ 40,
    - L = 5 for 40 <Max(TSSB, TDRX)≤320
    - L = 3 for TDRX >320.
  + Do not define requirements for the case of OOS evaluation period when Es/Iot > X dB in case no decision on Option 1 and 2 is made.
  + Note: return to in the 2nd round

**Issue 3-8: UE behaviour upon exceeding Lout,max of OOS evaluation period when Es/Iot > X dB (if Option 1 in 3-7 is agreed)**

* Proposals
  + Option 1: the same as if the radio link quality for this RLM-RS resource were below Qout (ZTE, Ericsson)
* 1st round summary:
  + 4 companies support Option 1
  + 1 company asked for further clarification
  + 1 company disagrees Option 1

**Issue 4-2: Measurement period for L1-RSRP**

* Proposals
  + Option 1: (Ericsson)
    - RAN4 should wait for LS response from RAN1 on the UE behavior when UE cannot transmit HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting. RAN4 should continue the discussion in the RRM maintenance in case RAN4 does not receive the LS response from RAN1 during RAN4#96-e
* Status:
  + 2 companies agree with Option 1 (wait for RAN1)
  + 1 company suggests to further discuss this issue in Rel-17.
  + 1 company asked the question on how to finalize the core requirement with this issue open.

2nd round email discussion conclusions

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

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

**Email discussion: [96e][208] NR\_unlic\_RRM\_3**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][208] NR\_unlic\_RRM\_3 | R16 NR-U | RRM Core: Measurement requirements, Measurement capability and reporting criteria | 7.1.5.10 7.1.5.11 |

**R4-2012039 Email discussion summary for [96e][208] NR\_unlic\_RRM\_3** *Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012208 (from R4-2012039).**

**R4-2012208 Email discussion summary for [96e][208] NR\_unlic\_RRM\_3** *Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012092 | WF on NR-U RRM part 3 | Nokia |

**Topic #1: Remaining issues intra and inter-frequency measurements and measurement capability**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009911 | Noted.  Chair: CR R4-2012098 was allocated instead. Please capture updates in CR and request CR number from MCC |
| R4-2010594 | Revised |
| R4-2010595 | Revised |
| R4-2011074 | Revised |
| R4-2010667 | Revised |
| R4-2009909 | Return to |

**Topic #2: RSSI and CO measurements**

Issue 2-1-1: Intra-frequency RSSI measurement definition

Agreement: No additional condition is needed for the intra-frequency measurement definition

Issue 2-1-2: Need for measurement gaps in RSSI measurements

Agreement: Measurement gaps are needed for RSSI/CO measurements when RSSI BW is not fully within the active DL BWP of the UE.

Issue 2-3-3: Scaling factor for DRX ≤ 320ms

Agreement: For RSSI Measurements, do not use the scaling factor of 1.5 when DRX ≤ 320ms.

Issue 2-4-1: RAN4 to define scheduling restrictions during RSSI/CO measurements

Agreement: RAN 4 to define scheduling restrictions during RSSI/CO measurements

GTW session (Aug 24th)

**1-2-1: UE behavior in RRC\_CONNECTED mode when serving cell is unavailable for consecutive SSB bursts**

* Candidate options:
  + Option 1 (Huawei, HiSilicon, Apple, Intel): UE shall initiate measurements on neighbour cells indicated by the serving cell if it is unable to measure the serving cell for consecutive SSB bursts.
  + Option 2 (MediaTek, Qualcomm, Ericsson, Nokia, Nokia Shanghai Bell): After no SSBs of a cell can be received during up to 8 seconds, the cell will not be considered as detectable and the Rel-15 UE behavior will apply. No other UE behavior or requirement on the consecutive SSBs in the serving cell is needed.
  + Option 2b (ZTE) No other UE behavior or requirement on the consecutive SSBs in the serving cell is needed for R16, further study Option 1 in R17 as possible enhancement to NR-U.
* Discussion
  + Apple: In Rel-15 we don’t have explicit agreements on UE behavior. What is the UE behavior there? 8 sec should be reduced.
  + QC: is Option 1 applicable only for the case when we don’t have thresholds? Typically there are ongoing neighbor cell measurements.
    - Apple: Option 1 applies for the case when UE is not making measurements.
  + QC: ok with option 1 (under correction that UE can continue doing measurements)
  + MTK: UE is not required to initiate measurements. In Rel-15 there is no clear UE behavior and it is up to UE.
  + Huawei: In Rel-15 UE needs to trigger RLF and no other behavior.
  + Nokia, E///: this would be taken care by RLF. No need to specify anything here.
  + Nokia, MTK: this is kind of optimization
  + Chair: companies can discuss whether any additional enhancements shall be introduced in the ongoing email discussion on Rel-17 RRM work scope
* Agreements
  + Do not specify additional UE behavior in RRC\_CONNECTED mode when serving cell is unavailable for consecutive SSB bursts

**1-4-1: Applicability of SMTC2 signaling to NR-U**

* Candidate options:
  + Option 1 (ZTE, Qualcomm, Ericsson, Apple, Intel and Nokia): Signaling of smtc2 is applicable to unlicensed band.

**2-3-1: RSSI measurement period when measurement gaps are not required**

* Candidate options:
  + Option 1 (MediaTek, Qualcomm, [Apple]): Not to specify requirements for the case in which the SMTC is overlapping with RMTC. When measurement gap is not required, RSSI/CO measurement period is scaled with Nintra-MO, and corresponds to:
    - Nintra-MO.max(reportInterval, rmtc-Period) when DRX is not used
    - Nintra-MO.max(reportInterval, rmtc-Period, DRXcycle length) when DRX is used
    - where Nintra-MO , reportInterval, and rmtc-Period is defined as the number of measurement objects that can be measured without gaps, configured reporting interval, and configured RMTC period, respectively.
  + Option 2 (Ericsson): To specify requirements also when the SMTC and RMTC are overlapping. The RSSI and CO measurement periods depend on:
    - max(reportInterval, rmtc-Period)\*CSSFoutside\_gap,i in non-DRX when measurement gaps are not required,
    - max(reportInterval, rmtc-Period, DRX)\*CSSFoutside\_gap,i in DRX when measurement gaps are not required,
  + Option 3 (Nokia) To have requirements for both cases. Option 1 for when the RMTC and SMTC are not overlapping, and Option 2 for when the RMTC and SMTC are overlapping.
* Discussion
  + E///: Agree with Nokia
  + Huawei: For Option 1 is there any limitation to do RSSI measurements on the same symbols with SSB?
  + QC: RSSI measurements shall be outside the SSB symbols in order to represent the actual interference.
  + E///: prefer to have RSSI measurements on SSB symbols
* Agreement:
  + SMTC and RMTC are overlapping
    - The RSSI and CO measurement periods depend on:
      * max(reportInterval, rmtc-Period)\*CSSFoutside\_gap,i in non-DRX when measurement gaps are not required,
      * max(reportInterval, rmtc-Period, DRX)\*CSSFoutside\_gap,i in DRX when measurement gaps are not required,
      * CSSFoutside\_gap,i takes into account the overlap between SMTC and RMTC
  + SMTC and RMTC are not overlapping
    - RSSI/CO measurement period is scaled with Nintra-MO, and corresponds to:
      * Nintra-MO.max(reportInterval, rmtc-Period) when DRX is not used
      * Nintra-MO.max(reportInterval, rmtc-Period, DRXcycle length) when DRX is used
      * where Nintra-MO , reportInterval, and rmtc-Period is defined as the number of measurement objects that can be measured without gaps, configured reporting interval, and configured RMTC period, respectively.

**2-3-2: RSSI measurement period when measurement gaps are required**

* Candidate options:
  + Option 1 (MediaTek, Qualcomm, Apple and Nokia): When measurement gap is required, RSSI/CO measurement period corresponds to:
* max(reportInterval, rmtc-Period, MGRP).CSSFinter when DRX is not used
* max(reportInterval, rmtc-Period, MGRP, DRXcycle length).CSSFinter when DRX is used
* where CSSFinter is determined according to CSSFwithin-gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps."
  + Option 2 (Ericsson): The RSSI and CO measurement periods depend on.
    - max(reportInterval, rmtc-Period, MGRP,DRX)\* CSSFwithin\_gap,i in DRX when measurement gaps are required
  + Option 3 (Moderator): When measurement gap is required, RSSI/CO measurement period corresponds to:
* max(reportInterval, rmtc-Period, MGRP). CSSFwithin\_gap,i when DRX is not used
* max(reportInterval, rmtc-Period, MGRP, DRXcycle length) CSSFwithin\_gap,i when DRX is used
* where CSSFwithin-gap,i is determined in clause 9.1.5.2 for measurement conducted within measurement gaps."

**2-4-2: Differentiate the scheduling restriction during RSSI measurements when deriveSSB\_indexFromCell is enabled or not**

* Candidate options:
  + Option 1 (Huawei, Ericsson, Qualcomm, Apple and Nokia): For scheduling restrictions during RSSI/CO measurements, do not differentiate the cases in which deriveSSB\_indexFromCell is enabled or not

**2-2-1: RSSI measurement bandwidth**

* Candidate options:
  + Option 1 (Ericsson, Apple, Intel and Nokia): RSSI measurement bandwidth is the LBT bandwidth
  + Option 2 (MediaTek, Qualcomm): The discussion can take place in the performance work

2nd round email discussion conclusions

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

**R4-2012090 WF on NR-U RRM requirements – Part 1**

*Type: other For: Approval  
 Source: Ericsson*

**Discussion:**

**Decision: Return to.**

**R4-2012091 WF on NR-U RRM requirements – Part 2**

*Type: other For: Approval  
 Source: MediaTek*

**Discussion:**

**Decision: Return to.**

**R4-2012092 WF on NR-U RRM requirements – Part 3**

*Type: other For: Approval  
 Source: Nokia*

**Discussion:**

**Decision: Return to.**

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

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

**R4-2010380 Updates to general section for NR-U in 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1000 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Add band group for NR-U

**Discussion:**

**Decision: Return to.**

**R4-2011354 On NR-U terminology reflecting LBT and the related number of SSBs to monitor**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On NR-U terminology reflecting LBT and the related number of SSBs to monitor

**Discussion:**

**Decision: Noted.**

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

**R4-2010590 Scell activation and deactivation requirements in NR-U**

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

**Abstract:**

This document discusses the SCell activation and deactivation requirements in NR-U.

**Discussion:**

**Decision: Noted.**

**R4-2011076 CR on introduction of RRC\_IDLE state moblity requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1045 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012093 (from R4-2011076).**

**R4-2012093 CR on introduction of RRC\_IDLE state moblity requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1045 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011081 Discussion on cell re-selection requirements for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011212 Remaining discussions on IDLE mode cell re-selection requirements for NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss and provide our view on these open issues in IDLE mode.

**Discussion:**

**Decision: Noted.**

**R4-2011213 RRC\_IDLE state inter-RAT moblity requirements for NR-U**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6955 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Inter-RAT requirements for TS 36.133 for NR-U

**Discussion:**

**Decision: Revised to R4-2012094 (from R4-2011213).**

**R4-2012094 RRC\_IDLE state inter-RAT moblity requirements for NR-U**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6955 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Inter-RAT requirements for TS 36.133 for NR-U

**Discussion:**

**Decision: Return to.**

**R4-2011214 DraftCR: RRC\_IDLE/INACTIVE state requirements for NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Ericsson*

**Abstract:**

IDLE/INACTIVE state requirements for NR-U

**Discussion:**

**Decision: Not pursued.**

**R4-2009678 Pending issues on cell re-selection under NR-U**

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

**Abstract:**

This paper discusses some pending issues left from last meeting.

**Discussion:**

**Decision: Noted.**

**R4-2009866 Remaining issues on cell reselection in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

##### 7.1.5.3 Handover [NR\_unlic-Core]

**R4-2010593 CR to TS 38.133 - Handover requirements in NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1011 Cat: D (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012086 (from R4-2010593).**

**R4-2012086 CR to TS 38.133 - Handover requirements in NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1011 Cat: D (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2011241 Analysis of RACH in HO and RRC connection control requirements in NR-U**

*Type: other For: Discussion  
 Source: Ericsson, Qualcomm*

**Abstract:**

This paper analyze the RA delay in RRC re-establishment and RRC release requirements in NR-U

**Discussion:**

**Decision: Noted.**

**R4-2011242 Correction to RACH delay in HO delay requirements in NR-U in 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1089 Cat: F (Rel-16)  
  
 Source: Ericsson, Qualcomm*

**Abstract:**

This CR clarifies RA delay in HO requirements in NR-U in 38.133

**Discussion:**

**Decision: Merged.**

**R4-2011243 Correction to RACH delay in HO delay requirements in NR-U in 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6956 Cat: F (Rel-16)  
  
 Source: Ericsson, Qualcomm*

**Abstract:**

This CR clarifies RA delay in HO requirements in NR-U in 36.133

**Discussion:**

**Decision: Agreed.**

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

**R4-2011077 CR on RRC re-establishment for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1046 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012087 (from R4-2011077).**

**R4-2012087 CR on RRC re-establishment for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1046 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011085 Discussion on RRC re-establishment for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011244 Correction to RACH delay in RRC release requirements in NR-U in 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1090 Cat: F (Rel-16)  
  
 Source: Ericsson, Qualcomm*

**Abstract:**

This CR clarifies RA delay in RRC re-establishment and RRC release with redirection requirements in NR-U in 38.133

**Discussion:**

**Decision: Agreed.**

**R4-2011245 Correction to RACH delay in RRC release requirements in NR-U in 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6957 Cat: F (Rel-16)  
  
 Source: Ericsson, Qualcomm*

**Abstract:**

This CR clarifies RA delay in RRC release with redirection requirements in NR-U in 36.133

**Discussion:**

**Decision: Agreed.**

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

**R4-2010211 Discussion on Scell activation for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011087 Discussion on SCell activation and deactivation requirements for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011349 On SCell activation delay in NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On SCell activation delay in NR-U

**Discussion:**

**Decision: Noted.**

**R4-2009867 On Scell activation and deactivation requirements in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009880 Introduction of activation and deactivation delay requirements for SCells operating with CCA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0940 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces Scell activation/deactivation requirements for NR-U

**Discussion:**

**Decision: Revised to R4-2012088 (from R4-2009880).**

**R4-2012088 Introduction of activation and deactivation delay requirements for SCells operating with CCA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0940 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces Scell activation/deactivation requirements for NR-U

**Discussion:**

**Decision: Return to.**

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

**R4-2010212 Discussion on TCI swtich for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2010213 CR on active TCI state switch delay in NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0990 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Merged.**

**R4-2011073 CR on active TCI state switching for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1042 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012089 (from R4-2011073).**

**R4-2012089 CR on active TCI state switching for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1042 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011078 Discussion on Active TCI state switching for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011350 On active TCI state switching requirements in NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On active TCI state switching requirements in NR-U

**Discussion:**

**Decision: Noted.**

**R4-2009675 TCI state switching under NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2009868 On active TCI state switching in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

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

**R4-2011075 CR on introduction of Active BWP switching delay requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1044 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011080 Discussion on BWP switch requirements for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011239 Analysis of open issues in BWP switching requirement due to consistent UL failure**

*Type: other For: Discussion  
 Source: Ericsson, Qualcomm*

**Abstract:**

This paper analyzes remaining issues related to delay requirements for BWP switching in NR-U under consistent LBT failures

**Discussion:**

**Decision: Noted.**

**R4-2011240 BWP switching delay requirement due to consistent UL failure in 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Ericsson, Qualcomm*

**Abstract:**

CR to complete/finalize the delay requirements for BWP switching in NR-U under consistent LBT failures.

**Discussion:**

**Decision: Not pursued.**

**R4-2009677 On BWP switch in NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2009869 Remaining issues in UL BWP switching in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

##### 7.1.5.8 RLM [NR\_unlic-Core]

**R4-2010214 Discussion on RLM requirement for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2010591 RLM requirements in NR-U**

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

**Abstract:**

This document discusses the reamining aspects of RLM in NR-U

**Discussion:**

**Decision: Noted.**

**R4-2011084 Discussion on RLM requirements for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011351 On RLM in NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On RLM in NR-U

**Discussion:**

**Decision: Noted.**

**R4-2011352 Introduction of RLM requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1102 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of RLM requirements for NR-U

**Discussion:**

**Decision: Revised to R4-2012095 (from R4-2011352).**

**R4-2012095 Introduction of RLM requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1102 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of RLM requirements for NR-U

**Discussion:**

**Decision: Return to.**

**R4-2009676 Discussion on RLM in NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2009870 On RLM requirements in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009912 On remaining issues for RLM/BFD OOS evaluation in NR-U**

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

**Discussion:**

**Decision: Noted.**

##### 7.1.5.9 Beam management [NR\_unlic-Core]

**R4-2010469 Beam management for NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the remaining open issues for NR-U beam management.

**Discussion:**

**Decision: Noted.**

**R4-2010470 CR: Beam management requirements with CCA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1007 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR introduce beam management requirements for NR-U.

**Discussion:**

**Decision: Revised to R4-2012096 (from R4-2010470).**

**R4-2012096 CR: Beam management requirements with CCA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1007 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR introduce beam management requirements for NR-U.

**Discussion:**

**Decision: Return to.**

**R4-2011079 Discussion on beam management requirements for NR-U**

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

**Discussion:**

**Decision: Noted.**

##### 7.1.5.10 Measurement requirements [NR\_unlic-Core]

**R4-2010082 Remaining issues on intra or inter frequency measurements**

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

**Discussion:**

**Decision: Noted.**

**R4-2010215 Discussion on measurements requirement for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2010592 Remaining aspects in measurement requirements in NR-U**

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

**Abstract:**

This document discusses remaining aspects of measurement requirements in NR-U:

**Discussion:**

**Decision: Noted.**

**R4-2010594 CR to TS 38.133 to address NR-U inter-frequency measurements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1012 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012099 (from R4-2010594).**

**R4-2012099 CR to TS 38.133 to address NR-U inter-frequency measurements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1012 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2010595 CR to TS 36.133 to address NR-U inter-RAT measurements**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6931 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012100 (from R4-2010595).**

**R4-2012100 CR to TS 36.133 to address NR-U inter-RAT measurements**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6931 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2011074 CR on introduction of intra-frequency measurements requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1043 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012101 (from R4-2011074).**

**R4-2012101 CR on introduction of intra-frequency measurements requirements for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1043 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011083 Discussion on measurement requirement for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2011353 On intra-frequency and inter-frequency measurements in NR-U including RSSI and CO**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On intra-frequency and inter-frequency measurements in NR-U including RSSI and CO

**Discussion:**

**Decision: Noted.**

**R4-2009871 Remaining issues on measurement requirements in NR-U**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009910 Further discussion on serving cell evaluation in RRC connected mode for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2009911 Draft CR on serving cell evaluation in RRC connected mode for NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2012098 CR on serving cell evaluation in RRC connected mode for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-TBA Cat: B (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

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

**R4-2011082 Discussion on measurement capability of NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2009908 On MO merging for NR-U**

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

**Discussion:**

**Decision: Noted.**

**R4-2009909 CR on UE measurement capability of NR-U for R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0957 Cat: B (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

##### 7.1.5.12 Timing [NR\_unlic-Core]

**R4-2010216 CR for timing requirement for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0991 Cat: B (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Revised to R4-2012097 (from R4-2010216).**

**R4-2012097 CR for timing requirement for NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0991 Cat: B (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2010596 Timing requirements in NR-U**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This documents discusses the remaining aspects in timing requirements in NR-U

**Discussion:**

**Decision: Noted.**

**R4-2010597 CR on timing requirements in NR-U**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1013 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Not pursued.**

**R4-2011246 Open issues related to UE timing requirements in NR-U**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper analyze the open issues on UE transmit timing requrements in NR-U

**Discussion:**

**Decision: Noted.**

**R4-2011247 UE transmit timing requirements in NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Ericsson*

**Abstract:**

This CR provides UE transmit timing requrements in NR-U. It is based on endorsed CR in R4-2008574 with additional updates

**Discussion:**

**Decision: Not pursued.**

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

**R4-2010667 CR 36.133 (8.17.2.2.a) Clarification of UE behaviour**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6932 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR with clarification on UE behaviour should the UE fail to fulfill the requirement on maximum allowed difference between fixing of time in PCell and fixing of time in neighbour cell when determining SFTD.

**Discussion:**

**Decision: Revised to R4-2012102 (from R4-2010667).**

**R4-2012102 CR 36.133 (8.17.2.2.a) Clarification of UE behaviour**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6932 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR with clarification on UE behaviour should the UE fail to fulfill the requirement on maximum allowed difference between fixing of time in PCell and fixing of time in neighbour cell when determining SFTD.

**Discussion:**

**Decision: Return to.**

**R4-2011086 Discussion on RSSI and CO measurement for NR-U**

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

**Discussion:**

**Decision: Noted.**

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

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

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

**Email discussion: [96e][209] NR\_Mob\_enh\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][209] NR\_Mob\_enh\_RRM | R16 NR Mob Enh | RRM requirements (Core maintenance and Perf) | 7.2.1 7.2.2 |

**R4-2012040 Email discussion summary for [96e][209] NR\_Mob\_enh\_RRM** *Type: other For: Information  
 Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012209 (from R4-2012040).**

**R4-2012209 Email discussion summary for [96e][209] NR\_Mob\_enh\_RRM** *Type: other For: Information  
 Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012103 | WF on NR Mobility Enhancement RRM | Intel Corporation |

**Topic #1: DAPS handover core requirement maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009896 | Return to |
| R4-2011050 | Return to |
| R4-2010517 | Agreed |
|  |  |

**Topic #2: Test case**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009748 | Return to |
| R4-2009749 | Return to |
| R4-2009884 | Return to |
| R4-2010381 | Return to |
| R4-2011052 | Return to |

2nd round email discussion conclusions

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

**R4-2012103 WF on NR Mobility Enhancement RRM**

*Type: other For: Approval  
 Source: Intel Corporation*

**Discussion:**

**Decision: Return to.**

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

**R4-2011049 Discussion on interruption issues for DAPS handover**

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

**Discussion:**

**Decision: Noted.**

**R4-2011050 CR on maintaining DAPS handover requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1034 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

**R4-2009895 Discussion on dual active protocol stack handover**

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

**Discussion:**

**Decision: Noted.**

**R4-2009896 CR on TS38.133 for dual active protocol stack handover**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0950 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Withdrawn.**

**R4-2012236 CR on TS38.133 for dual active protocol stack handover**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0950 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

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

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

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

**R4-2010381 Conditional handover test cases for NR**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1001 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR to add the CHO tests ; worksplit agreed in RAN4#95-e

**Discussion:**

**Decision: Return to.**

**R4-2011051 Discussion on DAPS handover test cases**

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

**Discussion:**

**Decision: Noted.**

**R4-2011052 CR on inter-band DAPS handover tests**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1035 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

**R4-2009748 Intra-band Inter-frequency sync DAPS handover test in SA for FR1**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0926 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2009749 Intra-band Inter-frequency async DAPS handover test in SA for FR1**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0927 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2009884 CR\_ Introduction of intrafrequency sync and async NR DAPS HO test cases in FR1**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0944 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces test cases for intra-frequency DAPS HO in sync and async modes

**Discussion:**

**Decision: Return to.**

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

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

**Email discussion: [96e][210] 5G\_V2X\_NRSL\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][210] 5G\_V2X\_NRSL\_RRM | R16 NR V2X | RRM requirements (Core maintenance and Perf) | 7.3.5 7.3.6 |

**R4-2012041 Email discussion summary for [96e][210] 5G\_V2X\_NRSL\_RRM** *Type: other For: Information  
 Source: Moderator (LGE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012210 (from R4-2012041).**

**R4-2012210 Email discussion summary for [96e][210] 5G\_V2X\_NRSL\_RRM** *Type: other For: Information  
 Source: Moderator (LGE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012104 | WF on NR V2X RRM requirements | LG Electronics |

**Topic #1: Interruption requirements**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010084 | Revised |
| R4-2010085 | Revised |
| R4-2011380 | Postponed |

**Topic #2: Measurement accuracy and side condition**

Agreement: Remove square brackets or update NR V2X operating band group and minimum received power in side condition based on agreed REFSENS in RF session.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011382 | Postponed |

**Topic #3: Test Cases**

Chair: capture all agreements in WF

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011053 | Noted |

2nd round email discussion conclusions

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

**R4-2012104 WF on NR V2X RRM requirements**

*Type: other For: Approval  
 Source:* LG Electronics

**Discussion:**

**Decision: Return to.**

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

**R4-2010037 Remaining issues on NR V2X RRM requirement**

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

**Discussion:**

**Decision: Noted.**

**R4-2010083 Discussion of maintenace issues for NR V2X**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Abstract:**

It discusses maintenance issues for NR V2X RRM requirements based on the agreed WF in last meeting.

**Discussion:**

**Decision: Noted.**

**R4-2010084 CR of missed requirements based on the agreed CRs in RAN4#95-e**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0973 Cat: F (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

It is CR to reflect the missed requirements based on the agreed CRs in RAN4#95-e meeting.

**Discussion:**

**Decision: Revised to R4-2012105 (from R4-2010084).**

**R4-2012105 CR of missed requirements based on the agreed CRs in RAN4#95-e**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0973 Cat: F (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

It is CR to reflect the missed requirements based on the agreed CRs in RAN4#95-e meeting.

**Discussion:**

**Decision: Return to.**

**R4-2010085 CR of interruption requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0974 Cat: F (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

It is CR of interruption requirements.

**Discussion:**

**Decision: Revised to R4-2012106 (from R4-2010085).**

**R4-2012106 CR of interruption requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0974 Cat: F (Rel-16)  
  
 Source: LG Electronics Inc.*

**Abstract:**

It is CR of interruption requirements.

**Discussion:**

**Decision: Return to.**

**R4-2011053 CR on PSBCH-RSRP measurement accuracy requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1036 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Postponed.**

**R4-2011054 Discussion on remaining issues for NR V2X**

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

**Discussion:**

**Decision: Noted.**

**R4-2011379 NR V2X RRM core and performance requirement remaining issues**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Noted.**

**R4-2011380 CR- Addition and correction of NR V2X RRM core requirement**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Postponed.**

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

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

**R4-2010038 Discussion on NR V2X RRM test case**

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

**Discussion:**

**Decision: Noted.**

**R4-2010086 Work Plan and List of Test Cases for NR V2X RRM**

*Type: Work Plan For: Approval  
 Source: LG Electronics Inc.*

**Abstract:**

It proposes work plan, list of test cases and work split for NR RRM.

**Discussion:**

**Decision: Return to.**

**R4-2011055 List of RRM test cases for NR V2X**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2009768 Discussion on test cases for NR V2X RRM**

*Type: discussion For: Approval  
 Source: Xiaomi*

**Discussion:**

**Decision: Noted.**

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

**R4-2010087 Discussion of Test Cases for NR V2X RRM**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Abstract:**

It discusses test configuration and parameters related test cases for NR RRM.

**Discussion:**

**Decision: Noted.**

**R4-2011056 Discussion on RRM test setup for NR V2X**

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

**Discussion:**

**Decision: Noted.**

**R4-2011382 CR-NR V2X RRM test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Postponed.**

**R4-2011383 NR V2X RRM test case discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Noted.**

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

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

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

**Email discussion: [96e][211] NR\_IAB\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][211] NR\_IAB\_RRM | R16 NR IAB | RRM Core requirements | 7.4.3 |

**R4-2012042 Email discussion summary for [96e][211] NR\_IAB\_RRM** *Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012211 (from R4-2012042).**

**R4-2012211 Email discussion summary for [96e][211] NR\_IAB\_RRM** *Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012104 | WF on transmit timing requirements for wide area IAB-MTs in CA scenarios | ZTE |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011431 | Noted. New pCR allocated instead R4-2011431 |
| R4-2009991 | Revised |
| R4-2010150 | Revised |
| R4-2011072 | Merged |
|  |  |

2nd round email discussion conclusions

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

**R4-2012107 WF on transmit timing requirements for wide area IAB-MTs in CA scenarios**

*Type: other For: Approval  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

##### 7.4.3.1 RLM requirements [NR\_IAB-Core]

**R4-2011071 Discussion on FR2 RLM requirement for IAB**

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

**Discussion:**

**Decision: Noted.**

**R4-2009670 Remaining issues on RLM requirement for IAB-MT**

*Type: discussion For: Discussion  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2009679 on RLM requirements for IAB-MT**

*Type: pCR For: Approval  
 38.174 v0.0.1  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012234 (from R4-2009679).**

**R4-2012234 on RLM requirements for IAB-MT**

*Type: pCR For: Approval  
 38.174 v0.0.1  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2009990 Discussion regarding RLM requirements of IAB-MTs**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010150 TP for TR38.809: IAB-MT RRM general**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Samsung*

**Discussion:**

**Decision: Revised to R4-2012110 (from R4-2010150).**

**R4-2012110 TP for TR38.809: IAB-MT RRM general**

*Type: pCR For: Approval  
 38.809 v0.2.0  
 Source: Samsung*

**Discussion:**

**Decision: Return to.**

**R4-2011072 TP to TS 38.174 on RRC release with redirection for IAB-MT**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Merged.**

**R4-2011431 discussion on CA scenarios in Tansmit Timing requirement for IAB-MT**

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

**Abstract:**

Discussion CA support on transmit timing requirement for wide area IAB-MT class

**Discussion:**

**Decision: Noted**

**R4-2012109 TP on CA scenarios in Transmit Timing requirement for IAB-MT**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion CA support on transmit timing requirement for wide area IAB-MT class

**Discussion:**

**Decision: Return to.**

**R4-2009680 transmit timing requirements of IAB-MTs in CA scenarios**

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

**Discussion:**

**Decision: Noted.**

**R4-2009991 TP for remaining items of RRM requirements for IAB-MTs**

*Type: discussion For: Approval  
 Source: Qualcomm*

**Discussion:**

**Decision: Revised to R4-2012108 (from R4-2009991).**

**R4-2012108 TP for remaining items of RRM requirements for IAB-MTs**

*Type: pCR For: Approval  
 38.174 v0.1.0  
 Source: Qualcomm*

**Discussion:**

**Decision: Return to.**

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

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

**Email discussion: [96e][212] LTE\_NR\_DC\_CA\_RRM\_1**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][212] LTE\_NR\_DC\_CA\_RRM\_1 | R16 MR-DC | RRM Core requirements: Early Measurement reporting, Others | 7.5.3.1 7.5.3.3 |

**R4-2012043 Email discussion summary for [96e][212] LTE\_NR\_DC\_CA\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012212 (from R4-2012043).**

**R4-2012212 Email discussion summary for [96e][212] LTE\_NR\_DC\_CA\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (Aug 19th)

**Sub-topic 1-1 s-NonIntraSearch thresholds and EMR carriers**

* Background:
  + RAN4 95e
    - Conclusion: Send LS to RAN2 to clarify RAN2 agreement and ask feedback on 2 Options above.
    - Agreement
      * Further discuss between the 2 options
        + Search thresholds do not apply to carriers configured for EMR measurements.
        + Search thresholds do not affect measurement procedures to carriers configured for EMR measurements, but the search thresholds are used to define the EMR measurement requirements.
      * Send LS to RAN2 to ask whether Option 1 or 2 contradict RAN2 agreements
    - Chair: Agreements need to be made no later than in RAN4 #96e. In case no conclusions are reached then no requirements may be defined for this scenario
  + RAN2 LS reply
    - RAN2 discussed RAN4 LS (R2-2006131) and reached following agreement:
      * RAN2 intended that search thresholds (s-nonIntraSearchP and s-NonIntraSearchQ) do not apply to EMR measurements performed on carriers configured for EMR measurements
* Proposals
  + Option 1: *s-NonIntraSearch* thresholds do not apply to EMR carriers (Nokia, ZTE, Apple)
  + Option 2: *s-NonIntraSearch* thresholds do apply to EMR carriers (Huawei, MTK, QC)
* Recommended WF
  + Agree on option 1, based on the RAN2 LS reply (R2-2006287/ R4-2009523).

Discussion

Nokia: still diverse view

MTK: Reply LS does not force RAN4 not to use search thresholds for EMR measurements. Option 1 contradicts to the previous agreements. EMR is an enhancement feature. If we don’t apply thresholds then it will change UE implementation.

QC: Agree with Huawei observations. Agree with Option 2 but not sure it will resolve all issues.

Apple: Support Option 1. For legacy networks it is up to network on how to use the thresholds.

Huawei: RAN2 is defining the procedures and RAN4 is defining the measurements.

ZTE: RAN4 requirements shall follow RAN2 procedures.

Nokia: If we go with Option 2 then we’ll need to inform RAN2.

Huawei: UE still measures EMR carriers disregards the configured

Tentative agreement

Option 1:

UE applies EMR carrier measurements disregards whether the signal exceeds the configured s-NonIntraSearch thresholds

UE will follow conventional measurement interval for both overlapping and non-overlapping EMR carrier measurements when s-NonIntraSearch thresholds are configured

Note: conventional measurement interval is the measurement period used for cell reselection purpose

Option 2: No requirements defined for the case s-NonIntraSearch thresholds are configured

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012111 | WF on MR-DC EMR RRM requirements | Nokia, Nokia Shanghai Bell |

**Topic #1: NR measurements for EMR (38.133)**

Issue 1-2-2-1: Number of non-overlapping EMR carrier

Agreement: The number of non-overlapping inter-frequency EMR carriers is ≤7

Issue 1-2-2-2: Number of non-overlapping EMR carrier when the total number limit is exceeded

Agreement: RAN4 will not define requirements for number of non-overlapping EMR carrier when the total number limit is exceeded

Issue 1-2-3-1: NR inter-frequency beam-level measurement capability

Agreement: RAN4 agree following related to NR inter-frequency beam-level measurement capability:

* FR1: 7 SSBs with different SSB index and/or PCI per inter-frequency layer
* FR2: 10 SSBs with different SSB index and/or PCI per inter-frequency layer

Issue 1-2-5-1: For overlapping EMR carriers

Agreement: For overlapping EMR carriers, the UE measurement accuracy requirements for carriers configured for EMR:

* Option 1: RAN4 to define relaxed NR measurement requirements for overlapping carrier compared to existing NR inter-frequency requirements in terms of SNR and accuracy
* Option 2: LTE inter-RAT measurement requirements for overlapping carrier follows existing LTE inter-frequency requirements for CA Idle mode measurements for overlapping carrier

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010568 | Revised |

**Topic #2: LTE NR Inter-RAT EMR (36.133)**

Agreements: s-NonIntraSearch thresholds and NR inter-RAT EMR carriers follow agreements for NR measurements for EMR

Agreement: Capture the UE capability according to the proposed applicability text in 36.133 (R4-2010569) with necessary name correction.

Agreement: UE should be able to measure up to 8 overlapping and non-overlapping inter-RAT NR EMR carriers in total:

* Overlapping NR inter-RAT carriers: ≤8
* Non-overlapping NR inter-RAT carriers: ≤2

Agreement: Measurement requirements for non-overlapping NR inter-RAT carriers are defined same as overlapping NR inter-RAT carriers

Agreement: For Measurement accuracy requirements for NR Inter-RAT EMR carrier same principles as in Issue 1-2-5-2 will be applied.

Agreement: For NR inter-RAT EMR, the UE beam-level measurement capability requirements for EMR is the same as the number of beams in the existing Rel-15 inter-frequency requirements for RRC\_CONNECTED state:

* FR1: 7 SSBs with different SSB index and/or PCI per inter-frequency layer
* FR2: 10 SSBs with different SSB index and/or PCI per inter-frequency layer

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011148 | Revised |

2nd round email discussion conclusions

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

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

**Email discussion: [96e][213] LTE\_NR\_DC\_CA\_RRM\_2**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][213] LTE\_NR\_DC\_CA\_RRM\_2 | R16 MR-DC | RRM Core requirements: Efficient and low latency serving cell configuration, activation and setup | 7.5.3.2 |

**R4-2012044 Email discussion summary for [96e][213] LTE\_NR\_DC\_CA\_RRM\_2** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012213 (from R4-2012044).**

**R4-2012213 Email discussion summary for [96e][213] LTE\_NR\_DC\_CA\_RRM\_2** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (Aug 19th)

**Sub-topic 2-1: General**

**Sub-topic 2-2: Switching of single SCell between dormancy and non-dormancy, triggering inside active time**

Issue 2-2-1: Delay requirement, triggering within first 3 OFDM symbols

* Proposals
  + Option 1 (MediaTek): For DCI received in first 3 OFDM symbols of a slot the switching delay between non-dormancy and dormancy shall follow the Rel-15 BWP switching delay specified in Table 8.6.2-1
  + Option 2 (vivo): The current DCI based BWP switch delay requirement within one CC applies for this scenario providing that: the timing difference between the CC where the DCI triggering BWP switch is received and CC where the BWP switch happens is within the MRTD for inter-band CA as defined in clause 7.6.4.
  + Option 3 (Ericsson): The switching delay shall take into account the smallest numerology of spCell (where triggering is carried out) and SCell(s) for which switching is triggered.
  + Option 4 (Huawei): For the baseline requirements and dormancy switch within DRX active time, when DCI is received in the first 3 symbols of a slot, the dormancy switch delay TDormancy\_normalDCI is
    - For self-scheduling case: TBWPswitchDelay (Rel-15 BWP switch delay defined in Table 8.6.2-1 of 38.133)
    - For cross-carrier scheduling case:
      * If SCS of scheduling cell is larger than SCS of scheduled cell: TBWPswitchDelay
      * If SCS of scheduling cell is equal to or smaller than SCS of scheduled cell: TBWPswitchDelay+Y, where Y=1 slot with respect to the SCS of the scheduled cell
      * The start point of the dormancy switch is the beginning of the slot where UE receives the DCI on the scheduling cell
      * TBWPswitchDelay corresponds to the smallest SCS among the scheduling cell and the scheduled cell.
* Discussion
  + Huawei: may need to resolve issue in the WI. Dormancy switch can be triggered using cross-carrier scheduling only.
  + vivo: Rel-15 does not have cross-carrier scheduling feature and this is specific to SCell dormancy in Rel-16.
  + QC: This is Dormant SCell BWP switching and not active BWP switching. We think that only non-Dormant BWP switching needs to be adjusted
  + ZTE: Cross-carrier scheduling shall be supported in Rel-16.
  + Huawei: Current agreement does not consider cross-carrier scheduling case. We need to include the BWP switching requirements for both Dormant BWP and Active BWP switching.
  + Chair: recommend to continue discussion on the BWP switching based on cross-carrier scheduling with the focus on Dormant BWP switching use case
* Agreement
  + For Dormancy switch requirement additional [1] slot relaxation is applied
    - In case SCS differs between spCell and SCell, the smaller SCS applies.

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012117 | WF on MR-DC Direct SCell activation and SCell dormancy RRM requirements | Ericsson |
| R4-2012118 | Reply LS on SCell Dormancy | Huawei |

**Topic #1: Direct SCell Activation**

Delay requirement for multiple SCells

Agreements:

* Delay requirements for direct activation of multiple SCells are based on those for MAC CE based activation of multiple SCells, with adaptation for RRC-based instead of MAC-based triggering.
  + The applicable scenarios are same as for MAC CE based multiple SCell activation.
  + Delay requirements for Direct SCell activation of multiple SCells shall fulfill:
    - For SCell addition and RRC resume: Ndirect\_multiple\_scells = TRRC\_Process + T1 + Tactivation\_time\_multiple\_scells + TCSI\_Reporting - 3ms, where Tactivation\_time\_multiple\_scells is defined in clause 8.3.7
    - For Handover: Ndirect\_multiple\_scells = TRRC\_process + Tinterrupt + T2 + T3 + Tactivation\_time\_multiple\_scells + TCSI\_Reporting - 3ms, where Tactivation\_time\_multiple\_scells is defined in clause 8.3.7

TFirstSSB\_MAX\_multiple\_scells used in Tactivation\_time\_multiple\_scells is clarified with respect to start time of the activation process in direct activation (accounting for difference between MAC and RRC-based triggering)

Interruption window for multiple SCells

Agreements:

* Definition of interruption windows for Direct Scell activation of Multiple Downlink Scells at Scell addition, RRC Resume, and Handover shall be based on the corresponding interruption windows for single Scell, with the following case added:
  + TFirstSSB\_MAX\_multiple\_scells, for any scenario where Tactivation\_time\_multiple\_cells includes TFirstSSB\_MAX\_multiple\_scells

Number of Scells to support in Direct Scell activation

Agreements:

* Direct Scell Activation of Multiple Downlink Scells at Scell addition, RRC Resume, and Handover shall be supported for [2] Scells.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010665 | Revised |
| R4-2011150 | Revised |
| R4-2011151 | Agreed |

**Topic #2: SCell Dormancy**

Triggering options

Agreements:

* Remove Timer-based triggering from scope and only support DCI-based triggering

Optimizations w.r.t. parameter changes

Agreements:

* RAN4 to only introduce generic requirements, and the further need for optimizations w.r.t. parameter change can be discussed in the future release, if needed

Delay requirement, triggering within first 3 OFDM symbols

Agreements:

* For Dormancy switch requirement additional [1] slot relaxation is applied
  + In case SCS differs between spCell and SCell, the smaller SCS applies.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010670 | Revised |
| R4-2010703 | Agreed |
| R4-2011153 | Revised |
| R4-2011154 | Revised |

2nd round email discussion conclusions

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

**R4-2012111 WF on MR-DC EMR RRM requirements** *Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2012117 WF on MR-DC Direct SCell activation and SCell dormancy RRM requirements**

*Type: other For: Approval  
 Source: Ericcson*

**Discussion:**

**Decision: Return to.**

**R4-2012118 Reply LS on SCell Dormancy**

*Type: LS Out For: Approval  
 To: RAN2  
 Source: Huawei*

**Discussion:**

**Decision: Return to.**

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

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

**R4-2011348 LS response on measurement capability for EMR**

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

**Abstract:**

LS response on measurement capability for EMR

**Discussion:**

**Decision: Revised to R4-2012112 (from R4-2011348).**

**R4-2012112 LS response on measurement capability for EMR**

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

**Abstract:**

LS response on measurement capability for EMR

**Discussion:**

**Decision: Return to.**

**R4-2012237 LS on EMR measurement requirements in NR**

*Type: LS out For: Approval  
 To: RAN2  
 Source: Ericsson*

**Discussion:**

**Decision: Return to.**

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

**R4-2010117 Early measurement reporting in MR-DC**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2010567 MR-DCCA and EMR RRM requirements for NR (38.133)**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Noted.**

**R4-2010568 CR on UE requirement for MR-DC early measurement reporting in 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1009 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012113 (from R4-2010568).**

**R4-2012113 CR on UE requirement for MR-DC early measurement reporting in 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1009 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2011145 Discussion on early measurement in NR**

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

**Discussion:**

**Decision: Noted.**

**R4-2011146 CR on EMR in 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1079 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Postponed.**

**R4-2011317 Remaining open issues on NR EMR**

*Type: discussion For: Discussion  
 Source: ZTE*

**Discussion:**

**Decision: Noted.**

**R4-2009893 CR on TS38.133 for measurement capability of IDLE mode DC/CA measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0949 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Postponed.**

**R4-2009894 Discussion on LTE CRS based and NR SSB based measurement in NR IDLE/INACTIVE mode**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010569 NR inter-RAT EMR requirements for 36.133**

*Type: discussion For: Discussion  
 36.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Noted.**

**R4-2010570 CR on UE requirement for MR-DC early measurement reporting in 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6930 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Postponed.**

**R4-2011147 Discussion on LTE – NR inter-RAT EMR**

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

**Discussion:**

**Decision: Noted.**

**R4-2011148 CR to introduce EMR in 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6944 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012114 (from R4-2011148).**

**R4-2012114 CR to introduce EMR in 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6944 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011318 Remaining open issues on NR inter-RAT EMR measurements**

*Type: discussion For: Discussion  
 Source: ZTE*

**Discussion:**

**Decision: Noted.**

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

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

**R4-2010664 On Direct SCell Activation of Multiple Downlink SCells**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we are providing proposals on delay requirements and interruption window definitions for the case where multiple downlink SCells are directly activated upon addition, handover, or resume.

**Discussion:**

**Decision: Noted.**

**R4-2010665 CR 38.133 (8.3.9-8.3.11) Direct SCell activation delay for multiple downlink SCells**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1016 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Adding delay requirements for direct SCell activation of multiple SCells at SCell addition, handover, or RRC Resume.

**Discussion:**

**Decision: Revised to R4-2012115 (from R4-2010665).**

**R4-2012115 CR 38.133 (8.3.9-8.3.11) Direct SCell activation delay for multiple downlink SCells**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1016 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Adding delay requirements for direct SCell activation of multiple SCells at SCell addition, handover, or RRC Resume.

**Discussion:**

**Decision: Return to.**

**R4-2011149 Discussion on remaining issues in direct SCell activation**

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

**Discussion:**

**Decision: Noted.**

**R4-2011150 CR on direct SCell activation**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1080 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012116 (from R4-2011150).**

**R4-2012116 CR on direct SCell activation**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1080 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011151 CR on interruption for direct activation of multiple SCells 36133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6945 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Agreed.**

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

**R4-2010118 Scell BWP dormancy**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2010365 On SCell dormancy RRM requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2010669 On SCell Dormancy Switching Delay**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we are discussing open issues for SCell dormancy, including those collected in the WF document at RAN4#95e and those listed in the WI exception sheet at RAN#88e. Additionally, we are discussing the LS received from RAN1 on SCell dorma

**Discussion:**

**Decision: Noted.**

**R4-2010670 CR 38.133 SCell dormancy switching of multiple SCells**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1017 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Adding delay and interruption requirements for SCell dormancy switching of multiple SCells. Additionally some corrections of interruption requirements for dormancy switching of single SCells.

**Discussion:**

**Decision: Revised to R4-2012119 (from R4-2010670).**

**R4-2012119 CR 38.133 SCell dormancy switching of multiple SCells**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1017 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Adding delay and interruption requirements for SCell dormancy switching of multiple SCells. Additionally some corrections of interruption requirements for dormancy switching of single SCells.

**Discussion:**

**Decision: Return to.**

**R4-2010703 CR on delay requirements for SCell dormancy**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1018 Cat: B (Rel-16)  
  
 Source: OPPO*

**Discussion:**

**Decision: Agreed.**

**R4-2010754 Discussion on RRM requirements for SCell dormancy**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

Provided our views on UE SCell dormancy switch delay requirements, UE requirements for a SCell dormancy and interruption requirements

**Discussion:**

**Decision: Noted.**

**R4-2010755 Reply LS on SCell Dormancy**

*Type: LS out For: Approval  
 to RAN1  
 Source: NEC*

**Abstract:**

We provided RAN4 RRM discussion or agreements for SCell dormancy triggered inside active time and outside active time for questions requested by RAN1 in LS R1-2005081

**Discussion:**

**Decision: Noted.**

**R4-2011152 Discussion on SCell dormancy**

*Type: LS out For: Approval  
 to RAN1  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011153 CR on requirements for SCell dormancy**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1081 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012120 (from R4-2011153).**

**R4-2012120 CR on requirements for SCell dormancy**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1081 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011154 CR on interruption requirements for SCell dormancy 36133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6946 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012121 (from R4-2011154).**

**R4-2012121 CR on interruption requirements for SCell dormancy 36133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6946 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011319 Remaining open issues on NR SCell dormancy**

*Type: discussion For: Discussion  
 Source: ZTE*

**Discussion:**

**Decision: Noted.**

**R4-2009897 Discussion on dormancy Scell**

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

**Discussion:**

**Decision: Noted.**

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

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

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

**Email discussion: [96e][214] NR\_UE\_pow\_sav\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][214] NR\_UE\_pow\_sav\_RRM | R16 NR UE Power Saving | RRM requirements (Core maintenance and Perf) | 7.6.2 7.6.3 |

**R4-2012045 Email discussion summary for [96e][214] NR\_UE\_pow\_sav\_RRM** *Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012214 (from R4-2012045).**

**R4-2012214 Email discussion summary for [96e][214] NR\_UE\_pow\_sav\_RRM** *Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012122 | Reply LS on RRM relaxation in power saving | Huawei |
| R4-2012124 | WF on RRM test cases for NR Power Saving | CATT |

**Topic #1: Open issue for RRM measurement relaxation – Core part**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009764 | Postponed |
| R4-2009809 | Postponed |
| R4-2010360 | Postponed |
| R4-2010705 | Postponed |
| R4-2011112 | Postponed |
| R4-2011211 | Revised |

2nd round email discussion conclusions

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

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

**R4-2010336 Discussion on RLM/BFD relaxation in R17 Power saving**

*Type: discussion For: Information  
 Source: vivo*

**Discussion:**

**Decision: Noted.**

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

**R4-2012122 Reply LS on RRM relaxation in power saving**

*Type: LS Out For: Approval  
 To: RAN2  
 Source: Huawei*

**Discussion:**

**Decision: Return to.**

**R4-2010359 On the higher priority inter frequency layer relaxation indicator for the UE power savings**

*Type: discussion For: Approval  
 38.133 v..  
 Source: vivo*

**Discussion:**

**Decision: Noted.**

**R4-2010360 CR for IDLE state measurement relaxation for UE power saving**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0997 Cat: F (Rel-16)  
  
 Source: vivo*

**Discussion:**

**Decision: Postponed.**

**R4-2010704 Discussion on RRM requirements maintenance of measurement relaxation for UE power saving**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2010705 CR for RRM Measurement relaxation requirements for UE power saving (TS 38.133)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1019 Cat: B (Rel-16)  
  
 Source: OPPO*

**Discussion:**

**Decision: Postponed.**

**R4-2011111 Discussion on measurement relaxation in power saving**

*Type: LS out For: Approval  
 to RAN2  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011112 CR on measurement relaxation for power saving**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1063 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Postponed.**

**R4-2011211 Correction CR to UE power saving**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1088 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Maintenance CR for UE power saving requirements.

**Discussion:**

**Decision: Revised to R4-2012123 (from R4-2011211).**

**R4-2012123 Correction CR to UE power saving**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1088 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Maintenance CR for UE power saving requirements.

**Discussion:**

**Decision: Return to.**

**R4-2009764 CR on measurement relaxation requirements for UEs under power saving mode**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0929 Cat: F (Rel-16)  
  
 Source: Xiaomi*

**Discussion:**

**Decision: Postponed.**

**R4-2009808 Discussion on RRM requirements for power saving**

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

**Discussion:**

**Decision: Noted.**

**R4-2009809 CR for RRM requirements for power saving**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0936 Cat: F (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Postponed.**

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

**R4-2012124 WF on RRM test cases for NR Power Saving**

*Type: other For: Approval  
 Source: CATT*

**Discussion:**

**Decision: Return to.**

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

**R4-2011113 Test case list for measurement relaxation in power saving**

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

**Discussion:**

**Decision: Noted.**

**R4-2009765 Discussion on test cases for power saving RRM**

*Type: discussion For: Approval  
 Source: Xiaomi*

**Discussion:**

**Decision: Noted.**

**R4-2009985 Features for performance tests in power saving WI**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010337 Discussion on RRM test cases for R16 UE power saving**

*Type: discussion For: Discussion  
 Source: vivo*

**Discussion:**

**Decision: Noted.**

**R4-2011210 Discussions on test cases for Rel-16 UE power saving**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The core part of the release 16 work item on UE power saving was finalized at last meeting. In this contribution, we discuss the corresponding test cases.

**Discussion:**

**Decision: Noted.**

**R4-2009810 Discussion on RRM Test cases for power saving**

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

**Discussion:**

**Decision: Noted.**

**R4-2009898 Discussion on RRM measurement relaxation for RRC\_IDLE/INACTIVE**

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

**Discussion:**

**Decision: Noted.**

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

### 7.7 NR Positioning Support [NR\_pos]

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

**Email discussion: [96e][215] NR\_pos\_RRM\_1**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][215] NR\_pos\_RRM\_1 | R16 NR Positioning | RRM Core requirements: General, UE requirements (PRS-RSTD, UE Rx-Tx time difference) | 7.7.1 7.7.2 7.7.2.1.1 7.7.2.1.3 7.7.2.1.4 (relevant papers) |

**R4-2012046 Email discussion summary for [96e][215] NR\_pos\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012215 (from R4-2012046).**

**R4-2012215 Email discussion summary for [96e][215] NR\_pos\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (Aug 20th-21st)

**PRS measurements**

* Discussion
  + Total measurement period for RSTD
    - E///: shall not apply CSSF and sum jointly
    - Intel: the proposal is ok
    - QC: agree with formulation. UE is not required to do measurements in parallel. There is no double counting. CSSF is for sharing between PRS and RRM measurements
    - Huawei: Agree with QC. CSSF is for sharing between PRS and RRM measurements
    - Mediatek: same view as QC and Huawei
    - Huawei/Intel/QC/Mediatek: support the proposal
    - E///: object the agreement
  + Measurement period for RSTD per frequency layer
    - Huawei: suggest to discuss measurement period first
  + Number of samples and also Definition of PRS occasion
    - QC: may not necessarily need to define the PRS occasion
    - MTK: agree with QC. Can discuss full equation. Prefer 4 samples.
    - E///: agree not to define
    - Huawei: do not define PRS occasion term. Prefer 4 samples. E/// proposal implies cross-occasion combining. Prefer not to complicate the Core requirement
    - Intel: Agree not to define. Final equations shall depend on RAN1 parameters.
* Agreements
  + Periodicity of PRS measurement
    - =
    - Note: CSSF impact will be further discussed
  + Do not define the term “PRS occasion”
  + Number of PRS measurement samples (
    - Option 1: [4] in the units of
    - Option 2: ≤ [4] in the units of
  + Scaling due to UE buffering and processing capability
  + Measurement period for RSTD per positioning frequency layer
    - Option 1: (MTK, Intel, Huawei, QC)
      * is the CSSF for sharing between PRS and RRM measurements within a single positioning frequency layer
      * is the RX beam sweeping scaling factor within a single positioning frequency layer
    - Option 2:  *)* (CATT, Intel, Huawei, QC)
      * is the CSSF for sharing between PRS and RRM measurements within a single positioning frequency layer
      * is the RX beam sweeping scaling factor within a single positioning frequency layer
    - Option 3: (avoid multiplying Ti with CSSF) (E///)
  + Processing of the last PRS measurement sample
    - Option 1:  *= + (Huawei, MTK)*
    - Option 2:  *= (Intel)*
    - Option 3:  *= (CATT)*
    - Option 4:  *=*
    - *Other options are not precluded*
  + Start of the measurement period is FFS
    - Option 1: the start of the earliest MG which contains the PRS resources of the positioning frequency layer after UE has received all assistance data
  + Total measurement period for RSTD
    - When MGs and processing time T have overlap between different frequency positioning frequency layers
      * *+X*
        + where is X is FFS to account for last sample processing
    - When MGs and processing time T do not have overlap between different positioning frequency layers
      * Option 1:*+X*, (Huawei, QC, Intel, MTK)
        + where is X is FFS to account for last sample processing
      * Option 2: (E///)
    - Note: impact of CSSF is under discussion
  + *for FR2*
    - when QCL info is not provided
    - FFS when QCL info is provided
      * Option 1:
        + when different PRS overlap in time on the same frequency layer
        + otherwise

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012126 | Reply LS on the UE DL PRS processing | Huawei, HiSilicon |
| R4-2012127 | WF on requirements for RSTD and UE Rx-Tx time difference measurement | Huawei, HiSilicon |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011364 | Agreed |
| R4-2011155 | Revised |
| R4-2009744 | Revised |
| R4-2009883 | Revised |
| R4-2011356 | Revised |
| R4-2011358 | Revised |

**Topic #2: Measurement period for RSTD**

Chair: 2nd round discussion shall be based on Fri GTW agreements

Measurement period extension due to MG reconfiguration

Chair: No further discussion. Companies can work on the wording in the CR, and R4-2009883 can be used as a starting point.

Measurement period and response time

Chair: No further discussion.

Principles for defining RSTD measurement period

Chair: No further discussion.

GTW session (Aug 26th)

**Issue 0-1: Measurement period for RSTD per positioning frequency layer**

Agreement

* + is the CSSF for sharing between PRS and RRM measurements within a single positioning frequency layer
  + is the RX beam sweeping scaling factor within a single positioning frequency layer
  + Note: if issues are identified with CSSF then the equation can be revisited in the maintenance part

**Issue 0-2: Number of PRS measurement samples (**

Agreement:

= [4]

How to address the case with multiple PRS repetitions will be discussed in the Performance part

**Issue 0-3: Processing of the last PRS measurement sample**

Agreement:

*= +*

*Note: RAN4 assumption is that is the sample duration in ms. The decision can be further revisited in case the definition is not aligned with RAN1/2 specification.*

**Issue 0-4: Start of the measurement period**

Agreement: Start of the measurement period the start of the earliest MG which contains the PRS resources of the positioning frequency layer after UE has received all assistance data

**Issue 0-5: for FR2** **when QCL info is provided**

Agreement

* When QCL info is provided
  + If PRS from different TRPs on the same frequency layer overlap withing the same MG

**Issue 0-6: Total measurement period for RSTD – overlapping case**

Agreement: X = .

**Issue 0-7: Total measurement period for RSTD – non-overlapping case**

* Note: it was agreed in GTW that when MGs and processing time T have overlap between different frequency positioning frequency layers, the total measurement period is as follows
  + *+X,* where is X is FFS to account for last sample processing
  + Different options were proposed for the case when MGs and processing time T do not have overlap between different positioning frequency layers. This issue is for non-overlapping case.
* Option 1 (Huawei, QC, Intel, MTK):
  + *+X*, i.e. same as overlapping case for overlapping case in Issue 0-6
* Option 2 (E///):

Conclusion: further discuss to identify if any scenarios can be defined for Option 2. If no scenarios identified then Option 1 will be used.

**Issue 3-1: Whether SRS periodicity should be accounted in measurement period**

* Option 1 (CATT, Intel, OPPO, HW, QC): No
* Option 2 (Ericsson): Yes
  + UE Rx-Tx measurement period depends on max(PRS periodicity, SRS periodicity)
* Option 3 (Ericsson): clarify that the requirements can be more relaxed if SRS is more sparse than PRS

Conclusion: no consensus that SRS periodicity should be accounted in measurement period

**Issue 3-2: Whether SRS dropping should be accounted in measurement period**

* Option 1 (QC, CATT, Intel, HW, OPPO): No
  + RAN4 to define requirements for UE Rx-Tx time difference measurement period assuming no SRS dropping due to any reason (QC)
* Option 2 (Ericsson): Yes
  + The UE Rx-Tx measurement period can also be extended to compensate for the number of dropped SRS transmissions, at least when the number of dropped SRS transmissions is large.
* Option 3 (Ericsson): clarify in the requirements that the measurement period can be longer if some (or more than X) SRS are dropped

Conclusion: no consensus that SRS dropping should be accounted in measurement period

2nd round email discussion conclusions

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

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

**Email discussion: [96e][216] NR\_pos\_RRM\_2**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][216] NR\_pos\_RRM\_2 | R16 NR Positioning | RRM Core requirements: UE requirements (PRS-RSRP measurements, SSB and CSI-RS RSRP/RSRQ measurements) | 7.7.2.1.2 7.7.2.1.4 (relevant papers) |

**R4-2012047 Email discussion summary for [96e][216] NR\_pos\_RRM\_2** *Type: other For: Information  
 Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012216 (from R4-2012047).**

**R4-2012216 Email discussion summary for [96e][216] NR\_pos\_RRM\_2** *Type: other For: Information  
 Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012133 | WF on requirements for PRS-RSRP measurements | Intel Corporation |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011158 | Revised |

**Topic #6: PRS RSRP measurement under cell change**

Agreements:

* When configured together with UE Rx-Tx, the UE behavior rules for PRS-RSRP are the same as for these for UE Rx-Tx (agreed in [R4-1915854])
* When configured together with RSTD, the UE behavior rules for PRS-RSPR measurement under cell change are the same as for RSTD (the rules for RSTD were agreed in [R4-1915854]):
  + The UE shall continue RSTD measurement after each serving cell change for:
    - intra-frequency handover,
    - inter-frequency handover.
* When not configured together with either UE Rx-Tx or RSTD, the UE behavior rules for PRS-RSPR measurement under cell change are the same as for RSTD (the rules for RSTD were agreed in [R4-1915854]).

GTW session (Aug 26th)

**Issue 1-1: Principles for defining measurement period for PRS RSRP**

* Option 1: (CATT, Huawei, Intel, Qualcomm, Oppo, MTK)
  + when configured with UE Rx-Tx time difference, PRS-RSRP measurement period requirements can be same as that of UE Rx-Tx time difference measurement
  + when configured with Rx`STD, PRS-RSRP measurement period requirements can be same as that of RSTD measurement
  + when not configured with either UE Rx-Tx or RSTD, measurement period requirements of RSTD can be reused for PRS-RSRP measurement.
* Option 2: (Ericsson)
  + when configured with UE Rx-Tx time difference, PRS-RSRP measurement period requirements can be:
    - max(TPRS-RSRP,TUE Rx-Tx), where TPRS-RSRP and TUE Rx-Tx are the measurement periods for PRS-RSRP and UE Rx-Tx, when configured without other measurements
  + when configured with RSTD, PRS-RSRP measurement period requirements can be :
    - max(TPRS-RSRP,TRSTD), where TPRS-RSRP and TRSTD are the measurement periods for PRS-RSRP and RSTD, when configured without other measurements
  + If PRS-RSRP is not configured together with any of UE Rx-Tx or RSTD, the PRS-RSRP measurement is defined as TPRS-RSRP (e.g., TPRS-RSRP = ceil(NPRS-RSRP,req / KPRS) × max(TPRS, MGRP) × CSSF × X)

2nd round email discussion conclusions

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

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

**Email discussion: [96e][217] NR\_pos\_RRM\_3**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][217] NR\_pos\_RRM\_3 | R16 NR Positioning | RRM Core requirements: New MG, gNB requirements, Others | 7.7.2.2 7.7.2.3 7.7.2.4 |

**R4-2012048 Email discussion summary for [96e][217] NR\_pos\_RRM\_3** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012217 (from R4-2012048).**

**R4-2012217 Email discussion summary for [96e][217] NR\_pos\_RRM\_3** *Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (Aug 20th)

**Topic #1: New measurement gap patterns for positioning measurements (AI 7.7.2.2)**

Sub-topic 1-1: Measurement gaps for positioning measurements

Issue 1-1-1: New MG patterns

* Summary

|  |  |  |
| --- | --- | --- |
| MG length (ms) | MG period (ms) | Companies |
| 20 | 160 | ZTE, QC, HW, E/// |
| 40 | 160 | ZTE, QC, Nokia |
| 10 | 80 | CATT, OPPO, NEC, HW, E///, Nokia, MTK |
| 10 | 160 | CATT, OPPO, MTK |
| 18 | 80 | MTK |
| 18 | 160 | MTK |
| 34 | 160 | MTK |
| 18 | 320 | MTK |
| 34 | 320 | MTK |
| 34 | 640 | MTK |
| 66 | 640 | MTK |

* Discussion
  + Chair: candidate proposals based on majority ar
    - 20ms MGL and 160ms MGRP
    - 10ms MGL and 80ms MGRP
  + QC: we are fine
  + ZTE: we are fine
  + Intel: we are ok to compromise but we need to conclude on other aspects as well
  + Chair: we can make tentative agreements on the MG topics. Per RAN4 #95e agreements in case all design is not finalized then the feature will not be supported. In such case the agreements will be reverted.
* Agreements
  + Introduce 2 new MG patterns for PRS measurements

|  |  |
| --- | --- |
| MG length (ms) | MG period (ms) |
| 20 | 160 |
| 10 | 80 |

Issue 1-1-2: New MG patterns are used only when UE is configured with at least PRS measurements i.e. cannot be used for only RRM

* Proposals
  + Option 1: Yes (CATT, Apple, Oppo, QC, E///, HW, Nokia)
* Discussion
  + Intel: ok for us
* Agreement: New MG patterns can only be configured when the UE is configured with PRS measurements

Issue 1-1-3: Whether new MG patterns is applicable for only PRS measurements or for both PRS and RRM measurements?

* Proposals:
  + Option 1: New MG patterns are applicable only for PRS measurements i.e. new gaps cannot be shared with RRM measurements (CATT, Oppo, NEC, Apple)
  + Option 2: New MG patterns are applicable for PRS and all RRM measurements i.e. new gaps can be shared between PRS and RRM measurements (QC, ZTE, HW, E///, Nokia, MTK)
  + Option 3: New MG patterns are applicable for PRS and NR/LTE all RRM measurements except 2G/3G and LTE PRS measurements i.e. new gaps are not can be shared between PRS and selected 2G/3G RRM measurements (HW)
* Discussion:
  + Intel: all 3 options will introduce new issues. Option 2 will affect existing requirements. Option 1 may have small impact but there is contradiction to previous WF which said we don’t introduce new independent MGs R4-2005379
    - E///: the agreement meant 2 independent MG for RRM and Positioning. Now we suggest a single one.
    - QC: same view
  + QC: Option 1 has drawbacks that UE stops doing RRM measurements when it requests MG for PRS measurements. We think Option 2 has small impact.
  + Apple: Support Option 1. CSSF and per-FR gap capability can have problems for Option 2. There are no accurate solutions to address our issues.
  + E///: Same view as QC. Also, Option 2 is aligned with RAN2 procedure.
  + CMCC: Option 1 will have impact on RRM measurement for the case of periodic measurements.
    - Apple: PRS measurements are not done often. CSSF scaling will increase the delay a lot in case both PRS and RRM are supported. There will be joint delay.
  + MTK: Support Option 2. Rule of CSSF can be defined more simply.
  + CATT: New MG pattern has too big length and can have impact on the system performance/throughput. Option 1 may have small impact.
  + ZTE: Option 2. Similar view with QC and CMCC.
  + Nokia: Option 2. CSSF can be defined.
  + OPPO: Option 1. Same view with Apple. For Option 2 UE behavior will be more complicated. Current requirements for RRM will be adjusted.
  + Apple: Compromise is to use new MG for both RRM and PRS but in this case RRM requirements will not apply.
    - Huawei: what kind of requirements will apply for PRS?
      * Apple: we’ll design all CSSF for legacy. For new MG the PRS requirements will apply based on legacy CSSF but RRM requirements will not apply
    - NEC: what is the impact on RRM measurements?
      * Apple: UE will do the best but no guarantee
    - E///: we should try to define RRM requirements. This is even worse than Option 1.
  + Nokia: for Option 2 we can prioritize PRS measurements
  + MTK: we also need to discuss how to share legacy MG between RRM and PRS measurements
    - E///: this is already under discussion
* Conclusion: come back in the 2nd round

1st round email discussion conclusions

**Topic #1: New measurement gap patterns for positioning measurements (AI 7.7.2.2)**

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012135 | WF on impact of NR positioning measurements on RRM | Ericsson |
| R4-2012136 | LS on new measurement gap patterns for positioning measurements | Ericsson |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009881 | Revised |
| R4-2009882 | Revised |
| R4-2011163 | Noted |
| R4-2011164 | Revised |
| R4-2011361 | Noted |

**Topic #2: gNB requirements (AI 7.7.2.3)**

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012140 | WF on gNB requirements for NR positioning | Ericsson |
| R4-2012141 | System simulation assumptions for deriving side conditions | Ericsson |
| R4-2012142 | Link simulation assumptions for deriving positioning SRS configurations | Nokia |

**Topic #3: Other requirements (AI 7.7.2.4)**

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012143 | Reply LS on positioning SRS during DRX inactive time | Apple |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011168 | Revised |
| R4-2011363 | Revised |

GTW session (Aug 26th)

**Issue 1-1-3: Whether new MG patterns is applicable for only PRS measurements or for both PRS and RRM measurements?**

* Option 1: CATT, Oppo, NEC, Apple
  + New MG patterns are applicable only for PRS measurements i.e. new gaps cannot be shared with RRM measurements.
* Option 2: QC, ZTE, HW, E///, Nokia, CMCC
  + New MG patterns are applicable for PRS and all RRM measurements i.e. new gaps can be shared between PRS and RRM measurements.
* Option 3: HW, MTK, E///, QC
  + New MG patterns are applicable for PRS and NR/LTE RRM measurements i.e. new gaps are not shared between PRS and 2G/3G RRM measurements.
* Option 4: Apple
  + New MG patterns are applicable for PRS and RRM measurements;
  + the UE is required to meet requirements for PRS measurements performed in the new MG gap pattern; and
  + while the new MG pattern is configured for the PRS measurements the UE is not required to meet requirements for RRM measurements which need gaps.

**Issue 1-1-4: New MG patterns is defined as per-UE or per-UE and per-FR capabilities?**

* + Option 1: QC, HW, E///, NEC, ZTE, MTK, Nokia, CATT
    - Defined as per-UE and per-FR capabilities
  + Option 2. Apple
    - Defined as only per-UE capability

**Issue 1-2-1: Whether performing PRS measurement in successive MG occasions subject to signalled UE capability {N, T}? N = duration of DL PRS symbols in ms processed every T ms?**

* Option 1: QC, HW, NEC, OPPO, MTK,
  + Yes.
* Option 2: E///, Nokia
  + No

**Issue 1-2-2: If new gaps are shared between PRS and RRM measurements then use the existing CSSF for sharing new MG pattern between RRM and PRS measurements?**

* Option 1: ZTE, QC, HW, E///, Nokia, MTK
  + Yes.
* Option 2: Apple, Intel
  + No

**Issue 1-2-3: If existing CSSF is used then rules for new MG sharing between RRM and PRS measurements?**

* Option 1: ZTE, HW
  + Equal split of gaps between PRS and all RRM measurements
* Option 2: E///, QC, Nokia
  + NR positioning measurements are counted together with inter-frequency and inter-RAT measurement objects and
  + gap sharing of NR positioning should be based on the same principle of LTE-PRS, i.e., scarce PRS (corresponding to long periodicities) should be prioritized over other candidates for measurement in the same gap instance.
* Option 3: MTK
  + If PRS periodicity >= 80 ms, then PRS measurement is prioritized over other candidates for measurement in the same gap instance;
  + Otherwise, Equal split of gaps between PRS and all RRM measurements

2nd round email discussion conclusions

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

**R4-2012126 Reply LS on the UE DL PRS processing**

*Type: LS Out For: Approval  
 To: RAN1  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

**R4-2012127 WF on requirements for RSTD and UE Rx-Tx time difference measurement**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

**R4-2012133 WF on requirements for PRS-RSRP measurements**

*Type: other For: Approval  
 Source: Intel Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2012135 WF on impact of NR positioning measurements on RRM**

*Type: other For: Approval  
 Source: Ericsson*

**Discussion:**

**Decision: Return to.**

**R4-2012136 LS on new measurement gap patterns for NR positioning**

*Type: LS Out For: Approval  
To: RAN2   
Source: Ericsson*

**Discussion:**

**Decision: Return to.**

**R4-2012140 WF on gNB requirements for NR positioning**

*Type: other For: Approval  
 Source: Ericsson*

**Discussion:**

**Decision: Return to.**

**R4-2012141 System simulation assumptions for deriving side conditions**

*Type: other For: Approval  
 Source: Ericsson*

**Discussion:**

**Decision: Return to.**

**R4-2012142 Link simulation assumptions for deriving positioning SRS configurations**

*Type: other For: Approval  
 Source: Nokia*

**Discussion:**

**Decision: Return to.**

**R4-2012143 Reply LS on positioning SRS during DRX inactive time**

*Type: LS Out For: Approval  
To: RAN2   
Source: Apple*

**Discussion:**

**Decision: Return to.**

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

**R4-2011364 General introduction of NR positioning measurements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1107 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

General introduction of NR positioning measurements

**Discussion:**

**Decision: Agreed.**

**R4-2012128 General introduction of NR positioning measurements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1107 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

General introduction of NR positioning measurements

**Discussion:**

**Decision: Withdrawn.**

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

**R4-2009881 CR\_ Revision of CSSF within gap for NR positioning**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0941 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces the necessary changes to CSSF to account for NR positioning with MG

**Discussion:**

**Decision: Revised to R4-2012137 (from R4-2009881).**

**R4-2012137 CR\_ Revision of CSSF within gap for NR positioning**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0941 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces the necessary changes to CSSF to account for NR positioning with MG

**Discussion:**

**Decision: Return to.**

##### 7.7.2.1 UE requirements [NR\_pos-Core]

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

**R4-2010203 Discussion of remaining issues for PRS-RSTD measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2010706 On PRS RSTD measurement requirements for NR positioning**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2011155 CR for general applicability of PRS measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1082 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012125 (from R4-2011155).**

**R4-2012125 CR for general applicability of PRS measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1082 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011156 Discussion on RSTD measurement**

*Type: LS out For: Approval  
 to RAN1, cc RAN2  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011357 On RSTD measurements and measurement reporting**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On RSTD measurements and measurement reporting

**Discussion:**

**Decision: Noted.**

**R4-2011358 Measurement report mapping and additional path reporting for PRS RSTD**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1104 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Measurement report mapping and additional path reporting for PRS RSTD

**Discussion:**

**Decision: Revised to R4-2012132 (from R4-2011358).**

**R4-2012132 Measurement report mapping and additional path reporting for PRS RSTD**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1104 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Measurement report mapping and additional path reporting for PRS RSTD

**Discussion:**

**Decision: Return to.**

**R4-2009673 Measurement period for PRS-RSTD**

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

**Discussion:**

**Decision: Noted.**

**R4-2009741 Further discussion on NR PRS RSTD requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2009744 CR for PRS RSTD requirements in TS38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0925 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Revised to R4-2012129 (from R4-2009744).**

**R4-2012129 CR for PRS RSTD requirements in TS38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0925 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2009845 Discussion on PRS RSTD measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009874 On PRS-RSTD measurements for NR positioning**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

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

**R4-2010204 Discussion of remaining issues for PRS-RSRP measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2011157 Discussion on PRS-RSRP measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2011158 CR for measurement requirements for PRS-RSRP**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1083 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012134 (from R4-2011158).**

**R4-2012134 CR for measurement requirements for PRS-RSRP**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1083 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011359 On PRS-RSRP measurements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On PRS-RSRP measurements

**Discussion:**

**Decision: Noted.**

**R4-2009742 Further discussion on PRS RSRP measurement requirements for NR positioning**

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

**Discussion:**

**Decision: Noted.**

**R4-2009846 Discussion on PRS-RSRP measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009875 On PRS-RSRP measurements for NR positioning**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

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

**R4-2010707 On UE Rx-Tx time difference measurement requirements**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2011159 Discussion on Rx-Tx time difference measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2011160 Simulation results for UE Rx-Tx time difference**

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

**Discussion:**

**Decision: Noted.**

**R4-2011355 On UE Rx-Tx measurements and measurement reporting**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On UE Rx-Tx measurements and measurement reporting

**Discussion:**

**Decision: Noted.**

**R4-2011356 Measurement report mapping and additional path reporting for UE Rx-Tx**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1103 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Measurement report mapping and additional path reporting for UE Rx-Tx

**Discussion:**

**Decision: Revised to R4-2012131 (from R4-2011356).**

**R4-2012131 Measurement report mapping and additional path reporting for UE Rx-Tx**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1103 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Measurement report mapping and additional path reporting for UE Rx-Tx

**Discussion:**

**Decision: Return to.**

**R4-2009671 UE Rx-Tx measurements**

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

**Discussion:**

**Decision: Noted.**

**R4-2009743 Discussion on UE RX-TX time difference measurement requirements for NR positioning**

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

**Discussion:**

**Decision: Noted.**

**R4-2009847 Discussion on UE Rx-Tx time difference measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009876 On UE Rx-Tx time difference measurement for NR positioning**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009883 CR\_Introduction of UE Rx-Tx time differencde measurement period requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0943 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces the measurement period requirements for UE Rx-Tx time difference measurements

**Discussion:**

**Decision: Revised to R4-2012130 (from R4-2009883).**

**R4-2012130 CR\_Introduction of UE Rx-Tx time differencde measurement period requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0943 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces the measurement period requirements for UE Rx-Tx time difference measurements

**Discussion:**

**Decision: Return to.**

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

**R4-2010708 Link-level simulation results for UE Rx-Tx time difference measurements**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2011161 Further simulation results for RSTD and PRS-RSRP**

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

**Discussion:**

**Decision: Noted.**

**R4-2011362 Link-level simulation results for NR UE Rx-Tx**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Link-level simulation results for NR UE Rx-Tx

**Discussion:**

**Decision: Noted.**

**R4-2009848 Link level simulation results for UE RX-Tx time difference**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009877 Link-level simulation assumptions for RSTD and UE Rx-Tx time difference measurements**

*Type: discussion For: Approval  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

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

**R4-2010205 Discussion on measurement gaps for positioning**

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

**Discussion:**

**Decision: Noted.**

**R4-2010709 On new measurement gap patterns for positioning measurements**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2010756 Discussion on new measurement gap patterns for positioning requirements**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

In this contribution, we provide our views on introduction of new measurement gap patterns for positioning measurements in Rel-16

**Discussion:**

**Decision: Noted.**

**R4-2011162 Impact of positioning on existing RRM requirements**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011163 CR on CSSF and measurement gap related requirements for positioning**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1084 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Postponed.**

**R4-2011164 CR on measurement gap related requirements for positioning 36133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6947 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012139 (from R4-2011164).**

**R4-2012139 CR on measurement gap related requirements for positioning 36133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6947 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011360 LS on new measurement gaps for NR positioning**

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

**Abstract:**

LS on new measurement gaps for NR positioning

**Discussion:**

**Decision: Noted.**

**R4-2011361 Introduction of new measurement gaps for PRS-based measurements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1105 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of new measurement gaps for PRS-based measurements

**Discussion:**

**Decision: Postponed.**

**R4-2011506 On new measurement gap patterns for NR positioning**

*Type: discussion For: Agreement  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Disussion on new MGP's for NR positioning

**Discussion:**

**Decision: Noted.**

**R4-2009674 New gap patterns for PRS measurements**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Noted.**

**R4-2009740 Further discussion on new gap patterns for NR Pos measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2009849 Discussion on new measurement gap patterns for positioning measurements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009879 On new MG patterns for NR positioning**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2009882 CR\_ Introduction of new MG patterns for NR positioning**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0942 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces two new MG patterns and their applicability requirements

**Discussion:**

**Decision: Revised to R4-2012138 (from R4-2009882).**

**R4-2012138 CR\_ Introduction of new MG patterns for NR positioning**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0942 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

This CR introduces two new MG patterns and their applicability requirements

**Discussion:**

**Decision: Return to.**

**R4-2009913 On new positioning measurement gaps**

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

**Discussion:**

**Decision: Noted.**

##### 7.7.2.3 gNB requirements [NR\_pos-Core]

**R4-2011165 Discussion on the scope gNB requirements for NR positioning**

*Type: discussion For: Discussion  
 Source: Huawei, Hisilicon, CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2011166 Discussion on gNB positioning measurement requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011302 gNB Positioning System Simulation on SRS signals**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

For rx tx measurement the BS must detect the SRS signal. The signal strength depends on the interference in the cell. The simulations give an overview about the levels in the serving and the neighbour cell.

**Discussion:**

**Decision: Noted.**

**R4-2011303 gNB Positioning Requirement Analysis**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

It is proposed to divided the requirements for gNB positioning in 38.104 and 38.133 and give an update to the contorversal discussions of the last meeting.

**Discussion:**

**Decision: Noted.**

**R4-2011507 On gNB measurement accuracy requirements for NR positioning**

*Type: discussion For: Agreement  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion on gNB measurement accuracy requirements for NR positioning.

**Discussion:**

**Decision: Noted.**

**R4-2009672 gNB requirements for NR positioning**

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

**Abstract:**

This paper discusses some pending issues left from last meeting.

**Discussion:**

**Decision: Noted.**

**R4-2009850 Discussion on gNB measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009878 on gNB requirements for NR positioning**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

##### 7.7.2.4 Other requirements [NR\_pos-Core]

**R4-2011167 Discussion on positioning SRS transmission during DRX inactive time**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011168 CR to add CSI-RS related reporting criteria for ECID**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1085 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012144 (from R4-2011168).**

**R4-2012144 CR to add CSI-RS related reporting criteria for ECID**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1085 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011249 SRS for positioning during DRX inactive time**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper analyzes the impact of SRS transmission during DRX inactive time

**Discussion:**

**Decision: Noted.**

**R4-2011363 Reporting criteria for NR positioning measurements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1106 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Reporting criteria for NR positioning measurements

**Discussion:**

**Decision: Revised to R4-2012145 (from R4-2011363).**

**R4-2012145 Reporting criteria for NR positioning measurements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1106 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Reporting criteria for NR positioning measurements

**Discussion:**

**Decision: Return to.**

**R4-2009914 On positioning SRS transmission in CDRX**

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

**Discussion:**

**Decision: Noted.**

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

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

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

**Email discussion: [96e][218] NR\_eMIMO\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][218] NR\_eMIMO\_RRM | R16 NR eMIMO | RRM Core requirements | 7.9.2 |

**R4-2012049 Email discussion summary for [96e][218] NR\_eMIMO\_RRM** *Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012218 (from R4-2012049).**

**R4-2012218 Email discussion summary for [96e][218] NR\_eMIMO\_RRM** *Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012146 | WF on Completing Rel-16 eMIMO RRM Core Requirement | Samsung |

**Topic #1: L1-SINR Measurement**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010220 | Revised |
| R4-2010465 | Agreed |

**Topic #2: DL/UL Beam Indication with Reduced Latency and Overhead**

Issue 2-1-1: The necessity of RRM requirement for MAC-CE based Pathloss RS activation procedure:

Agreement

* MAC-CE based pathloss RS activation procedure:
  + RAN4 specify known/unknown PL RS condition, and specify delay requirement when target PL RS is known.
* No performance test should be defined in Rel-16 to capture this requirement in 38.133 if RAN4 can’t confirm the testability of the pathloss RS activation procedure.

Issue 2-1-2: If RAN4 conclude “yes” to Issue 2-1-1, how to specify requirement:

Agreement

* Delay requirement for MAC-CE based Pathloss RS activation procedure:
  + For PL RS known case, n + +

Issue 2-1-3: If RAN4 conclude “yes” to Issue 2-1-1, expected UE behavior before Pathloss RS is applied:

Agreement

* No requirement should be defined during the transition period of the applicable timing, i.e., between 1 to 5 measurement samples, for activating/updating PL RS.
* RAN4 further study and conclude the timeline to apply old PL RS by RAN4#96:
  + FFS: UE shall apply old pathloss reference signals until the slotn + + , upon receiving PDSCH carrying MAC-CE activation in slot n.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010218 | Revised |
| R4-2011060 | Merged |
| R4-2009682 | Merged |

**Topic #3: Multi-TxRP Transmission**

Issue 3-1-2: Whether or not to specify how UE determine the reference timing of which TRxP is used for defining MRTD/MTTD requirements in intra-band EN-DC/CA

Agreement

* For multi-TRxP transmissions, RAN4 shall not to specify how UE to determine the reference timing of which TRxP is used for defining MRTD/MTTD requirements in intra-band EN-DC/CA.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010099 | Revised |

GTW session (Aug 26th)

**MAC-CE based Pathloss RS Activation Delay**

* For expected UE behavior before Pathloss RS is applied:
  + Option-1: UE shall apply old pathloss reference signals until the slot n + + , upon receiving PDSCH carrying MAC-CE activation in slot n.
  + Option-2: UE shall apply old pathloss reference signals until the slot n + + +Tfirst PL-RS, upon receiving PDSCH carrying MAC-CE activation in slot n.
  + Option-3: No requirement shall be defined for until when UE shall apply old pathloss reference signals.
  + Other view collection for R4-2012148 (revised from R4-2010218) CR on introduce MAC-CE based PL RS activation delay
* Discussion
  + Apple: the question is whether UE behavior is testable. If not, then we don’t need to define the requirements. Also depends on availability of PL RS which taken into account in Option 2.
  + QC: Option 1. To Apple – some UEs may have been configured with RS already and can use previous measurements. Option 2 prohibits Option 1. Option 1 does not preclude Option 2.
  + ZTE: Prefer Option 2 as baseline. The transition period shall be as short as possible. To QC, the mentioned scenario does not always apply and we should have generic requirements.
  + Nokia, MTK, Huawei: Agree with Option 1.
  + Samsung: for the testability – we raised similar issue in the beginning but we observed many companies prefer to specify this. We already agreed in the 1st round that no performance test case will be defined if testability is not confirmed.
* Agreement
  + UE shall apply old pathloss reference signals until the slot n + + , upon receiving PDSCH carrying MAC-CE activation in slot n.

**Multi-TRxP Transmission**

* Issue 3-1-1: Whether or not RRM requirement impact is needed for multi-TxRP transmission
  + Option 1 (Ericsson, Huawei, Qualcomm, Nokia): No impact.
  + Option 1a (Qualcomm, MediaTek, Nokia): No impact on RRM requirement, and a note is added saying that, “UE may assume that UE will receive all signals from multiple TRPs within CP in intra-band EN-DC/CA scenarios”.
  + Option 1b (MediaTek): No impact on RRM requirement, and only for FR1 intra-band contiguous CA in multiple TPxPs case, UE is required to receive the signals from multiple CCs within CP.
  + Option 2 (Apple): With multi-TRP deployment co-located deployment is still applicable if either TRP is co-located with PCell.
  + Option 3 (Samsung, MediaTek): RAN4 add the following text proposal to intra-band EN-DC MRTD/MTTD and intra-band CA MRTD requirement in TS38.133 to better explain “co-located deployment”:
    - “The requirement shall be applicable to the co-located deployment with multi-TRP transmission.”
  + Discussion
    - QC: there is no consensus on the last 2 sub-bullets
    - E///: Plenary had some response to ITU on co-located deployment definition. We use it as a reference. Existing spec works. Multiple TRxPs does not have definition.
    - Apple: we can de-couple intra-band contiguous and non-contiguous cases. For contiguous case we don’t have MRTD and need to keep co-located assumptions. For non-contiguous we are ok to remove co-located assumption.

**Agreement:**

* For Rel-16 eMIMO multi-TxRP transmission,
  + No RRM core requirement impact identified on MRTD/MTTD values specified in Rel-15;

2nd round email discussion conclusions

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

**R4-2012146 WF on Completing Rel-16 eMIMO RRM Core Requirement**

*Type: other For: Approval  
 Source: Samsung*

**Discussion:**

**Decision: Return to.**

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

**R4-2010100 Discussion on updating pathloss RS for PUSCH/SRS via MAC-CE**

*Type: discussion For: Approval  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010217 Discussion on PL RS activation requirement via MAC CE**

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

**Discussion:**

**Decision: Noted.**

**R4-2010218 CR for introduction of pathloss reference signal switching delay**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0992 Cat: B (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Revised to R4-2012148 (from R4-2010218).**

**R4-2012148 CR for introduction of pathloss reference signal switching delay**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0992 Cat: B (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2010466 RRM requirements for MAC-CE based PL-RS activation**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the RRM requirements of MAC CE based pathloss RS activation/updates.

**Discussion:**

**Decision: Noted.**

**R4-2011059 Discussion on activation delay requirements for non-maintained PL-RS**

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

**Discussion:**

**Decision: Noted.**

**R4-2011060 CR on activation time requirements for non-maintained PL-RS**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1038 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Merged.**

**R4-2009982 RRM requirements for PL-RS update**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010098 Discussion on Multi-TRP Transmission**

*Type: discussion For: Approval  
 Source: Samsung*

**Discussion:**

**Decision: Noted.**

**R4-2010099 CR to TS38.133 on introduction of multi-TRP transmission (Section 7.5 and 7.6)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0975 Cat: B (Rel-16)  
  
 Source: Samsung*

**Discussion:**

**Decision: Revised to R4-2012149 (from R4-2010099).**

**R4-2012149 CR to TS38.133 on introduction of multi-TRP transmission (Section 7.5 and 7.6)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0975 Cat: B (Rel-16)  
  
 Source: Samsung*

**Discussion:**

**Decision: Return to.**

**R4-2010191 Discussion on RRM requirements for Multi-TRP**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2010219 Discussion on MRTD for multiple TPxPs scenario**

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

**Discussion:**

**Decision: Noted.**

**R4-2010467 MRTD/MTTD requirements for Multi-TRP deployment for MIMO+CA and MIMO+DC**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the MRTD/MTTD requirements for multi-TRP deployment.

**Discussion:**

**Decision: Noted.**

**R4-2011061 Discussion on MRTD requirements for multi-TRP transmissions**

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

**Discussion:**

**Decision: Noted.**

**R4-2009609 Discussion on RRM requirements for Multi-TRP**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2009981 Multi-TRP transmission related requirements**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010220 CR for L1-SINR requirement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0993 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Revised to R4-2012147 (from R4-2010220).**

**R4-2012147 CR for L1-SINR requirement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0993 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2010465 Correction of L1-SINR reporting requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1006 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR adds the reference to the mapping table for L1-SINR measurement report.

**Discussion:**

**Decision: Agreed.**

**R4-2011057 Discussion on L1-SINR measurement accuracy requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011058 CR on L1-SINR measurement accuracy requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1037 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011337 Simulation results of L1-SINR measurement accuracy**

*Type: other For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The document has presented the simulation results of L1-SINR measurement accuracy for CMR-only, SSB+NZP-IMR, SSB+ZP-IMR, CSI-RS+NZP-IMR and CSI-RS+ZP-IMR.

**Discussion:**

**Decision: Noted.**

**R4-2009681 Discussion on applicable timing for the PL RS activated by MAC-CE**

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

**Discussion:**

**Decision: Noted.**

**R4-2009682 [CR] Applicable timing for the PL RS activated by MAC-CE**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0923 Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Merged.**

**R4-2009983 Requirements for L1-SINR estimation accuracy**

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

**Discussion:**

**Decision: Noted.**

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

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

**Email discussion: [96e][219] NR\_RF\_FR1\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][219] NR\_RF\_FR1\_RRM | R16 NR FR1 RF | RRM requirements (Core maintenance and Perf) | 7.11.2 7.11.3 |

**R4-2012050 Email discussion summary for [96e][219] NR\_RF\_FR1\_RRM** *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012219 (from R4-2012050).**

**R4-2012219 Email discussion summary for [96e][219] NR\_RF\_FR1\_RRM** *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012150 | WF on test case for DL interruption due to Tx switching between two uplink carriers | Huawei, HiSilicon |

2nd round email discussion conclusions

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

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

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

**R4-2012150 WF on test case for DL interruption due to Tx switching between two uplink carriers**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

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

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

**R4-2011114 Test case list for Tx switching between two uplink carriers**

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

**Discussion:**

**Decision: Noted.**

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

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

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

**R4-2009598 Introduction of the P-MPR 3 bits report mapping in 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0914 Cat: B (Rel-16)  
  
 Source: InterDigital, Inc.*

**Abstract:**

Introduction of the P-MPR 3 bits report mapping in 38.133.

**Decision: Return to.**

**Decision:                    Revised to R4-2011736 (from R4-2009598).**

**R4-2011736  Introduction of the P-MPR 3 bits report mapping in 38.133**

*Type: CR                       For: Agreement  
                                                            38.133 v16.4.0    CR-0914  Cat: B (Rel-16)  
  
                                                            Source: InterDigital, Inc.*

**Abstract:**

Introduction of the P-MPR 3 bits report mapping in 38.133.

**Discussion:**

**Decision:                    Return to.**

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

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

**Email discussion: [96e][220] NR\_RF\_FR2\_req\_enh\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][220] NR\_RF\_FR2\_req\_enh\_RRM | R16 NR FR2 RF | RRM Core requirements | 7.12.2.1 |

**R4-2012051 Email discussion summary for [96e][220] NR\_RF\_FR2\_req\_enh\_RRM** *Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012220 (from R4-2012051).**

**R4-2012220 Email discussion summary for [96e][220] NR\_RF\_FR2\_req\_enh\_RRM** *Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (Aug 18th)

Agreement in RAN4#95e: If no consensus can be made to define MRTD value for CBM and the study on the feasibility to support up to 3us MRTD by RAN4#96e, no CBM RRM requirements in Rel-16 are defined

Sub-topic 1-1: MRTD with CBM in Rel-16

* Option 1: 260ns (Apple, Mediatek, Qualcomm, Xiaomi, OPPO, Intel)
* Option 2: 3us (Ericsson, NTT DCM, KDDI, NEC, Huawei, Samsung, ZTE)
* Option 3: No CBM related RRM requirements are specified in Rel-16 (Nokia, Samsung, ZTE, Ericsson, Huawei)
* Option 3a: No CBM-specific RRM requirements are specified in Rel-16 (Nokia, Samsung, ZTE, Ericsson, Huawei)

Discussion:

Samsung: Support Option 2, 3.

ZTE: Support Option 2. Option 3 is also ok based on Apple’s revision

Intel: ok with Option 3 in case no compromise can be made

MediaTek: can accept Option 3 as a compromise

QC: 3us can work in case we adopt scheduling restrictions and mitigation techniques. Prefer Option 1 and can compromise to Option 3.

Nokia: RF session does not have progress on the CBM. Prefer to treat CBM in Rel-17.

E///: Option 3 is acceptable

Apple: Can accept Option 3. NW will not know when UE makes RX beam sweeping and this is the reason we think it should be transparent and proposed Option 1.

Nokia: suggest to focus on co-located IBM only in Rel-16 and leave other scenarios to Rel-17 (for both RF and RRM)

Huawei: we already agreed to consider co-located and non-co-located IBM in Rel-16

Nokia: our proposal is based on RF session progress

Apple: this is also a part of the RRM Enhancements email thread

E///: both co-located and non-co-located are feasible and shall be considered

Samsung: do not see reasons to restrict deployments

QC: for IBM we assume 8us MRTD. Would it already apply for non-co-located case?

Nokia: 8us could apply for MRTD but our intention is to align with RF session.

Apple: if we focus on co-located case then we’ll need to revise MRTD to avoid UE overdesign

Samsung: in RF session they have an assumption of 1 AoA for IBM but it does not restrict non-co-located deployments

Huawei: Option 3 is acceptable

KDDI: Option 1 is too strict for NW deployment. Ok with Option 3.

Agreement: No CBM-specific RRM requirements are specified in Rel-16

Sub-topic 1-3. Applicability of existing MRTD in R15 and R16 on common beam management

* Option 1: Clarify that MRTD of 8us for FR2 inter-band CA specified in Table 7.6.4-2 of TS38.133 is defined for IBM only. (Apple, OPPO)
* Option 2: no

Discussion:

Nokia: no impact on R15.

E///: Current table is fine as it is since we have only IBM in Rel-16

QC: At least for Rel-16 it should be clarified that this applies for IBM only

Huawei: we can have a note to clarify that 8us is under assumption of IBM

Apple: Option 1

Ericsson: prefer to introduce clarification when CBM is introduced. So far IBM is the only option

Nokia: suggest to wait conclusions from RF session. We are generally fine with Option 1.

ZTE: technically IBM and CBM will have different MRTD. There may be confusion for Rel-17. No need to clarify.

4. MTTD with IBM

* Option 1: 8.5us (Qualcomm, OPPO)

Agreement: MTTD with IBM is 8.5us

1st round email discussion conclusions

Chair: further discuss Sub-topic 1-3. Conclusions will be captured in R4-2012151. Remaining CRs will be noted.

2nd round email discussion conclusions

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

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

**R4-2010051 On MRTD for inter-band CA**

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

**Discussion:**

**Decision: Noted.**

**R4-2010056 CR on MRTD for inter-band CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0969 Cat: F (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Revised to R4-2012151 (from R4-2010056).**

**R4-2012151 CR on MRTD for inter-band CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0969 Cat: F (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

**R4-2010311 MRTD requirements for FR2 inter-band DL CA**

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

**Discussion:**

**Decision: Noted.**

**R4-2010616 Further study feasibility to support up to 3 us MRTD**

*Type: other For: Approval  
 Source: Ericsson, KDDI Corporation, NTT DOCOMO INC*

**Abstract:**

In this contribution, we present further study feasibility to support up to 3us MRTD.

**Discussion:**

**Decision: Noted.**

**R4-2010617 Updates on MRTD and MTTD requirements for FR2 inter-band DL CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1014 Cat: B (Rel-16)  
  
 Source: Ericsson, KDDI Corporation, NTT DOCOMO INC*

**Abstract:**

CR to facilitate the commomn beam management based UE implementation.

**Discussion:**

**Decision: Postponed.**

**R4-2010710 On MRTD requirement for FR2 DL inter-band CA**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2010757 Discussion on MRTD requirement for FR2 inter-band DL CA**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

MRTD values for CBM and IBM for FR2 inter-band DL CA is discussed

**Discussion:**

**Decision: Noted.**

**R4-2010758 CR to TS 38.133 on MRTD values for FR2 inter-band CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1021 Cat: F (Rel-16)  
  
 Source: NEC*

**Abstract:**

MRTD values for CBM and IBM is clarified in table 7.6.4-2

**Discussion:**

**Decision: Postponed.**

**R4-2011062 Discussion on MRTD requirements for FR2 inter-band DL CA**

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

**Discussion:**

**Decision: Noted.**

**R4-2011429 MRTD for FR2 inter-band DL CA**

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

**Abstract:**

discussion on MRTD requirement for FR2 inter-band DL CA

**Discussion:**

**Decision: Noted.**

**R4-2011430 CR on 38133 MRTD for FR2 inter-band DL CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1109 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

MRTD requirement for FR2 inter-band DL CA

**Discussion:**

**Decision: Postponed.**

**R4-2009766 Discussion on the remaining issues on MRTD requirement for FR2 inter-band CA**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Discussion:**

**Decision: Noted.**

**R4-2009767 CR on MRTD requirement for FR2 inter-band CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0930 Cat: F (Rel-16)  
  
 Source: Xiaomi*

**Discussion:**

**Decision: Postponed.**

**R4-2009984 MRTD/MTTD requirements in FR2 inter-band CA**

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

**Discussion:**

**Decision: Noted.**

**R4-2011322 MRTD requirements for CBM in FR2 inter-band CA**

*Type: discussion For: Approval  
 38.133 v..  
 Source: Intel Corporation*

**Session chair: moved from AI 7.12.1.1**

**Discussion:**

**Decision: Noted.**

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

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

**Email discussion: [96e][221] NR\_RRM\_Enh\_RRM\_1**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][221] NR\_RRM\_Enh\_RRM\_1 | R16 NR RRM Enh | RRM Core requirements: General, BWP switching, Spatial relation switch for UL | 7.13.1.3  7.13.1.4 7.13.1.6 (relevant papers) |

**R4-2012052 Email discussion summary for [96e][221] NR\_RRM\_Enh\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012063**

**R4-2012063 Email discussion summary for [96e][221] NR\_RRM\_Enh\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012221 (from R4-2012063).**

**R4-2012221 Email discussion summary for [96e][221] NR\_RRM\_Enh\_RRM\_1** *Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: BWP Switching on multiple CCs**

TBWPSwitchDelay based on the smallest SCS

Agreement: TBWPswitchDelay shall also be based on the smallest SCS among all SCS values of all involved CCs regardless of SCS changes.

Condition when define requirement for timer based partial overlap BWP switch

Agreement: Timer-based partial overlapping BWP switch requirements are defined when BWP switch does not involve SCS changing.

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012152 | WF on NR RRM requirements enhancements - BWP switching on multiple CCs | Intel Corporation |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011069 | Revised |
| R4-2009864 | Merged |
| R4-2011248 | Merged |
| R4-2010197 | Agreed |
| R4-2010362 | Merged |
|  |  |

**Topic #2: UL Spatial Relation Info Switching**

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012154 | WF on NR RRM requirements enhancements - UL spatial relation info switch | MediaTek |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009865 | Return to |

GTW session (Aug 24th)

**Topic #1: BWP Switching on multiple CCs**

Sub-topic 1-1: Simultaneous BWP switch on multiple CCs

Issue 1-1-1: Delay requirements for DCI/timer based BWP switch

N: Number of CCs with simultaneous BWP switch;

D is incremental delay for BWP switch processing on additional CCs;

FFS on definition of N.

* Option 1(Apple):
  + N is the number of CCs with simultaneous BWP switch.
* Option 2 (Xiaomi, Ericsson, OPPO, NEC, MediaTek, Vivo, Nokia, ZTE, Intel, Huawei):
  + For UE which is capable of per-FR gap, and no BWP switch involves SCS change, N is the number of simultaneous BWP switching on CCs within the same frequency range; For UE which is not capable of per-FR gap, or the BWP switches on multiple CCs involves SCS changing, N is the number of simultaneous BWP switching on both FR.
* Option 3(Qualcomm):
  + Introduce a new UE feature (mentioned as 9-12 in RAN4 UE feature list parameter set).
  + For UEs that support this capability and no BWP involves SCS change, N is the number of simultaneous BWP switching on CCs within the same frequency range; For UEs that do not support this feature, or the BWP switches on multiple CCs involves SCS changing, N is the number of simultaneous BWP switching on both FR.

Discussion:

QC: per-FR gap feature was not intended for BWP switching. UE may perform separate measurements but not able to do simultaneous switching.

Apple: similar concern as QC.

MTK: we already have relevant agreements for the partial overlap case where the processing depends on per-FR gap capability.

ZTE: per-FR gap was used for many features like interruption in Rel-15. It characterizes whether UE can do independent processing in FR1 and in FR2 in both RF and BB.

Huawei: Same view as MTK and ZTE. There is no difference vs Rel-15. Same principles can apply.

Apple: In partial overlap case we use per-FR gap the main reason is that we don’t have SCS change and assume that UE can receive DCI in another CC without any interruption.

MTK: It is still not clear why we need additional time.

Apple: object to Option 2.

Huawei: Definition of N is needed for the LS to RAN2? Agree with MTK that we already have requirements for partial overlap case and we don’t extend the requirement and FR1/FR2 can be done in parallel.

Apple: this case is different. The question is whether we need further extend the processing time. Option 3 can be a good approach to accommodate different implementation.

Intel: it seems that the concern is that UE may need additional time. In partial overlap we did not allow additional time. Option 1 does not mean that we need to update partial overlap case.

Apple: any concern on adding new capabilities

E///: it will become complicated

Intel: capability may be fine but then the requirements will not be consistent with partial overlap switching.

Conclusion: Continue discussion

Issue 1-1-2: Delay requirements for RRC based BWP switch

; Where DRRC is FFS

extended delay for RRC based BWP switching on multiple CCs is needed.

* Where DRRC is FFS.
  + Option 1 (NEC, Nokia): DRRC = 0ms
  + Option 2 (Apple, Xiaomi, Qualcomm, Vivo, OPPO, Ericsson, Intel, MediaTek): DRRC = D
  + Option 3 (Intel, Ericsson, NEC, ZTE): if N<=3, re-use the existing requirement. if N>3, DRRC =D. where N is the total number of CCs.
  + Option 4 (Vivo): An upper bound Nbound on N could be defined and the total switch delay will not further increase when N is larger than Nbound
  + Option 5 (Huawei): For type 1 UE, DRRC = 0ms; For type 2 UE, DRRC = D

Discussion:

Huawei: Can compromise to Option 5.

Intel/Nokia: ok to compromise to Option 5.

Apple: how is DRRC = 0 justified?

Huawei: D is introduced for DCI and timer based cases. Many companies observed that delay is too big for RRC based case.

Agreement: For type 1 UE, DRRC = 0ms; For type 2 UE, DRRC = D

Sub-topic 1-2: Partial overlap BWP switch on multiple CCs

Issue 1-2-2: Delay requirements for Timer based BWP switch

**Sub1:** if UE is capable of per-FR gap and the timer based BWP switch happens in two frequency range, whether UE handled timer-based BWP switch in parallel or sequentially

* Option 1(Huawei, Intel, ZTE):
  + If UE is capable of per-FR gap, the timer based BWP switch happens in two frequency range are performed in parallel if the BWP switch doesn’t involve SCS change.
* Option 2(Apple, Xiaomi, MediaTek, Vivo, Ericsson, OPPO, NEC, Qualcomm):
  + Sequentially

Discussion:

Huawei: Option 2 contradicts to RAN1.

MTK: Option 2 is aligned with RAN1 design.

Agreement: if UE is capable of per-FR gap and the timer based BWP switch happens in two frequency range, UE handles timer-based BWP switch sequentially

**Sub2:** Delay requirement for timer based BWP switch

* Option 1(Vivo, Apple, Xiaomi, NEC, Qualcomm, MediaTek, OPPO): Don’t differentiate UE capability of per-FR gap

TBWPSwitchDelayPartialOverlapTimer = TDelayTimer + TBWPSwitchDelayTimer

* Option 1a (Ericsson):

TMultipleBWPSwitchDelayTimer = (1+M)\*TBWPSwitchDelayTimer

where:

* M=0 when the timer-based BWP switch is triggered on CC1, no timer-based BWP switch is ongoing on any other CC.
* M> 0 if the timer-based BWP switch is triggered on CC1 and a timer-based BWP switch is ongoing on another CC (CC2).

(M-1) is the number of CCs on which the timer-based BWP switch is triggered before the triggering of the timer-based BWP switch on CC1 but while the timer-based BWP is ongoing on CC2.

* Option 2 (Intel, Huawei, ZTE): Dependent on the UE capability of per-FR gap
* For UE capable of per-FR gap:
  + Option 2a (Huawei): TMultipleBWPswitchDelayTotal = TDelay + TMultipleBWPswitchDelay, where TDelay is the time delayed by ongoing BWP switching within the same frequency range. TMultipleBWPswitchDelay is the timer-based BWP switch delay on current single CC or simultaneously triggered on multiple CCs.
* For UE not capable of per-FR gap:
  + Option 2a (Huawei): TMultipleBWPswitchDelayTotal = TDelay + TMultipleBWPswitchDelay*,* where *TDelay*is the time delayed by ongoing timer-based BWP switching with in the same frequency range; TMultipleBWPswitchDelayis TBWPSwitchDelay*+* D(N-1), N is the number of timer-based BWP switch on CCs in the other FR of which the time periods of BWP switching delay are overlapped with TMultipleBWPswitchDelay, and D is the incremental delay, which is same as that of simultaneous BWP switch on multiple CCs

Discussion

E///: Option 1 is ok but need to discuss equation

Agreement: Don’t differentiate UE capability of per-FR gap

Option A: TMultipleBWPswitchDelayTotal = TDelay + TMultipleBWPswitchDelay, where TDelay is the time delayed by ongoing BWP switching.

Option B: TMultipleBWPSwitchDelayTimer = (1+M)\*TBWPSwitchDelayTimer

where:

* M=0 when the timer-based BWP switch is triggered on CC1, no timer-based BWP switch is ongoing on any other CC.
* M> 0 if the timer-based BWP switch is triggered on CC1 and a timer-based BWP switch is ongoing on another CC (CC2).
* (M-1) is the number of CCs on which the timer-based BWP switch is triggered before the triggering of the timer-based BWP switch on CC1 but while the timer-based BWP is ongoing on CC2.

Issue 1-2-3: Delay requirements for RRC based BWP switch

**Sub1:** Whether RRC processing time is equal to BWP switch time in RAN2 (In case the RRC procedure triggers BWP switching, the RRC procedure delay is the value defined in the following table (Table 12.1-1 in TS 38.331) plus the BWP switching delay defined in TS 38.133 [14], clause 8.6.3.)

* Option 1(Xiaomi, Vivo, Apple): Yes
* Option 2(Ericsson, NEC, ZTE, Nokia, Intel): No.

**Sub2:** Additional waiting timefor RRC based BWP switch

* Option 1 (Apple, Intel, Xiaomi, MediaTek, Vivo, Ericsson, Qualcomm, OPPO): upper bounded by the multiple BWP switch time in CG1
* Option 2(OPPO, Nokia, NEC, Huawei, ZTE): upper bounded by the RRC processing time in the 1st CG.

Option 2a(Huawei): The waiting time is upper bounded by the RRC processing time (10ms) in the 1st CG

**Topic #2: UL Spatial Relation Info Switching**

Sub-topic 2-1: General

Issue 2-1-1: When the UL signal has spatial relation to an unknown DL RS

* Option 1 (Ericsson, NTT DOCOMO): UE transmits using previous TX beam
* Option 2 (NTT DOCOMO, Nokia, Ericsson): Drop UL transmission until spatial relation info is known
* Option 3 (Intel, Qualcomm, Vivo, MediaTek, OPPO, NTT DOCOMO, Huawei, Samsung): Up to UE implementation and no requirement is needed to be specified
* Recommended WF:
  + Due to limited time, suggest companies to compromise to option 3.
* Discussion
  + Nokia: prefer to specify UE behavior. At least preclude Option 1.
  + Huawei: this is quite similar to DL TCI state switching. Leave it up to UE implementation.
  + Apple: this is not a switching issues. UE does not know which beam to use. It is up to UE whether to transmit or drop.
  + QC: Agree with Huawei. Similar to DL. New requirements may conflict with RAN1 spec.
  + MTK: would like to further check why the NW configures UL signal with spatial relation to an unknown DL RS
  + ZTE: it is not clear. UE may need to do time tracking first. Prefer Option 1.
  + Chair: is this a typical scenario?
    - ZTE: active TCI state list can be small and this can be quite typical scenario
  + Nokia: 2 different sub-topics 1) what happens within 3ms after TCI state switch; 2) what happens after 3ms if UE does not have RS
* Agreement
  + Option 1:
    - Do not define requirements or UE behavior for the case when the UL signal has spatial relation to an unknown DL RS
  + Option 2:
    - Do not define UE behavior during the transition period
    - UE transmits using newly configured UL spatial relationship after the transition period

Issue 2-1-2: Whether to consider DL timing tracking when associated with DL-RS

**Sub1.** Whether to consider timing tracking when associated DL-RS is known but QCLed with a different qcl-Type1 RS?

* Option 1 (Apple, NTT DOCOMO, Vivo, Ericsson, Huawei, Nokia, Intel, Samsung, ZTE, Qualcomm): No
* Option 2 (MediaTek, Intel, OPPO): Only define the requirement when DL RS is in the active TCI list; Fine timing tracking isn’t needed when the DL RS has already added in the active TCI state list

**Sub2.** Whether to consider timing tracking when associated DL-RS is an unknown DL RS?

* Option 1(Apple, Ericsson, Huawei, NTT DOCOMO, Samsung, Qualcomm): No
* Option 2 (Nokia, ZTE): Yes
* Option 3 (MediaTek, Vivo, Huawei, Intel, OPPO): No requirement will be defined for unknown DL RS

2nd round email discussion conclusions

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

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

**Email discussion: [96e][222] NR\_RRM\_Enh\_RRM\_2**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][222] NR\_RRM\_Enh\_RRM\_2 | R16 NR RRM Enh | RRM Core requirements: SRS carrier switching, CGI reading, Mandatory MG patterns | 7.13.1.1  7.13.1.2 7.13.1.6 (relevant papers) |

**R4-2012053 Email discussion summary for [96e][222] NR\_RRM\_Enh\_RRM\_2** *Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012222 (from R4-2012053).**

**R4-2012222 Email discussion summary for [96e][222] NR\_RRM\_Enh\_RRM\_2** *Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: SRS carrier switching requirements**

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012155 | WF on NR RRM requirements enhancements - SRS carrier based switching | ZTE |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2011122](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Return to |

**Topic #2: CGI reading requirements with autonomous gap**

Sub-topic #1-1 Remaining issues

Agreements

* MIB decoding delay in FR2:
  + 3 \* N \* TSMTC, where N = 8 and TSMTC is SMTC periodicity of target cell
* SIB1 decoding delay and side condition
  + 6 samples and -3 dB SNR
* Value of timer T321 for FR2
  + 5 seconds

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012156 | Reply LS on CGI reading with autonomous gaps | ZTE |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2009596](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2010377](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Agreed |
| [R4-2010378](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2011170](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2011311](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Agreed |
| [R4-2011312](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Agreed |

GTW session (Aug 25th)

**Topic #1: SRS carrier switching requirements**

Issue 1-1a: Interruptions requirements for Case 1a: Co-located intra-band CA with same TA

* Proposals
  + Option 1: The same interruption requirements as for async cases in the spec shall apply
  + Option 2: One slot shorter interruption requirements than for async cases in the spec shall be specified
* Discussion
  + Nokia: We can have 1 slot shorter interruption than in async. We consider only co-located case.
  + QC: The issue is that there may be async UE UL and DL in different CC and hence one additional slot interruption needed. Option 1 is the only valid option.
  + MTK: Same view with QC. Can we confirm with Nokia that UL can affect 2 slots DL?
    - Nokia: In co-located case all CCs are aligned.
  + QC: what Nokia described is from BS perspective. But the issue is from UE perspective.
  + ZTE: if everything is perfectly aligned (SCS, DL:UL) then shorter interruption may be possible. For other cases it is unlikely.
  + Nokia: in some cases we can save one slot interruption.
* Agreements:
  + The same interruption requirements as for async cases in the spec shall apply

**Topic #2: CGI reading requirements with autonomous gap**

* Background
  + Two cases are identified in the 1st round discussion to FFS impact to L1 RRM measurement requirements due to CGI reading in FR2
    - Case 1A:
      * when intra-frequency CGI reading is performed on FR2
        + if all of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency in the same band outside measurement gap **are not fully overlapped** by intra-frequency SMTC occasions.
    - Case 1B:
      * when intra-frequency CGI reading is performed on FR2
        + if all of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency in the same band outside measurement gap **are fully non-overlapped** by intra-frequency SMTC occasions.
* Issue 2-2-1a: Impact to L1 RRM measurement requirements due to CGI reading in FR2
  + Whether UE should meet L1 measurement requirements for Case 1A or Case 1B during MIB decoding?
    - If yes, then how to handle different UE implementations, i.e. MIB decoding with Rx beam sweeping and without Rxbeam sweeping?
  + Whether UE should meet L1 measurement requirements for Case 1A or Case 1B during SIB1 decoding?
* Discussion:
  + ZTE: Previous agreement is that UE is not required to meet L1 measurement requirements for both FR1 and FR2. E/// suggested to revisit the FR2 case.
  + QC: prefer to keep the previous agreement.
  + E///: our previous assumption was that UE is not doing Rx beam sweeping.
  + Apple: understand motivation but prefer Option 1.
* Conclusion
  + Continue discussion in the 2nd round (focus on Case 1B, serving cell measurements and L1-RSRP)
  + In case no consensus reached previous agreements will be kept

2nd round email discussion conclusions

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

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

**Email discussion: [96e][223] NR\_RRM\_Enh\_RRM\_3**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][223] NR\_RRM\_Enh\_RRM\_3 | R16 NR RRM Enh | RRM Core requirements: Multiple Scell activation/deactivation, Inter-frequency measurements, UE-specific BW change, inter-band CA | 7.13.1.5  7.13.1.6 (relevant papers) |

**R4-2012054 Email discussion summary for [96e][223] NR\_RRM\_Enh\_RRM\_3** *Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012160 (from R4-2012054).**

**R4-2012160 Email discussion summary for [96e][223] NR\_RRM\_Enh\_RRM\_3** *Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012223 (from R4-2012160).**

**R4-2012223 Email discussion summary for [96e][223] NR\_RRM\_Enh\_RRM\_3** *Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam and/or common beam (7.13.1.5)**

Agreement: No need to discuss and no CBM-specific RRM requirements are specified in Rel-16.

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012161 | WF on NR RRM requirements enhancements - inter-band FR2 CA RRM | Huawei |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2010572](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip) | Revised |
| [R4-2011](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_eBis/Docs/R4-2003966.zip)064 | Revised |

**Topic #2: Multiple SCell activation/deactivation maintenance (7.13.1.6)**

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012164 | WF on NR RRM requirements enhancements – multiple SCell activation | Apple |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010044 | Revised |
| R4-2011171 | Merged |

**Topic #3: Inter-frequency measurements without MG maintenance (7.13.1.6)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009899 | Not pursued |
| R4-2010107 | Revised |
| [R4-2011124](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011124.zip) | Revised |
| [R4-2011125](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011125.zip) | Not pursued |

**Topic #4: UE-specific CBW change maintenance (7.13.1.6)**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009907 | Return to |

GTW session (Aug 25th)

**Topic #1: Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam and/or common beam (7.13.1.5) (Core requirement related)**

Issue 1-1-2: Assumption for IBM UE in Rel-16

* Option 1 (Nokia): RAN4 will define RRM requirements for IBM capable UE assuming collocated deployments using an L+H FR2 inter-band CA combo for Rel-16.
* Option 2 (Apple, MTK, Ericsson, vivo, Intel, Qualcomm, OPPO, Huawei, NTT DOCOMO, ZTE): Assumption of deployment and band pair for IBM UE should follow the RF session conclusions, and no restriction on deployment and band pair shall be assumed in RRM requirement right now unless RF session concluded on those restrictions.
* Agreements:
  + Assumption of deployment and band pair for IBM UE should follow the RF session conclusions, and no restriction on deployment and band pair shall be assumed in RRM requirement right now unless RF session concluded on those restrictions.

Issue 1-3-2: BM requirements for IBM UE

* Option 1 (Nokia):
  + RAN4 does not define Beam management requirements for IBM UEs in non-collocated deployments in Rel-16.
  + UE need to perform BFD in at least 1 cell per band when UE is configured with FR2 inter-band CA.
* Option 2 (Apple, MTK, Ericsson, vivo, Intel, QC, OPPO, NTT DOCOMO, ZTE):
  + UE need to perform BFD in at least 1 cell per band when UE is configured with FR2 inter-band CA.
* Option 3 (Huawei):
  + To follow the agreements in NR eMIMO on how to perform BFD/CBD measurements.
* Discussion
  + Nokia: ok with Option 2
  + Huawei: Option 2 is not aligned with conclusions in eMIMO case which are already present in the spec. i.e. UE is not required to perform BFD on deactivated SCell
  + QC: we support Option 2. Meantime Huawei comments are correct. Option 3 is ok. For inter-band CA with IBM – there are already agreements in eMIMO
  + Apple: For Option 3, do we have independent BFD for IBM for different bands? Not sure if same deployment as for eMIMO will always apply.
  + Samsung: in eMIMO we consider BFD/CBD on SCell. Both schemes are considered. For the restriction, we already have some for SCell and they should be followed.
  + Apple: In inter-band CA do we always have multiple TRPs for all bands and do we have multiple BFD/CBD in one band?
  + Samsung: sharing factor is proportional to number of cells and for each band we support one cell
* Agreements:
  + follow the agreements in NR eMIMO on how to perform BFD/CBD measurements.

Issue 1-4-1: necessity of clarification on “there is no scheduling restriction if UE uses independent beam”

* Option 1 (Ericsson): The IBM scheduling availability requirements for FR2 inter-band CA scenario do not need to be introduced as there is no scheduling restriction if UE uses independent beam. Only cases where there are scheduling restrictions need to be explicitly mentioned in the spec.
* Option 2 (Apple, MTK, Intel, QC, OPPO, Huawei, NTT DOCOMO, ZTE): The scheduling availability requirements for FR2 inter-band CA scenario shall be introduced to clarify there is no scheduling restriction if UE uses independent beam
* Agreement:
  + The scheduling availability requirements for FR2 inter-band CA scenario shall be introduced to clarify there is no scheduling restriction if UE uses independent beam

Issue 1-4-2: Scheduling restrictions requirements for IBM UE in cases 1~3

* Option 1 (NTT DOCOMO, Ericsson, OPPO, Huawei, Apple, Nokia): No requirements are needed for the case that there are contradictions between NW configuration and UE capability, i.e., case 1~3.
* Option 2 (Intel):
  + Do not define the scheduling restrictions for the case1 and case 2.
  + For IBM UEs do not define the scheduling restrictions for the case when network configures mixed numerology between SSB and data on two FR2 bands but keeps the same numerology withing each band.
  + For IBM UEs the scheduling restriction applies on one CC due to SS-RSRP/SS-RSRQ/SS-SINR measurements and SSB based RLM/BFD/CBD/L1-RSRP measurement being performed on another CC of the same FR2 band.
* Option 3 (MediaTek, QC):
  + The scheduling availability shall not apply for the case1 and case 2.
  + The scheduling availability shall not apply for the case 3a in which network configures mixed numerology between SSB and data on any one CC on two FR2 bands if the UE does not have the capability of *simultaneousRxDataSSB-DiffNumerology* in FR2.
* Option 4 (Nokia):
  + The requirements applicable for UE capable of IBM, apply when the IBM capable UE is operating in collocated deployments
  + Remove the scheduling availability requirements text of case 1~3 from the requirement section.
* Option 5 (Apple, vivo, OPPO, Huawei, ZTE):
  + Scheduling availability requirement shall not apply for the case1 and case 2
    - Note: to be clear, it means how to handle those cases is purely up to UE implementation without any specified requirement.
  + FFS on case 3 and other issues in 2nd round.
* Option 6 (added by moderator):
  + Scheduling availability requirement shall not apply for the case1 and case 2
    - Note: to be clear, it means how to handle those cases is purely up to UE implementation without any specified requirement.
  + There is no scheduling restriction allowed for IBM UE when network configures mixed numerology between SSB and data on two FR2 bands on which UE is using IBM.
* Discussion
  + Intel: prefer not to list Case 1 and Case into the spec
  + Nokia: we also share view. Case 1 and case 2 are network configuration errors
  + MTK: we already do it in Rel-15 and if we don’t do it in Rel-16 then it may cause confusion
  + Apple: same view as MTK. It is already in Rel-15 spec and prefer to follow in Rel-16 spec.
  + Nokia: Another option is to remove it from Rel-15. We may need to have spec clean up.
  + Intel: For Rel-15 it is more related to Case 3 rather than case 1 or case 2.
* Agreement
  + Scheduling availability requirement shall not apply for the Case 1 and Case 2
    - Case 1 and Case 2 are network configuration errors
    - How to handle those cases is up to UE implementation without any specified requirement.
  + There is no scheduling restriction allowed for IBM capable UE when network configures mixed numerology between SSB on one FR2 band and data on the other FR2 band and UE is configured for IBM operation for the band pair

Chair: further discuss whether and how to capture Case 1 and 2 in CRs.

Issue 1-5-1: Measurement restrictions requirements for IBM UE in cases 1 and 2

* Option 1 (NTT DOCOMO, Ericsson, Nokia, OPPO, Huawei, Apple): No requirements are needed for the case that there are contradictions between NW configuration and UE capability, i.e., case 1 and 2.
* Option 2 (Intel):
  + Do not define the scheduling restrictions for the case1.
  + For IBM UEs do not define the measurement restrictions for the case when network configures mixed numerology between SSB and CSI-RS on two FR2 bands but keeps the same numerology withing each band.
  + For IBM UEs the measurement restriction applies when the SSB for RLM, BFD, CBD or L1- RSRP measurement on one CC is in the same OFDM symbol as the CSI-RS for RLM, BFD, CBD or L1- RSRP measurement on another CC of the same FR2 band.
* Option 3 (MediaTek, QC):
  + No measurement requirements for the case1.
  + No measurement requirements for the case 2a in which network configures mixed numerology between SSB and data on any one CC on two FR2 bands if the UE does not have the capability of *simultaneousRxDataSSB-DiffNumerology* in FR2.
* Option 4 (Apple, vivo, OPPO, Huawei, ZTE):
  + Measurement restrictions requirement shall not apply for the case1.
    - Note: to be clear, it means how to handle those cases is purely up to UE implementation without any specified requirement.
  + FFS on case 2 and other issues in 2nd round.
* Option 5 (added by moderator):
  + Measurement restriction requirement shall not apply for the case1
    - Note: to be clear, it means how to handle those cases is purely up to UE implementation without any specified requirement.
  + There is no measurement restriction allowed for IBM UE when network configures mixed numerology between SSB and CSI-RS on two FR2 bands on which UE is using IBM.
* Agreement
  + Measurement requirement shall not apply for the Case1
    - Case 1 is network configuration error
    - How to handle this case is up to UE implementation without any specified requirement.
  + There is no measurement restriction allowed for IBM UE when network configures mixed numerology between SSB on one FR2 band and CSI-RS on the other FR2 band and UE is configured for IBM operation for the band pair

Issue 1-6-2: SCell activation delay requirements for IBM UE

* Option 1 (Nokia, MTK, Intel, OPPO): Specifically define the requirements for ‘SCell being activated belongs to FR2 and there is an active serving cell on that FR2 band and the PCell or PSCell is in FR2 and the PCell or PSCell and SCell being activated are in a band pair with independent beam management’.
* Option 2 (Apple, vivo, QC, Huawei, NTT DOCOMO, ZTE, MTK, Intel): not necessary to specify the requirements for ‘SCell being activated belongs to FR2 and there is an active serving cell on that FR2 band and the PCell or PSCell is in FR2 and the PCell or PSCell and SCell being activated are in a band pair with independent beam management’
* Discussion
  + MTK: we are ok with Option 2.
  + Nokia: It would be good to clarify which requirement we are going to apply.
  + Intel: ok with Option 2.
  + Apple: the system will not be broken. It is ok to further discuss in the maintenance part.
  + Nokia: we have a CR
* Conclusion: further check Nokia CR. In case of no consensus, no requirements will be introduced for ‘*SCell being activated belongs to FR2 and there is an active serving cell on that FR2 band and the PCell or PSCell is in FR2 and the PCell or PSCell and SCell being activated are in a band pair with independent beam management*’

**Topic #2: Multiple SCell activation/deactivation maintenance (7.13.1.6)**

Issue 2-1: Tx beam assumption of FR1 intra-band contiguous CA

* Option 1 (Qualcomm, Nokia): RAN4 to send an LS to RAN1 to ask
  + if UE is allowed to establish an assumption that configured cells in intra-band contiguous CA exploit a common Tx beam across CCs based on RAN4 side condition in section 8.3.7
  + if the condition made by RAN4 conflicts with RAN1 spec
  + if there are any adverse impacts that RAN1 can anticipate
* Option 2 (Apple, MTK, Huawei): RAN4 not send an LS to RAN1 for issue 2-1.
* Discussion
  + Apple: this is a RAN4 assumption and not related to RAN1 specs.
  + MTK: Agree with QC motivation to clarify UE behavior but don’t think sending LS to RAN1 is useful. Suggest to clarify that UE shall not assume common TX beam in FR1 for intra-band contiguous CA
  + E///: in this case do we need to define the requirements?
  + Huawei: current requirements are clear and have a different understanding from MTK on current requirements. UE shall not perform cell detection for intra-band CA and hence can assume the common beam. We already agreed that in case the conditions do not hold, then we don’t specify any requirements.
* Conclusion: Continue email discussion. No impact on Core part completion. Do not send LS to RAN1 in this meeting.

2nd round email discussion conclusions

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

**R4-2012152 WF on NR RRM requirements enhancements - BWP switching on multiple CCs**

*Type: other For: Approval  
 Source: Intel Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2012233 LS on multiple BWP switch impact on HARQ design in dormancy SCell**

*Type: LS Out For: Approval  
 To: RAN1  
 Source: MediaTek*

**Discussion:**

**Decision: Return to.**

**R4-2012154 WF on NR RRM requirements enhancements - UL spatial relation info switch**

*Type: other For: Approval  
 Source: MediaTek*

**Discussion:**

**Decision: Return to.**

**R4-2012155 WF on NR RRM requirements enhancements - SRS carrier based switching** *Type: other For: Approval  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2012156 Reply LS on CGI reading with autonomous gaps**

*Type: LS Out For: Approval  
 TO: RAN2  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

**R4-2012161 WF on NR RRM requirements enhancements - inter-band FR2 CA RRM**

*Type: other For: Approval  
 Source: Huawei*

**Discussion:**

**Decision: Return to.**

**R4-2012164 WF on NR RRM requirements enhancements – multiple SCell activation**

*Type: other For: Approval  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

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

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

**R4-2010040 Remaining issues on Interruption at SRS carrier switch**

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

**Discussion:**

**Decision: Noted.**

**R4-2011121 Discussion on SRS carrier switching interruption**

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

**Discussion:**

**Decision: Noted.**

**R4-2011122 Correction on the interruption requirements due to SRS carrier switching**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1066 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012238 (from R4-2011122).**

**R4-2012238 Correction on the interruption requirements due to SRS carrier switching**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1066 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011313 Remaining open issues on NR SRS carrier switching RRM requirements**

*Type: discussion For: Discussion  
 Source: ZTE*

**Discussion:**

**Decision: Noted.**

**R4-2011385 CGI reading core requirement discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Noted.**

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

**R4-2010041 Remaining issues on CGI reading requirement**

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

**Discussion:**

**Decision: Noted.**

**R4-2010376 Discussion on remaining issues for NR CGI reading**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Provides views on the remaining issues for NR CGI reading including additional aspects for RLM and BM of serving cell

**Discussion:**

**Decision: Noted.**

**R4-2010377 Impact of CGI reading on RLM**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6925 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR on RLM aspects of NR CGI reading with autonomous gaps

**Discussion:**

**Decision: Agreed.**

**R4-2010378 Impact of CGI reading on RLM and BM**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0999 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR on RLM and BM aspects of NR CGI reading with autonomous gaps

**Discussion:**

**Decision: Revised to R4-2012158 (from R4-2010378).**

**R4-2012158 Impact of CGI reading on RLM and BM**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0999 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR on RLM and BM aspects of NR CGI reading with autonomous gaps

**Discussion:**

**Decision: Return to.**

**R4-2011169 Discussion on NR CGI reading requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011170 CR to 36.133 for CGI reading**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6948 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012159 (from R4-2011170).**

**R4-2012159 CR to 36.133 for CGI reading**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6948 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011310 Remaining open issues on NR CGI reading with autonomous gaps**

*Type: discussion For: Discussion  
 Source: ZTE*

**Discussion:**

**Decision: Noted.**

**R4-2011311 CR to 38.133 on CGI reading of NR cell**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1100 Cat: B (Rel-16)  
  
 Source: ZTE*

**Discussion:**

**Decision: Agreed.**

**R4-2011312 CR to 36.133 on CGI reading of E-UTRA cell in NE-DC**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6959 Cat: B (Rel-16)  
  
 Source: ZTE*

**Discussion:**

**Decision: Agreed.**

**R4-2011386 SCS carrier switching core requirement discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Noted.**

**R4-2011426 discussion on CGI reading with autonomous gap**

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

**Abstract:**

discussion on CGI reading with autonomous gap

**Discussion:**

**Decision: Noted.**

**R4-2011427 Response LS on CGI reading with autonomous gaps**

*Type: LS out For: Approval  
 to RAN2  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Response LS on T321 timer value for CGI reading with autonomous gaps

**Discussion:**

**Decision: Noted.**

**R4-2009596 NR CGI measurements with autonomous gaps for 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6917 Cat: B (Rel-16)  
  
 Source: Ericsson Limited, Nokia, Nokia Shanghai Bell*

**Abstract:**

Resubmission of endorsed CR R4-208688

**Discussion:**

**Decision: Revised to R4-2012157 (from R4-2009596).**

**R4-2012157 NR CGI measurements with autonomous gaps for 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6917 Cat: B (Rel-16)  
  
 Source: Ericsson Limited, Nokia, Nokia Shanghai Bell*

**Abstract:**

Resubmission of endorsed CR R4-208688

**Discussion:**

**Decision: Return to.**

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

**R4-2010042 Discussion on BWP switch on multiple CCs**

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

**Discussion:**

**Decision: Noted.**

**R4-2010189 Requirements for BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010197 CR on BWP switch on multiple CCs**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0984 Cat: F (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Agreed.**

**R4-2010361 Consideration on remaining issues for BWP switching over multiple CCs**

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

**Discussion:**

**Decision: Noted.**

**R4-2010362 CR for RRC based simultaneously BWP switch over multiple CCs**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0998 Cat: B (Rel-16)  
  
 Source: vivo*

**Discussion:**

**Decision: Merged.**

**R4-2010668 On BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The discussion on delay requirements for BWP switching of multiple component carriers continued at RAN4#95-e, with a few unresolved issues collected in a Way Forward document.

In this contribution we are providing our input on those issues.

**Discussion:**

**Decision: Noted.**

**R4-2010711 On RRM requirements for BWP switching on multiple CCs**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2010759 Discussion on requirements for BWP switch delay on multiple CC**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We provided our views on delay requirements for BWP switching on multiple CC.

**Discussion:**

**Decision: Noted.**

**R4-2011069 CR on BWP switching delay on mulitple CCs**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1041 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012153 (from R4-2011069).**

**R4-2012153 CR on BWP switching delay on mulitple CCs**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1041 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011070 Discussion on BWP switching on multiple CCs**

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

**Discussion:**

**Decision: Noted.**

**R4-2011248 Partial overlap timer-based and RRC -based BWP switching delay on multiple CCs**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1091 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR specifies requirements for non-smultaneous BWP switching delay on multiple CCs

**Discussion:**

**Decision: Merged.**

**R4-2011428 discussion on BWP switch on multiple CCs**

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

**Abstract:**

Discussion on delay requirements for BWP switch considering multiple CCs.

**Discussion:**

**Decision: Noted.**

**R4-2009607 Requirements for BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2009745 Discussion of RRM requirements for BWP switching on multiple CCs**

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

**Discussion:**

**Decision: Noted.**

**R4-2009769 Discussion on the remaining issues for BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 Source: Xiaomi Technology*

**Discussion:**

**Decision: Noted.**

**R4-2009864 CR on RRM requirements for BWP switching delay on multiple CCs**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0938 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Merged.**

**R4-2009980 Delay requirement for switching of multiple BWPs**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010043 Remaining issues on active spatial relation switch**

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

**Discussion:**

**Decision: Noted.**

**R4-2010190 Requirements for UL spatial relation info switch**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Withdrawn.**

**R4-2010364 On remaining issues for UL Spatial Relation Info Switching**

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

**Discussion:**

**Decision: Noted.**

**R4-2010573 Discussion on UL spatial relation switch**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Noted.**

**R4-2010666 On Spatial Relation Switching Delay Requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussions on delay requirements for spatial relation change of PUCCH, PUSCH and SRS continued during RAN4#95-e, with a few unresolved issues being captured in a way forward document. In this contribution we are providing our input on those issues.

**Discussion:**

**Decision: Noted.**

**R4-2011126 Discussion on spatial relation switch for uplink channels and SRS**

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

**Discussion:**

**Decision: Noted.**

**R4-2009608 Requirements for UL spatial relation info switch**

*Type: discussion For: Discussion  
 Source: Apple*

**Discussion:**

**Decision: Noted.**

**R4-2009708 Discussion on spatial relation switch for uplink**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2009752 Discussion on requirements for spatial relation info switch**

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

**Discussion:**

**Decision: Noted.**

**R4-2009865 CR on RRM requirements for uplink spatial relation switch delay (section 8.12)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0939 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2009987 Spatial relation switch for uplink**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010221 Discussion on Inter-band CA requirement for FR2**

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

**Discussion:**

**Decision: Noted.**

**R4-2010363 Further considerations on FR2 inter CA requirements.**

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

**Discussion:**

**Decision: Noted.**

**R4-2010375 Further considerations on RRM requirements for interband CA on FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on based on the agreed WF R4-2008998 “WF on NR RRM enhancements – FR2 inter-band CA RRM

**Discussion:**

**Decision: Noted.**

**R4-2010571 FR2 inter-band CA requirements**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Noted.**

**R4-2010572 CR for FR2 inter-band CA requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1010 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012162 (from R4-2010572).**

**R4-2012162 CR for FR2 inter-band CA requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1010 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2010712 On FR2 inter-band CA RRM requirement for CBM and/or IBM UE**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2011063 Discussion on RRM remaining issues for FR2 inter-band CA**

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

**Discussion:**

**Decision: Noted.**

**R4-2011064 CR on maintaining measurement restriction requirements for NR CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1039 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012163 (from R4-2011064).**

**R4-2012163 CR on maintaining measurement restriction requirements for NR CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1039 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

**R4-2009709 Discussion on inter-band CA requirement for FR2**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2009863 RRM requirements for inter-band CA in FR2**

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

**Discussion:**

**Decision: Noted.**

**R4-2009986 RRM requirements with CBM and IBM in FR2 inter band CA**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010044 CR on multiple SCell activation**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0968 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Revised to R4-2012165 (from R4-2010044).**

**R4-2012165 CR on multiple SCell activation**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0968 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2010107 CR on definition of inter-frequency measurements without measurement gap (9.3.1)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0976 Cat: F (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Revised to R4-2012166 (from R4-2010044).**

**R4-2012166 CR on definition of inter-frequency measurements without measurement gap (9.3.1)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0976 Cat: F (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Return to.**

**R4-2010120 Multiple SCell activation in NR**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm Incorporated*

**Discussion:**

**Decision: Noted.**

**R4-2011123 Discussion on CSSF for inter-frequency measurement without gap in FR2 inter-band CA sceneario**

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

**Discussion:**

**Decision: Noted.**

**R4-2011124 CSSF for inter-frequency measurement without gap in FR2 inter-band CA sceneario**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1067 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012167 (from R4-2011124).**

**R4-2012167 CSSF for inter-frequency measurement without gap in FR2 inter-band CA sceneario**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1067 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011125 Correction on inter-frequency without gap measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1068 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Not pursued.**

**R4-2011171 CR on multiple SCell activation requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1086 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Merged.**

**R4-2009899 CR on TS38.133 for inter-frequency measurement requirement without gap**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0951 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Not pursued.**

**R4-2009907 Draft CR on UE behavior for UE specific CBW change**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

**R4-2009915 Test case list for multiple SCell activation for R16 eRRM**

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

**Discussion:**

**Decision: Noted.**

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

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

**Email discussion: [96e][224] NR\_CSIRS\_L3meas\_RRM\_1**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][224] NR\_CSIRS\_L3meas\_RRM\_1 | R16 NR CSI-RS L3 Measurements | RRM Core requirements: CSI-RS measurement bandwidth; CSI-RS intra/inter-frequency measurement definition; Others | 7.14.1.1 7.14.1.2  7.14.1.5 |

**R4-2012055 Email discussion summary for [96e][224] NR\_CSIRS\_L3meas\_RRM\_1** *Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012081 (from R4-2012055).**

**R4-2012081 Email discussion summary for [96e][224] NR\_CSIRS\_L3meas\_RRM\_1** *Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012224 (from R4-2012081).**

**R4-2012224 Email discussion summary for [96e][224] NR\_CSIRS\_L3meas\_RRM\_1** *Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (Aug 18th)

**Issue 2-1: Synchronization assumption for CSI-RS based measurement**

* Proposals
  + Option 1: (Intel, MTK)
    - RAN4 to address the issue of timing difference between the arrival of the CSI-RS and UE’s FFT timing in the performance part.
  + Option 2: (Apple, CMCC, vivo, Docomo, HUAWEI, ZTE, OPPO)
    - the corresponding timing of CSI-RS resources should be assume the same as the timing of the cell given by the cellId of the CSI-RS resource configuration.
  + Option 3: (CMCC, Nokia, HUAWEI)
    - introduce the UE capability to differentiate the following 2 types of UEs.
      * Type 1: UE supporting using only single timing for CSI-RS measurement per frequency layer
        + Type1.1: UE supporting using only single timing for CSI-RS measurement per frequency layer based on the serving cell timing
        + Type1.2: UE supporting using only single timing for CSI-RS measurement per frequency layer based on ONE of the associated neighbor cell SSBs
      * Type 2: UE supporting using timing of associated SSB for respective CSI-RS measurement
  + Option 4: (NEC)
    - RAN4 to introduce scheduling restriction such that gNB may schedule neighbour cells CSI-RS resources, whose timing is within the same Timing Advance Group (TAG)
    - RAN4 to further study this problem in Rel-17 for single FFT UE implementation
  + Option 5: (Qualcomm)
    - RAN4 shall consider requirements only defined if the timing difference between serving and neighbor cell including cell phase synchronization is guaranteed to be less than half CP length.
    - A baseline WID compliant UE features single FFT based on the same timing and/or same Rx beam for the serving cell. Such a baseline UE shall be assumed for defining the minimal requirements and test cases by RAN4.
* Recommended WF
  + Option 2 is recommended.

Discussion:

Chair: what is the impact on Core part?

Apple: Time tracking assumptions may have impact

MTK: we think no impact on Core part and impacts accuracy only for Option 1 and Option 2. Option 3 has impact on Core part. Option 2 may require 2 FFT timings which contradicts to plenary agreement (i.e. UE can use single FFT)

vivo: the impact on Core part is whether async deployment needs to be specified. Interpretation of single FFT needs to be clarified. For SSB measurements single FFT was not assumed.

ZTE: time tracking will not be impacted by synch assumptions. Time tracking is based on SSB beam. Single FFT may not work for signals from different cells.

QC: share same view with MTK that only Single FFT is in the scope. May be impact on the scheduling restriction in case UE follows other cells timing. We think that UE can follow either serving or neighbouring cell timing and both implementations shall be allowed.

Nokia: should follow single FFT assumption. We are also fine to define different capabilities.

OPPO: Can support Option 2. Timing tracking can be based on serving cell SSB.

CMCC: Option 3.

CATT: Single FFT assumption is not reasonable and can be revised in case of majority view. Option 1 is too restrictive.

Intel: FFT window can be up to UE implementation. Requirements shall be defined based on Single FFT. If UE can support multiple FFTs then it can pass the requirements as well.

Apple: we don’t think Single FFT is possible. We never assumed single FFT in LTE or in NR. We should put this assumption aside.

NTT DOCOMO: Prefer Option 2. Option 1 is also ok.

Huawei: Option 3.

QC: Cannot agree with Option 2. We would like to add a clarification that UE needs to follow a single timing.

MTK: Same view as QC. Clear agreement in the plenary to have a single FFT.

ZTE: is Single FFT measurement assumed for SSB-based measurements? Do not agree to have multiple capabilities.

Chair: is there any consensus to consider multiple FFTs?

vivo: probably we can discuss in the Performance part.

QC: do not agree with multiple FFTs

MTK: single FFT is only in the scope. In the most practical cases single FFT is sufficient (e.g. on cell edge). For cell-center UEs the accuracy does not matter that much.

Nokia: we should stick to previous agreements.

CMCC: can we consider combination of Option 1 and Option 3.

Apple: under which assumption can we use single FFT?

MTK: there is no intention to tighten NW synchronization. In case of big timing offset then we assume there will be performance degradation.

Huawei: Our suggestion is to have both single FFT and multi-FFT implementations.

QC: for Option 3 we cannot agree with Type 2.

Agreement:

Rel-16 CSI-RS based measurement requirements are based on Single FFT implementation

Chair: Further discuss

* Impacts on the Core part requirements
* UE time tracking assumptions for CSI-RS measurements
  + Option 1: UE follows serving cell timing
  + Option 2: UE follows associated neighbor cell SSBs

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012168 | WF on CSI-RS configuration and synchronization assumption for CSI-RS based L3 measurement | CATT |

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| [R4-2010073](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010073.zip) | Revised |
| [R4-2009844](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009844.zip) | Revised |
| [R4-2010335](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010335.zip) | Revised |
| [R4-2011116](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011116.zip) | Revised |
| [R4-2010715](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010715.zip) | Revised |
| [R4-2010314](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009842.zip) | Merged |
| [R4-2010057](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010057.zip) | Merged |
| [R4-2011416](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011416.zip) | Revised |
| [R4-2009763](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2009763.zip) | Revised |
| [R4-2011174](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2011174.zip) | Merged |
| [R4-2010390](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010390.zip) | Revised |
| [R4-2010391](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010391.zip) | Merged |
| R4-2010392 | Postponed |

GTW session (Aug 26th)

**Issue 2-1: Synchronization assumption for CSI-RS based measurement**

* Agreements
* UE supports using the serving cell timing for CSI-RS based L3 measurement for intra-frequency measurements in Rel-16
  + Note: the measurement degradation can be expected for the case when timing difference is larger than CP and it can be discussed in the performance part

2nd round email discussion conclusions

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

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

**Email discussion: [96e][225] NR\_CSIRS\_L3meas\_RRM\_2**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][225] NR\_CSIRS\_L3meas\_RRM\_2 | R16 NR CSI-RS L3 Measurements | RRM Core requirements: Measurement capability; Intra/Inter-frequency measurement requirements | 7.14.1.3 7.14.1.4 |

**R4-2012056 Email discussion summary for [96e][225] NR\_CSIRS\_L3meas\_RRM\_2** *Type: other For: Information  
 Source: Moderator (OPPO)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012225 (from R4-2012056).**

**R4-2012225 Email discussion summary for [96e][225] NR\_CSIRS\_L3meas\_RRM\_2** *Type: other For: Information  
 Source: Moderator (OPPO)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (Aug 18th)

**Sub-topic 1-1: Frequency layer**

Issue 1-1-1: Whether CSI-RS and SSB for mobility configured in the same MO are counted as 2 layers

* Proposals
  + Option 1: SSB and CSI-RS for mobility configured in the same MO should be considered as 2 layers.
  + Option 2: SSB and CSI-RS for mobility configured in the same MO is merged into one single frequency layer (MTK)
* Recommended WF
  + Option 1 as majority view is recommended

Discussion

MTK: Option 1 is not correct. RAN2 has “PCI confusion” issue. In case UE detects same PCI on different layers then UE shall not treat them as same cell. So, we cannot reuse freq/timing.

vivo: support Option 2.

Apple: UE behavior for Option 2 is unclear for intra- and inter-frequency measurements. UE may always need to do parallel SSB and CSI-RS measurements.

ZTE: In RAN4 we use frequency layers to specify measurement capabilities and restrictions. Frequency layer shall not be linked to PCI confusion issue.

Huawei: we are not sure if this is an issue. UE detects PCI based on SSB only and not CSI-RS. Option 1 is preferred.

Nokia: Option 1. Same view as HW.

CATT: Share same view as HW and Nokia.

MTK: Our fundamental issue is not resolved.

Tentative agreement:

SSB and CSI-RS for mobility configured in the same MO should be considered as 2 layers.

UE can use timing and frequency measurements obtained on SSB frequency layer for CSI-RS frequency layer

Issue 1-1-2: Whether multiple MOs can be counted as one frequency layer

* Proposals
  + Option 1: YES
    - Option 1a: Multiple MOs are counted as one frequency layer as long as CSI-RS center frequencies are the same. (ZTE, Nokia)
    - Option 1b: CSI-RS resources configured in multiple MOs can be counted as one frequency layer with the following 2 conditions: (Apple)
      * different MOs share the same center frequency and the same SCS for CSI-RS resources
      * the total number of CSI-RS resources associated with the same PCI should be no more than maxNrofCSI-RS-ResourcesRRM
  + Option 2: NO
    - Option 2a: Only one MO corresponding to one frequency layer is considered in R16 and further enhancement is considered in R17 (Intel, QC, CATT, MTK)
    - Option 2b: RAN4 kindly asks RAN1 and RAN2 to increase the number of configurable CSI-RS resources per MO from 96 to 288 (Huawei with LS in R4-2011172 )
* Recommended WF
  + Option 2a is recommended.

Discussion

ZTE: Option 1a. 2b is also ok.

Apple: can compromise to Option 2a

Nokia: multiple MOs are allowed in RAN2 specs. We can compromise to Option 2a but clarify that multiple MO configuration is not precluded. No need to send LS and we can address in Rel-17

Huawei: agree with ZTE comment that 1 MO with 96 resources will put constraints

CATT/MTK/CMCC/vivo: Option 2a.

Apple: do not see the need for LS to RAN1/2. Not sure >96 resources is reasonable. Keep this feature as simple as possible. Cannot accept to increase the number of resources.

QC: same view as Apple.

Tentative agreement

Option 1 (Apple, QC, vivo, Intel, CATT, MTK, CMCC, Nokia, DCM, OPPO):

Only one MO corresponding to one frequency layer is considered in R16 for requirements definition

Note: multiple MO configuration is not precluded

Option 2 (ZTE, Huawei, NEC, CATT, MTK, CMCC, Nokia, DCM, OPPO):

Only one MO corresponding to one frequency layer is considered in R16 for requirements definition

Note: multiple MO configuration is not precluded

Send LS to RAN1 and RAN2 and ask to increase the number of configurable CSI-RS resources per MO from 96 to 288

Chair:

Can Option 1 be agreed. Objected by ZTE.

Can Option 2 be agreed. Objected by Apple. QC need further discussion in email thread.

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012177 | WF on CSI-RS L3 measurement capability | Apple |
| R4-2012178 | WF on CSI-RS L3 measurement requirements | OPPO |
| R4-2012179 | LS on number of configurable CSI-RS resources per MO | Huawei |

**Topic #1: Measurement capability**

Sub-topic#1-1: Some concerns were raised in email reflector on tentative agreements. Continue discussion in the second round.

Issue 1-2-1: number of cells to be monitored per layer

Agreements:

* The cells to be monitored based on CSI-RS can be the same set or a subset of the cells monitored based on SSB.

Issue 1-3-1: number of CSI-RS resource/beams to be monitored

Agreements:

The number of CSI-RS resource/beams to be monitored can be at least

* + For intra-frequency measurement for FR1: 32
  + For intra-frequency measurement for FR2: 32
  + FFS for inter-frequency measurement for FR1:
    - Option 2: 24(Huawei, CMCC, CATT, ZTE, Xiaomi)
    - Option 3: 14(vivo, CMCC, OPPO, Qualcomm, Apple)
  + For inter-frequency measurement for FR2: 24

Issue 1-3-2: Neighbor cell CSI-RS resource measurement in FR2

Agreements: For each FR2 band, UE is required to measure neighbour cell CSI-RS on one CSI-RS layer, whose associated SSB should be on the same SSB layer as the one where UE is required to measure neighbour cell SSB

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010073 | Revised |
| R4-2009844 | Revised |
| R4-2010335 | Revised |

**Topic #2: Measurement requirements for CSI-RS intra-frequency and inter-frequency measurements**

Issue 2-1-1: How to define requirements for with index and without index

Agreement:

Keep agreements in last meeting and clarify whether SBI acquisition can be skipped, which depends on whether *deriveSSB-IndexFromCell* is configured.

* + Option 1:
    - T CSI-RS\_identify\_intra = (TPSS/SSS\_sync + T CSI-RS\_measurement\_period\_intra + TSSB\_time\_index) ms
    - T CSI-RS\_identify\_inter = (TPSS/SSS\_sync + T CSI-RS\_measurement\_period\_inter + TSSB\_time\_index) ms

If *deriveSSB-IndexFromCell* is indicated, UE can skip PBCH decoding, i.e., TSSB\_time\_index = 0.

If UE has already detected the SSB of the target cell, UE can skip cell detection, i.e., TPSS/SSS\_sync = 0.

Issue 2-2-1: Whether to introduce a longer tuning time for CSI-RS based measurement

Agreement: *The tuning time for CSI-RS based measurement is equal to the gap switch time for measuring the inter-frequency SSBs.*

Issue 2-3-3: Frequency domain restriction on CSI-RS resources configuration

Agreement: do not introduce frequency domain restriction, e.g. CSI-RS BW should always cover the SSB configured in the same MO

Issue 2-4-1: Whether UE is required to perform RX beam sweeping when CSI-RS is QCL-ed to the associated SSB for FR2

Agreement: Option 2: UE is required to perform Rx beam sweeping for CSI-RS based L3 measurement in FR2, in the case that CSI-RS resources in the same OFMD symbol are QCL-ed with different associated SSB

Issue 2-6-1: Searcher assumption for CSI-RS based measurement

Agreement: At least no additional searcher for CSI-RS based L3 measurement (for PSS/SSS detection).

Issue 2-7-4: Whether to specify scheduling restriction for associated SSB

Agreement: The scheduling restriction for associated SSB should also be specified, and the existing SSB requirements can be re-used.

Issue 2-8-1: Collision between CSI-RS L3 measurement of neighbor cell and serving cell measurement for RLM/BFD or other CSI-RS L1 measurements

Agreement: Do not define CSI-RS measurement requirements for such collision case in Rel-16.

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011116 | Revised |
| R4-2010715 | Revised |
| R4-2010314 | Revised |
| R4-2011416 | Revised |
| R4-2009763 | Revised |
| R4-2011174 | Merged |
| R4-2010390 | Revised |
| R4-2010391 | Merged |
| R4-2010392 | Postponed. |
| R4-2010057 | Revised |

GTW session (Aug 26th)

**Issue 1-1-2: Whether multiple MOs can be counted as one frequency layer**

Agreement

* Only one MO corresponding to one frequency layer is considered in R16 for requirements definition
  + Note: multiple MO configuration is not precluded
  + Send LS to RAN1 and RAN2 and ask to increase the number of configurable CSI-RS resources per MO from 96 to 192

**Issue 2-3-1: Time-domain restriction (measurement window) on CSI-RS resources configuration**

Agreement:

* Do not associate CSI-RS location with SMTC
* CSI-RS resources per frequency layers are configured within 5 ms window at any location
* CSI-RS periodicities for L3 measurement: 10, 20, 40 ms
* Up to 1 CSI-RS periodicity can be configured per CSI-RS intra-frequency layer
* Up to 1 CSI-RS periodicity can be configured per CSI-RS inter-frequency layer
* The exact relative location between CSI-RS and SMTC can be decided by NW to make sure a single MG pattern can cover both CSI-RS and SMTC for inter-frequency layer.
* Note: the restrictions above are the conditions to apply the requirements for both Core and Performance part

**Issue 2-6-1: Searcher assumption for CSI-RS based measurement**

Agreement:

* Synchronization and measurement for CSI-RS based measurement can use the same searcher for SSB based measurement

**Issue 2-5-1: New UE capability on the simultaneous reception of CSI-RS and SSB~~/Data~~**

Agreement:

* Simultaneous reception of CSI-RS and SSB (from the serving or neighbor cells)
  + Do not introduce new UE capability on the simultaneous reception of CSI-RS and SSB
  + UE is not required to support simultaneous reception of CSI-RS and SSB

#### **Sub-topic 2-7: Scheduling Restriction**

Agreement:

Issue 2-7-3: When UE performs Rx beam sweeping in FR2 band:

Scheduling restriction apply for data OFDM symbols overlapped by to-be-measured CSI-RS resources only.

2nd round email discussion conclusions

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

**R4-2012168 WF on CSI-RS configuration and synchronization assumption for CSI-RS based L3 measurement**

*Type: other For: Approval  
 Source: CATT*

**Discussion:**

**Decision: Return to.**

**R4-2012177 WF on CSI-RS L3 measurement capability**

*Type: other For: Approval  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

**R4-2012178 WF on CSI-RS L3 measurement requirements**

*Type: other For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Return to.**

**R4-2012179 LS on number of configurable CSI-RS resources per MO**

*Type: other For: Approval  
To: RAN1, RAN2  
Source: Huawei*

**Discussion:**

**Decision: Return to.**

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

**R4-2011338 Remaining issues in the core requirements of CSI-RS L3 measurements and draft LS to RAN2 on new UE capability**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

Further discussions on open tasks identified by RAN plenary for CSI-RS based measurement for RRM

Draft LS for new UE capability for minimum separation between two CSI-RS L3 slots.

**Discussion:**

**Decision: Noted.**

**R4-2011416 CR on scheduling restriction for CSI-RS based intra-frequency measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1108 Cat: B (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

CR on agreeable scheduling restrictions for CSI-RS based intra-frequency measurements

**Discussion:**

**Decision: Revised to R4-2012174 (from R4-2011416).**

**R4-2012174 CR on scheduling restriction for CSI-RS based intra-frequency measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1108 Cat: B (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

CR on agreeable scheduling restrictions for CSI-RS based intra-frequency measurements

**Discussion:**

**Decision: Return to.**

**R4-2009843 UE feature on support of RRM requirements for CSI-RS based L3 measurement**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

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

**R4-2010052 On measurement bandwidth of CSI-RS based L3 measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2010385 Discussion on CSI-RS measurement bandwidth**

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

**Discussion:**

**Decision: Noted.**

**R4-2010576 Discussion on CSI-RS based L3 measurement bandwidth**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2010760 Discussion on CSI-RS measurement Bandwidth**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

In this contribution, we provide our views on defining requirements for CSI-RS configuration of {D=1 with PRB=96

**Discussion:**

**Decision: Noted.**

**R4-2011065 Discussion on CSI-RS based L3 measurement requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011314 Remaining open issue on configuration of CSI-RS based L3 measurement**

*Type: discussion For: Discussion  
 Source: ZTE*

**Discussion:**

**Decision: Noted.**

**R4-2009747 Discussion about CSI-RS L3 measurement bandwidth and synchronization**

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

**Discussion:**

**Decision: Noted.**

**R4-2009760 Discussion on the remaining issues on CSI-RS measurement configuration**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Discussion:**

**Decision: Noted.**

**R4-2009839 Discussion on CSI-RS based measurement bandwidth**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

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

**R4-2010072 Discussion on the synchronization assumption for CSI-RS measurement**

*Type: discussion For: Approval  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010390 38.133 CR on introduction of CSI-RS based intra-frequency measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1003 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Revised to R4-2012176 (from R4-2010390).**

**R4-2012176 38.133 CR on introduction of CSI-RS based intra-frequency measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1003 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Return to.**

**R4-2010577 Discussion on synchronization assumption for CSI-RS based L3 measurement**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2009840 Discussion on CSI-RS based intra and inter-frequency measurement definition**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

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

**R4-2010053 On UE measurement capability of CSI-RS based L3 measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2010057 CR on CSSF with both CSI-RS and SSB**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0970 Cat: B (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Revised to R4-2012181 (from R4-2010057).**

**R4-2012181 CR on CSSF with both CSI-RS and SSB**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0970 Cat: B (Rel-16)  
  
 Source: Apple*

**Discussion:**

**Decision: Return to.**

**R4-2010065 Further discussion on CSI-RS measurement capability**

*Type: discussion For: Approval  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010073 38.133 CR on UE measurement capability on the number of frequency layers to be monitored for CSI-RS measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0971 Cat: B (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Revised to R4-2012169 (from R4-2010073).**

**R4-2012169 38.133 CR on UE measurement capability on the number of frequency layers to be monitored for CSI-RS measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0971 Cat: B (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Return to.**

**R4-2010312 Discussion on measurement capability for CSI-RS RRM**

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

**Discussion:**

**Decision: Noted.**

**R4-2010386 Discussion on the CSI-RS based measurement capability**

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

**Discussion:**

**Decision: Noted.**

**R4-2010713 On measurement capability of CSI-RS L3 measurement**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2011172 On CSI-RS measurement capability and time windowing**

*Type: LS out For: Approval  
 to RAN1, RAN2  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Noted.**

**R4-2011315 Remaining open issues on UE measurement capability of CSI-RS based L3 measurement**

*Type: discussion For: Discussion  
 Source: ZTE*

**Discussion:**

**Decision: Noted.**

**R4-2009746 Discussion about CSI-RS L3 measurement capability and requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2009761 Discussion on the remaining issues for UE measurement capabilities requirements**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Discussion:**

**Decision: Noted.**

**R4-2009841 Discussion on CSI-RS based UE measurement capabilities**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

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

**R4-2010066 Discussion on CSI-RS measurement requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010181 Discussion on CSI-RS L3 measurement requirement**

*Type: discussion For: Discussion  
 Source: LG Electronics UK*

**Discussion:**

**Decision: Noted.**

**R4-2010313 Cell identification requirements for CSI-RS RRM**

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

**Discussion:**

**Decision: Noted.**

**R4-2010314 Introduction of CSSF requirement for CSI-RS based L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0994 Cat: B (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Revised to R4-2012180 (from R4-2010314).**

**R4-2012180 Introduction of CSSF requirement for CSI-RS based L3 measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0994 Cat: B (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Return to.**

**R4-2010333 Discussion on CSI-RS based L3 measurement period requirement**

*Type: discussion For: Discussion  
 Source: vivo*

**Discussion:**

**Decision: Noted.**

**R4-2010335 CR on introduction, applicablity and capability for CSI-RS inter-frequency measurement requirements.**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0996 Cat: B (Rel-16)  
  
 Source: vivo*

**Discussion:**

**Decision: Revised to R4-2012171 (from R4-2010335).**

**R4-2012171 CR on introduction, applicablity and capability for CSI-RS inter-frequency measurement requirements.**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0996 Cat: B (Rel-16)  
  
 Source: vivo*

**Discussion:**

**Decision: Return to.**

**R4-2010387 CSI-RS based intra-frequency measurement requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2010391 38.133 CR on CSI-RS based intra-frequency measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1004 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Merged.**

**R4-2010578 Discussion on CSI-RS based L3 measurement requirement and capability**

*Type: discussion For: Discussion  
 38.133 v..  
 Source: NTT DOCOMO, INC.*

**Discussion:**

**Decision: Noted.**

**R4-2010714 On measurement requirements for CSI-RS L3 measurement**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2010715 CR on inter-frequency CSI-RS L3 measurements requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1020 Cat: B (Rel-16)  
  
 Source: OPPO*

**Discussion:**

**Decision: Revised to R4-2012173 (from R4-2010715).**

**R4-2012173 CR on inter-frequency CSI-RS L3 measurements requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1020 Cat: B (Rel-16)  
  
 Source: OPPO*

**Discussion:**

**Decision: Return to.**

**R4-2011115 Discussion on CSI-RS based L3 measurement requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011116 CR on CSI-RS based intra-frequency measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1064 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Revised to R4-2012172 (from R4-2011116).**

**R4-2012172 CR on CSI-RS based intra-frequency measurement requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1064 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011316 Remaining open issues on measurement requirements for CSI-RS based L3 mobility**

*Type: discussion For: Discussion  
 Source: ZTE*

**Discussion:**

**Decision: Noted.**

**R4-2009762 Discussion on the remaining issues for cell identification requirement**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Discussion:**

**Decision: Noted.**

**R4-2009842 Discussion on CSI-RS based intra and inter measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Discussion:**

**Decision: Noted.**

**R4-2009844 CR on CSI-RS based intra-frequency measurement requirement (Introduction, requirement applicability and number of cell and beams)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0937 Cat: B (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Revised to R4-2012170 (from R4-2009844).**

**R4-2012170 CR on CSI-RS based intra-frequency measurement requirement (Introduction, requirement applicability and number of cell and beams)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0937 Cat: B (Rel-16)  
  
 Source: CATT*

**Discussion:**

**Decision: Return to.**

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

**R4-2010054 On other remaining issues of CSI-RS based L3 measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2010315 Synchronization assumption for L3 CSI-RS measurement**

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

**Discussion:**

**Decision: Noted.**

**R4-2010334 Discussion on synchronization assumption for CSI-RS based L3 measurement**

*Type: discussion For: Discussion  
 Source: vivo*

**Discussion:**

**Decision: Noted.**

**R4-2010388 Discussion on synchronization assumption**

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

**Discussion:**

**Decision: Noted.**

**R4-2010389 Simulation results for CSI-RS based measurements**

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

**Discussion:**

**Decision: Noted.**

**R4-2010392 38.133 CR on the performance of CSI-RS based intra-frequency measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1005 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Postponed.**

**R4-2010716 On UE capability signalling for CSI-RS L3 measurement**

*Type: discussion For: Approval  
 Source: OPPO*

**Discussion:**

**Decision: Noted.**

**R4-2010761 Discussion on Synchronisation assumption for CSI-RS measurements**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

In this contribution, we provide our views on the synchronisation assumption for CSI-RS measurements

**Discussion:**

**Decision: Noted.**

**R4-2011173 On synchronization assumption for CSI-RS measurement requirements**

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

**Discussion:**

**Decision: Noted.**

**R4-2011174 CR on reporting criteria for CSI-RS measurement**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1087 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Merged.**

**R4-2009763 CR on capabilities for support of event triggering and reporting criteria**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0928 Cat: F (Rel-16)  
  
 Source: Xiaomi*

**Discussion:**

**Decision: Revised to R4-2012175 (from R4-2009763).**

**R4-2012175 CR on capabilities for support of event triggering and reporting criteria**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0928 Cat: F (Rel-16)  
  
 Source: Xiaomi*

**Discussion:**

**Decision: Return to.**

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

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

**Email discussion: [96e][226] NR\_HST\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][226] NR\_HST\_RRM | R16 NR HST | RRM requirements (Core maintenance and Perf) | 7.15.1 7.15.2 |

**R4-2012057 Email discussion summary for [96e][226] NR\_HST\_RRM**  *Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012226 (from R4-2012057).**

**R4-2012226 Email discussion summary for [96e][226] NR\_HST\_RRM**  *Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012182 | WF on RRM requirements for NR HST | CMCC |

**Topic #1: RRM core requirements maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2010077 | Agreed |
| R4-2010078 | Agreed |
| R4-2010330 | Return to |
| R4-2010331 | Return to |
| R4-2010374 | Agreed |
| R4-2011119 | Not pursued |
| R4-2011325 | Not pursued |
| R4-2011329 | Agreed |
|  |  |

**Topic #2: RRM performance part**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011118 | Return to |
| R4-2011377 | Return to |

2nd round email discussion conclusions

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

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

**R4-2012182 WF on RRM requirements for NR HST**

*Type: other For: Approval  
 Source: CMCC*

**Discussion:**

**Decision: Return to.**

**R4-2010064 Discussion on release independent for RRM enhanced requirements for NR HST**

*Type: discussion For: Approval  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010077 36.133 CR on cell identification in connected mode for EUTRAN-NR measurement for Rel-16 NR HST**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6922 Cat: F (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Agreed.**

**R4-2010078 38.133 CR on cell re-selection requirements for Rel-16 NR HST**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0972 Cat: F (Rel-16)  
  
 Source: CMCC*

**Discussion:**

**Decision: Agreed.**

**R4-2010330 CR on HST cell reselection requirment of interRAT higher priority carrier in TS 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0995 Cat: F (Rel-16)  
  
 Source: vivo*

**Discussion:**

**Decision: Return to.**

**R4-2010331 CR on HST cell reselection requirment of interRAT higher priority carrier in TS 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6923 Cat: F (Rel-16)  
  
 Source: vivo*

**Discussion:**

**Decision: Return to.**

**R4-2010374 Correction to cell re-selection for EUTRAN-NR high speed in TS36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6924 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correction : idle mode requirements for LTE idle mode HST reselcetion to NR refer to an incorrect symbol Tevaluate, NR,nonHST; Change Tevaluate, NR,nonHST to Tevaluate, NR which is the symbol used in other places

**Discussion:**

**Decision: Agreed.**

**R4-2011119 Correction on inter-RAT measurement in HST**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6937 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Not pursued.**

**R4-2011325 CR to TS 36.133: Corrections to subclause 4.2.2.5.6**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6960 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Not pursued.**

**R4-2011329 CR to TS 38.133: Corrections to Table 9.4.3.3-2 in subclause 9.4.3.3 (Requirements when DRX is used)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1101 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Discussion:**

**Decision: Agreed.**

**R4-2011378 NR HST remaining requirement**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Noted.**

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

**R4-2010379 Testing for NR HST RRM requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Proposed test case list for NR HST

**Discussion:**

**Decision: Noted.**

##### 7.15.2.1 General [NR\_HST-Perf]

**R4-2010081 Discussion on SS-SINR measurement for NR HST**

*Type: discussion For: Discussion  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2010332 Discussion on SS-SINR accuracy requirement in NR HST**

*Type: discussion For: Discussion  
 Source: vivo*

**Discussion:**

**Decision: Noted.**

**R4-2011117 Discussion on SS-SINR in NR HST**

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

**Discussion:**

**Decision: Noted.**

**R4-2011118 CR on SS-SINR in NR HST**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1065 Cat: B (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011331 Discussions on SS-SINR measurements for Rel-16 high speed train**

*Type: other For: Discussion  
 38.133 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Proposal 1: RRM relevant use cases should be taken into consideration in order to decide if there is a need to specify the SS-SINR accuracy.

**Discussion:**

**Decision: Noted.**

##### 7.15.2.2 Test cases [NR\_HST-Perf]

**R4-2010067 Discussion on test case list for Rel-16 NR HST**

*Type: discussion For: Approval  
 Source: CMCC*

**Discussion:**

**Decision: Noted.**

**R4-2011120 Discussion on test case list in NR high speed scenarios**

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

**Discussion:**

**Decision: Noted.**

**R4-2011376 NR HST test case discussion**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Noted.**

**R4-2011377 CR-NR HST RRM test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Qualcomm, Inc.*

**Discussion:**

**Decision: Return to.**

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

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

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

**Email discussion: [96e][227] NR\_2step\_RACH\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][227] NR\_2step\_RACH\_RRM | R16 2-step RACH for NR | RRM requirements (Core maintenance and Perf) | 7.18.1 7.18.2 |

**R4-2012058 Email discussion summary for [96e][227] NR\_2step\_RACH\_RRM**  *Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012227 (from R4-2012058).**

**R4-2012227 Email discussion summary for [96e][227] NR\_2step\_RACH\_RRM**  *Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012183 | WF on test cases for 2-step RACH RRM | ZTE |

**Topic #1: RRM core requirements maintenance**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009686 | Revised |
|  |  |

**Topic #2: RRM performance requirements**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009684 | Revised |
| R4-2010909 | Revised |

2nd round email discussion conclusions

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

**R4-2012183 WF on test cases for 2-step RACH RRM**

*Type: other For: Approval  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

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

**R4-2009686 Maintenance CR for 2-step RA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0924 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012184 (from R4-2009686).**

**R4-2012184 Maintenance CR for 2-step RA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0924 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Return to.**

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

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

**R4-2010468 Overview of test cases with 2-step RACH**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the test case for 2-step RACH.

**Discussion:**

**Decision: Noted.**

**R4-2010908 On RRM performance requirements for 2-step RA type**

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

**Abstract:**

Discussion on the test cases for 2-step RACH RRM performance.

**Discussion:**

**Decision: Noted.**

**R4-2009683 Work split for 2-step RACH performance part**

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

**Discussion:**

**Decision: Noted.**

**R4-2009979 Features for Performance Tests in 2-step RACH**

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

**Discussion:**

**Decision: Noted.**

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

**R4-2010909 Draft CR on 2-step RA type Contention based random access test in FR1 for NR standalone**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

New PRACH configuration 5 for SSB based CBRA 2-step RA type in FR1. New clause for 2-step RA type contention based random access test in FR1 for NR standalone.

**Discussion:**

**Decision: Revised to R4-2012186 (from R4-2010909).**

**R4-2012186 Draft CR on 2-step RA type Contention based random access test in FR1 for NR standalone**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

New PRACH configuration 5 for SSB based CBRA 2-step RA type in FR1. New clause for 2-step RA type contention based random access test in FR1 for NR standalone.

**Discussion:**

**Decision: Return to.**

**R4-2009684 [draftCR] Test cases for 2-step RACH (Random access)**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Revised to R4-2012185 (from R4-2009686).**

**R4-2012185 [draftCR] Test cases for 2-step RACH (Random access)**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Return to.**

**R4-2009685 Test cases for 2-step RACH (Random access)**

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

**Discussion:**

**Decision: Noted.**

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

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

### 7.19 R16 NR maintenance [WI code or TEI16]

#### 7.19.5 RRM [WI code or TEI16]

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

**Email discussion: [96e][204] R16\_NR\_RRM\_maintenance**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][204] R16\_NR\_RRM\_maintenance | Misc | RRM maintenance | 7.19.5 |

**R4-2012035 Email discussion summary for [96e][204] R16\_NR\_RRM\_maintenance** *Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012205 (from R4-2012035).**

**R4-2012205 Email discussion summary for [96e][204] R16\_NR\_RRM\_maintenance** *Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

**Topic #1: Dual DRX for FR1+FR2 CA**

Agreement

No interruption is allowed for transitions between active and non-active during DRX when UE is configured with dual DRX in FR1+FR2 CA, regardless per-FR gap is supported or not

**Topic #2: Misc CRs**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2009900 | Agreed |
| R4-2009922 | Agreed |
| R4-2009923 | Agreed |
| R4-2010024 | Agreed |
| R4-2010210 | Merged |
| R4-2010517 | Note: Discussed in thread 209 |
| [R4-2010663](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_96_e/Docs/R4-2010210.zip) | Revised |
| R4-2011144 | Return to |

2nd round email discussion conclusions

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

**R4-2010024 CR for Table number mismatch for CLI performance tests**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0961 Cat: F (Rel-16)  
  
 Source: LG Electronics Inc.*

**Discussion:**

**Decision: Agreed.**

**R4-2010210 CR for SCell activation delay in FR2 in R16**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0989 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Merged.**

**R4-2010517 [CR] Corrections to DAPS Handover**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1008 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Discussion:**

**Decision: Agreed.**

**R4-2010663 CR 38.133 (8.3.2) Corrections to SCell activation delay requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1015 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Addresses an incorrect implementation of CR 0816 (mirror to CR 0815) which was agreed at RAN4#95e, but for some reason only got partly implemented in the Rel-16 version of 38.133.

**Discussion:**

**Decision: Revised to R4-2012235 (from R4-2010663).**

**R4-2012235 CR 38.133 (8.3.2) Corrections to SCell activation delay requirements**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1015 Cat: F (Rel-16)  
  
 Source: Ericsson, MediaTek*

**Abstract:**

Addresses an incorrect implementation of CR 0816 (mirror to CR 0815) which was agreed at RAN4#95e, but for some reason only got partly implemented in the Rel-16 version of 38.133.

**Discussion:**

**Decision: Return to.**

**R4-2011144 CR on reporting criteria for CLI**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1078 Cat: F (Rel-16)  
  
 Source: Huawei, Hisilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011250 Analysis of interruption requirements under dual DRX**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

This document analysis interruption requirements for dual DRX in NR FR1-FR2 CA

**Discussion:**

**Decision: Noted.**

**R4-2011251 Interruption requirements under dual DRX**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1092 Cat: C (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The CR defines interruption requirements for dual DRX in NR FR1-FR2 CA

**Discussion:**

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

**R4-2009900 CR on TS38.133 for intra-freq. measurement definition**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0952 Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Discussion:**

**Decision: Agreed.**

**R4-2009916 On RRM requirement based on dual DRX for FR1+FR2 CA**

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

**Discussion:**

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

**R4-2009917 CR on RRM requirement based on dual DRX for FR1+FR2 CA**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0958 Cat: B (Rel-16)  
  
 Source: Apple*

**Discussion:**

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

**R4-2009922 Update NR Frequency Band Groups to include Band n30**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0959 Cat: F (Rel-16)  
  
 Source: AT&T*

**Discussion:**

**Decision: Agreed.**

**R4-2009923 Update NR Frequency Band Groups to include Band n14**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-0960 Cat: F (Rel-16)  
  
 Source: AT&T*

**Discussion:**

**Decision: Agreed.**

**R4-2013034 [CR] Replacing x in references with correct numbers (Core R16 Cat F)**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1111 Cat: F (Rel-16)  
  
 Source: ZTE*

**Discussion:**

**Decision: Return to.**

#### 7.19.6 Demodulation and CSI [WI code or TEI16]

## 8 Rel-16 UE feature list

GTW session (Aug 19th)

**NR mobility enhancement**

Issue 2-1: the type of capabilities for intra-frequency DAPS (5-1, 5-5, 5-7, 5-9)

* Proposals:
  + Let RAN2 decide the type of capabilities. No need to discuss in this meeting.
* Discussion
  + CMCC: HW commented to reflector that they are ok to let RAN2 decide
  + QC: also ok with the proposal
  + E///: also ok to let RAN2 to decide
  + Intel: RAN2 agreed CR in the last meeting. They have ongoing discussion
  + Huawei: in RAN2 companies have contributions and then we can leave up to them
* Agreement:
  + The type of capabilities signalling for intra-frequency DAPS features 5-1, 5-5, 5-7, 5-9 will be up to RAN2 decision. Remove signalling type from UE feature list and recommend RAN2 to provide a solution.

Issue 2-2: new UE feature (supported channel bandwidth on source cell and target cell)

* Proposals:
  + For the feature of supported channel bandwidth per CC for DAPS, and other related features

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Features | Index | Feature group | Components | Type |
| 5. Mobility Enhancement | 5-X | Supported channel bandwidth on source cell and target cell | Indicate the supported channel bandwidth per SCS on source cell and target cell separately | Type 5 Per FSPC |

* + - Option 1: To capture the above features in UE feature list
    - Option 2: To capture the above features in TR (need to check whether there is a TR)
* Discussion
  + Huawei: Companies prefer not to include it in the feature list. We are ok to include a note into feature list and LS that previously agreed parameters shall be included into the capabilities signalling.
  + QC: Why does NW need to know the parameters?
    - Huawei: even for intra-frequency different capabilities may be needed for DAPS case and for regular case.
  + Intel: CBW is already captured in RAN2 specs
* Agreement: Include a note into RAN4 UE feature list LS that previously agreed parameters for DAPS including CBW shall be included into the UE capabilities signalling.

**MR-DC**

[6-4] Support of beam level Early Measurement Reporting

* Proposal in email summary document

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | Consequence if the feature is not supported by the UE | Type | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| [6-4] | Support of beam level Early Measurement Reporting | Supporting of beam level measurement and reporting for Early Measurement Reporting at connection setup. | TBD | Yes | N/A | Network cannot configure beam-level reporting to UE for EMR | Per UE | No | No | N/A |  | [Optional with capability signalling] |

* Discussion
  + Huawei: the measurement is done in IDLE mode.
  + CMCC: Huawei suggested to clarify that this applies to both IDLE and INACTIVE modes and QC preferred not to change the name. So, no changes were made.
  + HW: In the component we suggest to clarify that the measurement is done in IDLE and INACTIVE modes
  + Nokia: UEs in IDLE modes are supposed to support the measurements. Need to differentiate between NR inter-frequency and NR inter-RAT. For NR inter-frequency it is mandatory for UE to support already. For inter-RAT we do not have it.
    - MTK: In the original EMR capability inter-frequency and inter-RAT supported is already separated. In conventional re-selection UE needs to read SSB index only after UE selects the target cell and capability is need.
    - QC: To Nokia conventional Rel-15 UE does not need to read SSB index. UE needs to consider only total number of detected SSBs. In this feature UE needs to differentiate SSB index.
    - Huawei: Similar understanding with QC. EMR requirements include additional SSB index reading time. So, capability is needed.
    - Nokia: Clarifications are fine.
  + Huawei: we would like to differentiate capabilities for NR inter-frequency in NR IDLE/Inactive mode and LTE-NR Inter-RAT when UE is in LTE IDLE/INACTIVE mode
    - QC: what is the motivation behind this?
    - MTK: Support to have different capabilities
    - Apple: are these NR or LTE capabilities?
    - Huawei: one is for NR and the other is for LTE capability
* Agreement
  + NR UE feature list

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | Consequence if the feature is not supported by the UE | Type | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 6-4 | Support of beam level Early Measurement Reporting | Supporting of beam level measurement and reporting when in NR Idle/Inactive mode for Early Measurement Reporting at connection setup. | *idleInactiveNR-MeasReport-r16* | Yes | N/A | Network cannot configure beam-level reporting to UE for EMR | Per UE | No | Yes | N/A |  | [Optional with capability signalling] |

* + LTE UE feature list

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | Consequence if the feature is not supported by the UE | Type | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
|  | Support of beam level Early Measurement Reporting | Supporting of NR beam level measurement and reporting when in LTE Idle/Inactive mode for Early Measurement Reporting at connection setup for FR1 | *endc-IdleInactiveMeasFR1-r16* | Yes | N/A | Network cannot configure beam-level reporting to UE for EMR | Per UE | No | N/A | N/A |  | [Optional with capability signalling] |
|  | Supporting of NR beam level measurement and reporting when in LTE Idle/Inactive mode for Early Measurement Reporting at connection setup for FR2 | *endc-IdleInactiveMeasFR2-r16* | Yes | N/A | Network cannot configure beam-level reporting to UE for EMR | Per UE | No | N/A | N/A |  | [Optional with capability signalling] |

**NR RRM Enhancements**

The latest list in email summary document

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | Consequence if the feature is not supported by the UE | Type | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 9-1 | BWP switching on multiple CCs RRM requirements | [1) Support of BWP switching on multiple CCs RRM requirements.]  2) Incremental delay for BWP switch processing on additional CCs in timer/DCI based simultaneous BWP switching on multiple CCs | [RAN1 feature 6-2, 6-3, 6-4 specified in TR 38.822] | Yes | N/A | There may be additional unclear BWP switching delay if network trigger BWP switching on multiple CC simultaneously. | Per UE | No | [No] | N/A | For component 2), the candidate values are:   * {100us, 200us} for UE indicates type1 in bwp-SwitchingDelay * {400us, 800us, 1000us} for UE indicates type 2 in bwp-SwitchingDelay   The total BWP switching delay will be captured in TS38.133 | Optional with capability signalling |
| 9-2 | Mandatory gap pattern for NR-only measurements in NR SA and NR DC | 1) Support of additional mandatory gap patterns for NR-only measurements in NR SA and NR DC, |  | Yes | N/A | Network cannot configure corresponding gap patterns for the UE. | Per UE | No | No | N/A | Note: Agreements are provided in [R4-2005846]. According to RAN4 agreement, a bitmap should be introduced | Mandatory with capability |
| 9-3 | Mandatory gap pattern for NR measurement only in LTE SA, EN-DC, NE-DC | 1) Support of full set of mandatory additional gap patterns defined for NR SA and NR-DC for NR measurement only in LTE SA, EN-DC, NE-DC | 9-2 | Yes | N/A | Network cannot configure corresponding gap patterns for the UE. | Per UE | No | No | N/A | Note: Agreements are provided in [R4-2005846]. According to RAN4 agreement, a single bit should be introduced | Optional with capability |
| 9-4 | SSB based inter-frequency measurement without measurement gap | 1) Support of inter-frequency measurement without MG when the inter-frequency SSB is completely contained in the active DL BWP of the UE |  | Yes | N/A | 1) gNB has to configure measurement gap for inter-frequency measurement | Per UE | No | Yes | N/A |  | Optional with capability signalling |
| 9-5 | Different SCS between PDCCH/PDSCH and SSB in inter-frequency measurement without MG | 1) Support of SSB based measurement on inter-frequency without MG and data reception of PDCCH/PDSCH in serving with different SCS | 9-4 | Yes | N/A | 2) UE cannot support of SSB based measurement on inter-frequency without MG and data reception of PDCCH/PDSCH in serving with different SCS | Per UE | No | Yes | N/A | Details can be found in RAN4 LS R4-2005350 to RAN2, wherein two options are listed, i.e.1) update existing IE (simultaneousRxDataSSB-DiffNumerology); 2) introduce a new UE capability | Optional with capability signalling |
| 9-6 | CGI reading of an NR neighbour cell | 1) Support of autonomous gap-based CGI reading of an NR neighbour cell for EN-DC, NR SA, LTE SA, NR-DC, NE-DC |  | Yes | N/A | gNB cannot configure CGI reading of NR neighbor cell | Per UE | No | Yes | N/A | Signalling details are up to RAN2. | Optional with capability signalling |
| 9-7 | CGI reading of an E-UTRA neighbour cell | 1) Support of autonomous gap-based CGI reading of an E-UTRA neighbour cell for EN-DC, NR SA, LTE SA, NR-DC, NE-DC |  | Yes | N/A | gNB cannot configure CGI reading of E-UTRA neighbor cell | Per UE | No | Yes | N/A | Signalling details are up to RAN2. | Optional with capability signalling |
| [9-8] | [SRS carrier switching] | 1) Support of SRS carrier switching RRM requirements | [Rel-15 NR RAN1 UE feature list feature 2-56 (SRS carrier switch)] | Yes | N/A | Network cannot know the interruption time when SRS carrier switching happens for this UE. Therefore, either network may not trigger SRS carrier switch or there will be performance degradation | Per UE | No | Yes | N/A | Functionality of SRS carrier switching has already been supported since R15. RRM requirement is expected to be introduced in R16. Thus, R16 UE shall meet corresponding RRM requirement. The requirements apply when SRS carrier switching is on NR carrier or on LTE carrier i.e. it should cover also EN-DC and NE-DC scenarios.  9-5 is mandatory for Rel-16 UEs supporting SRS carrier switching | Optional with capability signalling |
| [9-9] | [Multiple SCell activation] | 1) Support of multiple SCell activation RRM requirement |  | Yes | N/A | Network cannot know the multiple SCell activation delay and corresponding interruption length for this UE. Therefore, either network may not trigger multiple SCell activation or there will be performance degradation | Per UE | No | Yes | N/A | Functionality of multiple SCell activation has already been supported since R15. RRM requirement is expected to be introduced in R16. Thus, R16 UE shall meet corresponding RRM requirement. | Optional with capability signalling |
| [9-10] | [UE specific CBW change] | 1) Support of UE-specific CBW change RRM requirement |  | Yes | N/A | Network cannot know the UE specific CBW change delay and corresponding interruption length for this UE. There will be performance degradation when UE specific CBW changes | Per UE | No | No | N/A | Functionality of UE specific CBW change has already been supported since R15. RRM requirement is expected to be introduced in R16. Thus, R16 UE shall meet corresponding RRM requirement. | Optional with capability signalling |
| [9-11] | [Spatial relation switch for uplink] | 1) Support of UL spatial relation switch RRM requirement |  | Yes | N/A | Network cannot know the uplink spatial relation switch delay for this UE. There will be performance degradation when uplink spatial relation changes | Per UE | No | No | N/A | Functionality of uplink spatial relation change has already been supported since R15. RRM requirement is expected to be introduced in R16. Thus, R16 UE shall meet corresponding RRM requirement. | Optional with capability signalling |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

Issue 6-1: 9-1 (BWP switching on multiple CCs RRM requirements)

* Proposals:
  + Option 1 (Intel):
    - Remove components 1, i.e. support of BWP switching on multiple CCs RRM requirements. This can be implicitly indicated by the components of incremental delay.
    - Square brackets in Prerequisite feature groups should be removed. UE has to support corresponding BWP operation if it supports BWP switching on multiple CCs.
    - No need to differentiate FR1/FR2, similar with RAN1 feature 6-2, 6-3, 6-4 specified in TR 38.822.
  + Option 2 (Qualcomm):
    - 1) should not exist, requirements are not optional
    - 2) should be mandatory to support one of the options
* Discussion
  + QC: suggest another feature. Simultaneous processing of BWP in FR1 and FR2
  + Intel: this may need more discussion. In 221 email thread most companies prefer to go with the existing capabilities. Can update list if further agreements are reached.
  + MTK: Suggest additional value 200us for Type 2 UE. To QC, per FR gap capability can be used and do not see motivation in the new capability
  + Huawei: For QC proposal we share same view as Intel/MTK
  + QC: Component 1 shall be removed.
* Agreement

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | Consequence if the feature is not supported by the UE | Type | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 9-1 | BWP switching on multiple CCs RRM requirements | Incremental delay for BWP switch processing on additional CCs in timer/DCI based simultaneous BWP switching on multiple CCs | RAN1 feature 6-2, 6-3, 6-4 specified in TR 38.822 | Yes | N/A | There may be additional unclear BWP switching delay if network trigger BWP switching on multiple CC simultaneously. | Per UE | No | No | N/A | For component 2), the candidate values are:   * {100us, 200us} for UE indicates type1 in bwp-SwitchingDelay * {200us, 400us, 800us, 1000us} for UE indicates type 2 in bwp-SwitchingDelay   The total BWP switching delay will be captured in TS38.133  UE needs to indicate either of the candidate values in case it supports CA | Optional with capability signalling |

9-8 / 9-9 / 9-10 / 9-11

* Discussion
  + QC: This is a capability that UE supports the requirements. This should not be optional. If UE supports the feature but does not support requirements, how do we test it?
  + Intel: SRS carrier switching is fine. But for the rest of the features, there are no capabilities and new requirements were introduced in Rel-16 only. NW may not know if UE can meet the requirements. Some UEs may meet the requirements and some may not.
  + Huawei: Rel-15 UE may support 9-9, 9-10, 9-11 and we prefer not to specify capability. Rel-15 UEs do not need to pass the test. Rel-16 UEs need to pass the test. For 9-8 – the capability signalling is already present and no need to introduce a new one.
  + Apple: 9-9, 9-10, 9-11 are Rel-15 features but requirements are introduced in Rel-16. Rel-15 may not need to comply with requirements. If we do not introduce capabilities, then the new requirements become mandatory and prefer optional. For 9-8, we prefer mandatory with signalling and the purpose is to indicate that this applies to Rel-16 UEs.
  + ZTE: Agree with QC. Rel-16 UE needs to meet the requirements. Rel-15 UE should not meet the requirements. NW can read UE release to get the information.
  + MTK: Agree with QC, Huawei, ZTE since these all are Rel-15 leftovers. NW knows the release of the UE.
  + CMCC / China Telecom: Do not think signalling is needed. NW get release from the UE.
  + Intel: Relying on Rel number is not a good idea since UE needs to support all mandatory features before it can announce new release. We can also preclude late Rel-15 UEs to take benefit from the new capabilities.
  + QC: 9-9, 9-10, 9-11 are mandatory for Rel-15. These features are not broken even if UE does not meet the requirements. Simply it may take longer time. We can have capability for Rel-15 UEs only instead.
  + Apple: Need to differentiate 9-8 with others. We should not apply Rel-16 requirements to Rel-15 UEs. How does UE know how to apply the requirements? Capability is required to indicate whether it can meet the requirements. For the rest of the features – all of them are mandatory in Rel-15, we prefer to have new requirements as optional.
  + Huawei: For 9-9 to 9-11 – typically we introduce the requirements to make sure the NW may enable / disable some functionality. Do companies want to enable/disable some functionality or we simply want to make the requirements optional?
  + Nokia: what about release-independent features?
  + Apple: for example for CBW switching – why do we want to introduce it as mandatory? Deep concern on making all the requirements as mandatory.
  + Ericsson: These are Rel-16 requirements. All features are essential and shall be mandatory.
* Agreement
  + Feature 9-8 SRS carrier switching
    - Remove feature [9-8] [SRS carrier switching] from the features list
    - Rel-16 SRS carrier switching requirements apply for Rel-16 UEs only
  + Further discuss UE features 9-9, 9-10, 9-11
    - Whether the requirements for 9-9, 9-10, 9-11 are mandatory or optional for Rel-16 UEs
    - Whether the network needs to know that UE supports respective requirements
    - Whether UE release signalling is sufficient for NW to know that UE supports the requirements

**NR Positioning**

* Additional features to be introduced?
* Chair: recommend postpone to Thu GTW session

**NR L3 CSI-RS measurements**

The latest list in email summary document

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | Consequence if the feature is not supported by the UE | Type | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| [12-1] | [Simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell] | UE support FDM-ed mix-numerology on simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell | TBA | YES |  | The performance of CSI-RS L3 measurement cannot be guaranteed | Per UE | No | No |  |  | Optional with capability signalling |
| [12-2] | [CSI-RS measurement] | Support CSI-RS measurement based on timing of each of the detected associated SSB | csi-RSRP-AndRSRQ-MeasWithSSB | Yes | n/a | UE can only use a single common timing to measure CSI-RS resources per frequency layer, and can meet the accuracy requirements only under the timing error conditions defined in 38.133. | Per UE | no | no | n/a |  | Optional with capability signalling |

* Discussion
  + Apple: suggest to remove 12-1 and replace with several new capabilities
  + CATT: 12-1 is related to new proposal from Apple. Need further discussion.
  + Huawei: For 12-1 we propose to remove mixed numerology. Prefer further discussion.
  + MTK: Not possible to have quick discussion.
  + Nokia: 12-2 conflicts with our recent agreement on single FFT
  + OPPO: 12-1 suggest to revise the feature description based on the email discussion
  + ZTE: 12-1 more discussion. 12-2 does not contradict single capability
  + Huawei: 12-2 companies need to further discuss the exact wording
  + Apple: 12-2 agree with ZTE that it does not conflict with Single FFT case. What is the reference timing in case UE does not support the feature?
  + QC: 12-2 need to change the description to adopt 2 UE types depending whether UE can follow serving cell or associated SSBs
  + MTK: not very clear on 12-2.
  + Nokia: need more discussion on the wording.
* Conclusion: Continue discussion for both 12-1 and 12-2 in this meeting

**NR HST**

The latest list in email summary document (RRM-related)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | Consequence if the feature is not supported by the UE | Type | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 10-1 | RRM enhanced requirements specified within NR and NR-E-UTRAN inter-RAT measurement for NR HST | The enhanced RRM requirements specified within NR and NR-E-UTRAN inter-RAT measurement to support high speed up to 500 km/h, as specified in TS 38.133 |  | No |  | The performance of RRM in NR HST scenario cannot be guaranteed | Per UE | NO | FR1 only |  |  | [mandatory with capability signalling] |
| 10-3 | RRM enhancement for E-UTRAN -NR inter-RAT measurement for NR HST | The enhanced RRM requirements specified for E-UTRAN-NR inter-RAT measurement to support high speed up to 500 km/h, as specified in TS 36.133 |  | No |  | The performance of RRM in NR HST scenario cannot be guaranteed | Per UE | NO | FR1 only |  |  | [mandatory with capability signalling] |

* Discussion

## 10 Rel-17 spectrum related Work Items for NR

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

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

**Email discussion: [96e][231] NR\_FR2\_FWA\_Bn257\_Bn258\_RRM**

|  |  |  |  |
| --- | --- | --- | --- |
| Email title | WI | Topic areas | AI |
| [96e][231] NR\_FR2\_FWA\_Bn257\_Bn258\_RRM | R17 FR2 FWA UE with max 23dBm TRP | RRM requirements | 10.20.2 10.20.3 |

**R4-2012062 Email discussion summary for** [96e][231] NR\_FR2\_FWA\_Bn257\_Bn258\_RRM *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2012231 (from R4-2012062).**

**R4-2012231 Email discussion summary for** [96e][231] NR\_FR2\_FWA\_Bn257\_Bn258\_RRM *Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

New tdocs

|  |  |  |
| --- | --- | --- |
| R4-2012199 | WF on FR2 new FWA UE RRM requirements | Huawei |

**Topic #1: Core requirements**

Tdoc decisions

|  |  |
| --- | --- |
| **Tdoc** | **Decision** |
| R4-2011067 | Revised |
| R4-2011253 | Merged |
| R4-2011254 | Revised |

2nd round email discussion conclusions

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

**R4-2012199 WF on FR2 new FWA UE RRM requirements**

*Type: other For: Approval  
 Source: Huawei*

**Discussion:**

**Decision: Return to.**

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

**R4-2011066 Discussion on RRM core requirements for FR2 FWA UE**

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

**Discussion:**

**Decision: Noted.**

**R4-2011067 CR on RRM requirements for new FR2 FWA UE**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1040 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Revised to R4-2012200 (from R4-2011067).**

**R4-2012200 CR on RRM requirements for new FR2 FWA UE**

*Type: draftCR For: Endorsement  
 38.133 v16.4.0 Cat: B (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

**Decision: Return to.**

**R4-2011252 Analysis of RRM core requirements for FR2 FWA UE power class**

*Type: other For: Discussion  
 Source: Ericsson, SoftBank*

**Abstract:**

This document analysis RRM requirements for new FR2 FWA UE power class of 23 dBm max TRP

**Discussion:**

**Decision: Noted.**

**R4-2011253 RRM core requirements for FR2 FWA UE power class in 38.133**

*Type: CR For: Agreement  
 38.133 v16.4.0 CR-1093 Cat: B (Rel-16)  
  
 Source: Ericsson, SoftBank*

**Abstract:**

This CR introduces RRM requirements for new FR2 FWA UE power class of 23 dBm max TRP in 38.133

**Discussion:**

**Decision: Merged.**

**R4-2011254 RRM core requirements for FR2 FWA UE power class in 36.133**

*Type: CR For: Agreement  
 36.133 v16.6.0 CR-6958 Cat: B (Rel-16)  
  
 Source: Ericsson, SoftBank*

**Abstract:**

This CR introduces RRM requirements for new FR2 FWA UE power class of 23 dBm max TRP in 36.133

**Discussion:**

**Decision: Revised to R4-2012201 (from R4-2011254).**

**R4-2012201 RRM core requirements for FR2 FWA UE power class in 36.133**

*Type: draftCR For: Endorsement  
 36.133 v16.6.0 Cat: B (Rel-17)  
  
 Source: Ericsson, SoftBank*

**Abstract:**

This CR introduces RRM requirements for new FR2 FWA UE power class of 23 dBm max TRP in 36.133

**Discussion:**

**Decision: Return to.**

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

**R4-2011068 Discussion on RRM performance impacts for new FR2 FWA UE**

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

**Discussion:**

**Decision: Noted.**

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

## BACKUP

**R4-20AAAAA Way forward on XXXX**

*Type: other For: Approval  
 Source: TBA*

**Discussion:**

**Decision: Return to.**