3GPP TSG-RAN WG4 Meeting #100-e R4-21xxxxx

E-meeting, 16th – 27th August, 2021

**Agenda item:** **2**

**Source: RAN4 Vice Chair (Samsung)**

**Title: RAN4#100-e BSRF\_Test\_Demod Session Chair notes**

**Document for:** **Approval**

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## 5 Rel-15 and previous release maintenance

### 5.1 Rel-15 New radio access technology

#### 5.1.3 UE EMC requirements maintenance

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**Email discussion for [100-e][303] NR\_EMC, AI 5.1.3,5.1.6,6.1.2.5,9.5.4– Wubin Zhou**

**R4-2115594 Email discussion summary for [100-e][303] NR\_EMC**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115775 (from R4-2115594).**

**R4-2115775 Email discussion summary for [100-e][303] NR\_EMC**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2115664 | WF on the gap between regulation concern and current UE EMC specification | Xiaomi | Approved |  |
| R4-2115663 | Draft CR to TS38.124: MU value for the effective radiated RF power between 12.75GHz and 26 GHz, Rel-15 | Huawei | Endorsed |  |
| R4-2114397 | Draft CR to TS38.124: MU value for the effective radiated RF power between 12.75GHz and 26 GHz, Rel-16 | Huawei | Endorsed |  |
| [R4-2112770](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112770.zip) | CR to TS 38.113: Radiated emission measurement uncertainty(R15) | ZTE Corporation | Not Pursued |  |
| R4-2112772 | CR to TS 38.113: Radiated emission measurement uncertainty(R16) | ZTE Corporation | Withdraw |  |
| R4-2115665 | CR to TS 38.113 on Spatial Exclusion description, Release 15 | Ericsson | Endorsed |  |
| R4-2113188 | CR to TS 38.113 on Spatial Exclusion description, Release 16 | Ericsson | Endorsed |  |
| R4-2115666 | CR to TS 38.175: IAB test configurations | ZTE Corporation | Endorsed |  |
| R4-2115667 | Draft CR to TS 38.175: further extension of spatial exclusion considerations for EMC RI test for IAB, Rel-16 | Huawei | Endorsed |  |
| R4-2112864 | 3GPP TS 38.114 v0.1.0 | ZTE Corporation | Withdraw |  |

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**R4-2115664 WF on the gap between regulation concern and current UE EMC specification**

*Type: other For: Approval  
 Source: Xiaomi*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**Sub-topic 1-1: On LS from CCSA**

**R4-2112609 on LS from CCSA on UE EMC**

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

**Decision: Noted.**

**Sub-topic 1-2: MU value for the effective radiated RF power measurements**

**R4-2114395 Discussion on the MU value for the effective radiated RF power measurements between 12.75GHz and 26 GHz**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discussion on the maximum MU value selection for the measurements of the effective radiated RF power in frequency range 12.75 – 26 GHz.

**Decision: Noted.**

**R4-2114396 Draft CR to TS38.124: MU value for the effective radiated RF power between 12.75GHz and 26 GHz, Rel-15**

*Type: draftCR For: Endorsement  
 38.124 v15.6.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Removal of the TBD for the maximum measurement uncertainty value for measurements of the effective radiated RF power in 12.75 – 26 GHz frequency range.

**Decision: Revised to R4-2115663 (from R4-2114396).**

**R4-2115663 Draft CR to TS38.124: MU value for the effective radiated RF power between 12.75GHz and 26 GHz, Rel-15**

*Type: draftCR For: Endorsement  
 38.124 v15.6.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Removal of the TBD for the maximum measurement uncertainty value for measurements of the effective radiated RF power in 12.75 – 26 GHz frequency range.

**Decision: Endorsed.**

**R4-2114397 Draft CR to TS38.124: MU value for the effective radiated RF power between 12.75GHz and 26 GHz, Rel-16**

*Type: draftCR For: Endorsement  
 38.124 v16.3.0 CR- rev Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Removal of the TBD for the maximum measurement uncertainty value for measurements of the effective radiated RF power in 12.75 – 26 GHz frequency range.

**Decision: Endorsed.**

#### 5.1.4 BS RF requirements maintenance

##### 5.1.4.1 General

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**Email discussion for [100-e][301] BSRF\_Maintenance, AI 5.1.4, 6.1.9.1 (except 2114399), 6.1.10.1,5.2.2.1 – Johan Sköld**

**R4-2115592 Email discussion summary for [100-e][301] BSRF\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115773 (from R4-2115592).**

**R4-2115773 Email discussion summary for [100-e][301] BSRF\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc number | Title | Source | Recommendation | Comments |
| R4-2113314 | CR to TR 38.921: Addition of array antenna model extension in subclause 8.1 | Ericsson | Not pursued |  |
| R4-2115648 | OTA transmitter intermodulation 38.104 R15 | Huawei, HiSilicon | Endorsed |  |
| R4-2113078 | OTA transmitter intermodulation 38.104 R16 | Huawei, HiSilicon | Endorsed |  |
| R4-2113079 | OTA transmitter intermodulation 38.104 R17 | Huawei, HiSilicon | Endorsed |  |
| R4-2115654 | OTA transmitter intermodulation 37.105 R15 | Huawei, HiSilicon | Endorsed |  |
| R4-2113084 | OTA transmitter intermodulation 37.105 R16 | Huawei, HiSilicon | Endorsed |  |
| R4-2113085 | OTA transmitter intermodulation 37.105 R17 | Huawei, HiSilicon | Endorsed |  |
| R4-2113068 | Correction on the test configuration for NC operation 37.141 R15 | Huawei, HiSilicon | Not pursued |  |
| R4-2113069 | Correction on the test configuration for NC operation 37.141 R16 | Huawei, HiSilicon | Not pursued |  |
| R4-2113070 | Correction on the test configuration for NC operation 37.141 R17 | Huawei, HiSilicon | Withdrawn |  |
| R4-2113918 | TP to TR 38.921: MR/LA BS UEM requirements | ZTE Corporation | Not pursued |  |
| R4-2115650 | Draft CR to 37.104: MSR band table update | Ericsson | Endorsed |  |
| R4-2112291 | Draft CR to 37.104: MSR band table update | Ericsson | Endorsed | Change from Cat A to Cat F |
| R4-2115651 | Draft CR to 37.141: MSR band table update | Ericsson | Endorsed |  |
| R4-2112293 | Draft CR to 37.141: MSR band table update | Ericsson | Endorsed | Change from Cat A to Cat F |
| R4-2115652 | Draft CR to 37.941: BS OTA test, FR2 Rx OOB test MU value Math correction (14.2.4, 17) | Keysight Technologies UK Ltd | Endorsed |  |
| R4-2113029 | Draft CR to 37.941: BS OTA test, FR2 Rx OOB test MU value Math correction (14.2.4, 17) | Keysight Technologies UK Ltd | Endorsed |  |
| R4-2114398 | Draft CR to TR 37.941: correction of the FR2 upper frequency (43.5 GHz), Rel-16 | Huawei | Endorsed |  |
| R4-2115649 | CR to TR 38.820: Addition of array antenna model extension in subclause 7.2 | Ericsson | Not pursued |  |
| R4-2113314 | CR to TR 38.921: Addition of array antenna model extension in subclause 8.1 | Ericsson | Not pursued |  |
| R4-2114400 | Draft CR to TS 37.104: addition of the missing note in applicability table for BC2 WA BS OBUE, Rel-16 | Huawei | Endorsed |  |
| R4-2114401 | Draft CR to TS 37.104: addition of the missing note in applicability table for BC2 WA BS OBUE, Rel-17 | Huawei | Endorsed |  |
| R4-2112294 | Draft R to 36.104: Correction In-band blocking for multi-band Base Stations | Ericsson | Endorsed |  |
| R4-2112295 | Draft R to 36.104: Correction In-band blocking for multi-band Base Stations | Ericsson | Endorsed |  |
| R4-2112296 | Draft R to 36.104: Correction In-band blocking for multi-band Base Stations | Ericsson | Endorsed |  |
| R4-2112297 | Draft CR to 36.141: Correction In-band blocking for multi-band Base Stations | Ericsson | Endorsed |  |
| R4-2112298 | Draft CR to 36.141: Correction In-band blocking for multi-band Base Stations | Ericsson | Endorsed |  |
| R4-2112299 | Draft CR to 36.141: Correction In-band blocking for multi-band Base Stations | Ericsson | Endorsed |  |
| R4-2112269 | Draft CR to TS 38.141-1: Clarification of power boosted NB-IoT RB placement | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2112270 | Draft CR to TS 38.141-1: Clarification of power boosted NB-IoT RB placement | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2115653 | Draft CR to TR 37.941: correction of the FR2 upper frequency (43.5 GHz), Rel-16 | Huawei | Endorsed |  |
| R4-2112236 | Draft CR to TR 37.941: Relative calibration approach | ROHDE & SCHWARZ | Not pursued |  |
| R4-2112237 | Draft CR to TR 37.941: Relative calibration approach | ROHDE & SCHWARZ | Withdrawn |  |

**Array antenna model extension**

**R4-2113314 CR to TR 38.921: Addition of array antenna model extension in subclause 8.1**

*Type: CR For: Agreement  
 38.921 v17.0.0 CR-0001 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

At last RAN4 meeting an extension of the antenna array model originally defined in TR 37.842 to support sub-arrays was agreed. The extension of the model and corresponding relevant model parameters was communicated to ITU-R WP 5D and CEPT in an LS (R4-210

**Decision: Not pursued.**

**R4-2113918 TP to TR 38.921: MR/LA BS UEM requirements**

*Type: other For: Approval  
 Source: ZTE Corporation*

Session Chair Note: Move to this AI from AI 13.2

**Decision: Not pursued.**

**R4-2113315 CR to TR 38.820: Addition of array antenna model extension in subclause 7.2**

*Type: CR For: Agreement  
 38.820 v16.1.0 CR-0003 rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

At last RAN4 meeting an extension of the antenna array model originally defined in TR 37.842 to support sub-arrays was agreed. The extension of the model and corresponding relevant model parameters was communicated to ITU-R WP 5D and CEPT in an LS (R4-210

**Decision: Revised to R4-2115649 (from R4-2113315).**

**R4-2115649 CR to TR 38.820: Addition of array antenna model extension in subclause 7.2**

*Type: CR For: Agreement  
 38.820 v16.1.0 CR-0003 rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

At last RAN4 meeting an extension of the antenna array model originally defined in TR 37.842 to support sub-arrays was agreed. The extension of the model and corresponding relevant model parameters was communicated to ITU-R WP 5D and CEPT in an LS (R4-210

**Decision: Not pursued.**

##### 5.1.4.2 TX/RX requirements maintenance (38.104)

**OTA transmitter intermodulation**

**R4-2113077 OTA transmitter intermodulation 38.104 R15**

*Type: draftCR For: Endorsement  
 38.104 v15.14.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2115648 (from R4-2113077).**

**R4-2115648 OTA transmitter intermodulation 38.104 R15**

*Type: draftCR For: Endorsement  
 38.104 v15.14.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113078 OTA transmitter intermodulation 38.104 R16**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113079 OTA transmitter intermodulation 38.104 R17**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

##### 5.1.4.3 MSR specifications maintenance\

**Test configuration for NC operation**

**R4-2113068 Correction on the test configuration for NC operation 37.141 R15**

*Type: draftCR For: Endorsement  
 37.141 v15.15.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Not pursued.**

**R4-2113069 Correction on the test configuration for NC operation 37.141 R16**

*Type: draftCR For: Endorsement  
 37.141 v16.10.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Not pursued.**

**R4-2113070 Correction on the test configuration for NC operation 37.141 R17**

*Type: draftCR For: Endorsement  
 37.141 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Withdrawn.**

**OTA transmitter intermodulation for MSR**

**R4-2113083 OTA transmitter intermodulation 37.105 R15**

*Type: draftCR For: Endorsement  
 37.105 v15.13.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2115654 (from R4-2113083).**

**R4-2115654 OTA transmitter intermodulation 37.105 R15**

*Type: draftCR For: Endorsement  
 37.105 v15.13.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113084 OTA transmitter intermodulation 37.105 R16**

*Type: draftCR For: Endorsement  
 37.105 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113085 OTA transmitter intermodulation 37.105 R17**

*Type: draftCR For: Endorsement  
 37.105 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**Missing note in applicability table for BC2 WA BS OBUE**

**R4-2114400 Draft CR to TS 37.104: addition of the missing note in applicability table for BC2 WA BS OBUE, Rel-16**

*Type: draftCR For: Endorsement  
 37.104 v16.10.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Missing note 2 is added to the Table 6.6.2.2-0 (Applicability of operating band unwanted emission requirements for BC2 Wide Area BS).

**Decision: Endorsed.**

**R4-2114401 Draft CR to TS 37.104: addition of the missing note in applicability table for BC2 WA BS OBUE, Rel-17**

*Type: draftCR For: Endorsement  
 37.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei*

**Abstract:**

Missing note 2 is added to the Table 6.6.2.2-0 (Applicability of operating band unwanted emission requirements for BC2 Wide Area BS).

**Decision: Endorsed.**

#### 5.1.5 BS conformance testing Maintenance

##### 5.1.5.1 General

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**Email discussion for [100-e][302] NR\_Conformance\_Maintenance, AI 5.1.5 – Liehai Liu**

**R4-2115593 Email discussion summary for [100-e][302]NR\_Conformance\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115774 (from R4-2115593).**

**R4-2115774 Email discussion summary for [100-e][302]NR\_Conformance\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2113071 | Correction on the test configuration for NC operation 37.145-1 R15 | Huawei, HiSilicon | Not Pursued |  |
| R4-2113072 | Correction on the test configuration for NC operation 37.145-1 R16 | Huawei, HiSilicon | Not Pursued |  |
| R4-2113073 | Correction on the test configuration for NC operation 37.145-1 R17 | Huawei, HiSilicon | Withdrawn |  |
| R4-2113074 | Correction on the test configuration for NC operation 37.145-2 R15 | Huawei, HiSilicon | Not Pursued |  |
| R4-2113075 | Correction on the test configuration for NC operation 37.145-2 R16 | Huawei, HiSilicon | Not Pursued |  |
| R4-2113076 | Correction on the test configuration for NC operation 37.145-2 R17 | Huawei, HiSilicon | Withdrawn |  |
| R4-2115655 | OTA transmitter intermodulation 38.141 R15 | Huawei, HiSilicon | Endorsed |  |
| R4-2113081 | OTA transmitter intermodulation 38.141 R16 | Huawei, HiSilicon | Endorsed |  |
| R4-2113082 | OTA transmitter intermodulation 38.141 R17 | Huawei, HiSilicon | Endorsed |  |
| R4-2115656 | OTA transmitter intermodulation 37.145-2 R15 | Huawei, HiSilicon | Endorsed |  |
| R4-2113087 | OTA transmitter intermodulation 37.145-2 R16 | Huawei, HiSilicon | Endorsed |  |
| R4-2113088 | OTA transmitter intermodulation 37.145-2 R17 | Huawei, HiSilicon | Endorsed |  |
| R4-2115814 | draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up | CAICT, Rohde & Schwarz | Endorsed |  |
| R4-2115815 | draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up | CAICT, Rohde & Schwarz | Endorsed |  |
| R4-2115816 | draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up | CAICT, Rohde & Schwarz | Endorsed |  |
| R4-2115657 | Draft CR to TS 38.141-2 test configuration corrections | Nokia, Nokia Shaghai Bell | Endorsed | *Update the coversheet* |
| R4-2113500 | Draft CR to TS 38.141-2 test configuration corrections | Nokia, Nokia Shaghai Bell | Endorsed |  |
| R4-2113501 | Draft CR to TS 38.141-2 test configuration corrections | Nokia, Nokia Shaghai Bell | Endorsed |  |
| R4-2115658 | TS 37.105: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |
| R4-2113988 | TS 37.105: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |
| R4-2113989 | TS 37.105: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |
| R4-2115659 | TS 37.145-1: Clarifications and corrections on extreme test environment | Ericsson | Endorsed |  |
| R4-2113997 | TS 37.145-1: Clarifications and corrections on extreme test environment | Ericsson | Endorsed |  |
| R4-2113998 | TS 37.145-1: Clarifications and corrections on extreme test environment | Ericsson | Endorsed |  |
| R4-2115660 | TS 37.145-2: Clarifications and corrections on extreme test environment | Ericsson | Endorsed |  |
| R4-2114000 | TS 37.145-2: Clarifications and corrections on extreme test environment | Ericsson | Endorsed |  |
| R4-2114001 | TS 37.145-2: Clarifications and corrections on extreme test environment | Ericsson | Endorsed |  |
| R4-2115661 | Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-15 | Huawei, Nokia | Endorsed | *To add Nokia as co-sourcing company* |
| R4-2115662 | Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-16 | Huawei, Nokia | Endorsed | *To add Nokia as co-sourcing company* |
| R4-2114404 | Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-17 | Huawei | Endorsed |  |
| R4-2112773 | Draft CR to 38.141-2: BS FR2 OBUE Cat B requirement table note clarification (6.7.4.5.2) | Keysight Technologies UK Ltd | Endorsed |  |
| R4-2112774 | Draft CR to 38.141-2: BS FR2 OBUE Cat B requirement table note clarification (6.7.4.5.2) | Keysight Technologies UK Ltd | Endorsed |  |
| R4-2112775 | Draft CR to 38.141-2: BS FR2 OBUE Cat B requirement table note clarification (6.7.4.5.2) | Keysight Technologies UK Ltd | Endorsed |  |
| R4-2113313 | CR to TR 37.842: Addition of array antenna model extension in subclause 5.3.3 | Ericsson | not pursued |  |
| R4-2113496 | Draft CR to TS 38.141-1 NRTC4 test configuration correction | Nokia, Nokia Shaghai Bell | Endorsed |  |
| R4-2113497 | Draft CR to TS 38.141-1 NRTC4 test configuration correction | Nokia, Nokia Shaghai Bell | Endorsed |  |
| R4-2113498 | Draft CR to TS 38.141-1 NRTC4 test configuration correction | Nokia, Nokia Shaghai Bell | Endorsed |  |
| R4-2113990 | TS 37.145-1: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |
| R4-2113991 | TS 37.145-1: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |
| R4-2113992 | TS 37.145-1: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |
| R4-2113993 | TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |
| R4-2113994 | TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |
| R4-2113995 | TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | Ericsson | Endorsed |  |

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##### 5.1.5.2 Conducted conformance testing (38.141-1)

**Topic #6: NRTC4 test configuration correction**

**R4-2113496 Draft CR to TS 38.141-1 NRTC4 test configuration correction**

*Type: draftCR For: Endorsement  
 38.141-1 v15.9.0 CR- rev Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This is draft CR to TS 38.141-1 with proposal to correct test configuration NRTC4 description.

**Decision: Endorsed.**

**R4-2113497 Draft CR to TS 38.141-1 NRTC4 test configuration correction**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This is draft CR to TS 38.141-1 with proposal to correct test configuration NRTC4 description.

**Decision: Endorsed.**

**R4-2113498 Draft CR to TS 38.141-1 NRTC4 test configuration correction**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This is draft CR to TS 38.141-1 with proposal to correct test configuration NRTC4 description.

**Decision: Endorsed.**

##### 5.1.5.3 Radiated conformance testing (38.141-2)

**Topic #2: FR2 OBUE Cat B requirement table note clarification**

**R4-2112773 Draft CR to 38.141-2: BS FR2 OBUE Cat B requirement table note clarification (6.7.4.5.2)**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Endorsed.**

**R4-2112774 Draft CR to 38.141-2: BS FR2 OBUE Cat B requirement table note clarification (6.7.4.5.2)**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Endorsed.**

**R4-2112775 Draft CR to 38.141-2: BS FR2 OBUE Cat B requirement table note clarification (6.7.4.5.2)**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Endorsed.**

**Topic #4: OTA transmitter intermodulation**

**R4-2113080 OTA transmitter intermodulation 38.141 R15**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2115655 (from R4-2113080).**

**R4-2115655 OTA transmitter intermodulation 38.141 R15**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113081 OTA transmitter intermodulation 38.141 R16**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113082 OTA transmitter intermodulation 38.141 R17**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113086 OTA transmitter intermodulation 37.145-2 R15**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2115656 (from R4-2113086).**

**R4-2115656 OTA transmitter intermodulation 37.145-2 R15**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113087 OTA transmitter intermodulation 37.145-2 R16**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113088 OTA transmitter intermodulation 37.145-2 R17**

*Type: draftCR For: Endorsement  
 37.145-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**Topic #1: OTA measurement system set-up**

**R4-2113111 draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: (Rel-15)  
  
 Source: CAICT, Rohde & Schwarz*

**Abstract:**

Abbreviation on Plane Wave Synthesizer added, and PWS chamber added to the corresponding annex E clauses on any suitable OTA chamber. (Rel-15)

**Decision: Revised to R4-2115814 (from R4-2113111).**

**R4-2115814 draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: (Rel-15)  
  
 Source: CAICT, Rohde & Schwarz*

**Abstract:**

Abbreviation on Plane Wave Synthesizer added, and PWS chamber added to the corresponding annex E clauses on any suitable OTA chamber. (Rel-15)

**Decision: Revised to R4-2115823 (from R4-2115814).**

**R4-2115823 draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: (Rel-15)  
  
 Source: CAICT, Rohde & Schwarz*

**Abstract:**

Abbreviation on Plane Wave Synthesizer added, and PWS chamber added to the corresponding annex E clauses on any suitable OTA chamber. (Rel-15)

**Decision: Endorsed.**

**R4-2113185 draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: (Rel-16)  
  
 Source: CAICT, Rohde & Schwarz*

**Abstract:**

Abbreviation on Plane Wave Synthesizer added, and PWS chamber added to the corresponding annex E clauses on any suitable OTA chamber. (Rel-16)

**Decision: Revised to R4-2115815 (from R4-2113185).**

**R4-2115815 draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: (Rel-16)  
  
 Source: CAICT, Rohde & Schwarz*

**Abstract:**

Abbreviation on Plane Wave Synthesizer added, and PWS chamber added to the corresponding annex E clauses on any suitable OTA chamber. (Rel-16)

**Decision: Endorsed.**

**R4-2113186 draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: (Rel-17)  
  
 Source: CAICT, Rohde & Schwarz*

**Abstract:**

Abbreviation on Plane Wave Synthesizer added, and PWS chamber added to the corresponding annex E clauses on any suitable OTA chamber. (Rel-17)

**Decision: Revised to R4-2115816 (from R4-2113186).**

**R4-2115816 draftCR to 38.141-2: Addition of Plane Wave Synthesizer in OTA measurement system set-up**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: (Rel-17)  
  
 Source: CAICT, Rohde & Schwarz*

**Abstract:**

Abbreviation on Plane Wave Synthesizer added, and PWS chamber added to the corresponding annex E clauses on any suitable OTA chamber. (Rel-17)

**Decision: Endorsed.**

**Topic #7: TS 38.141-2 test configuration corrections**

**R4-2113499 Draft CR to TS 38.141-2 test configuration corrections**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This is draft CR to TS 38.141-2 with proposal to correct in OTA test specification naming of test configurations and NRTC4 details description.

**Decision: Revised to R4-2115657 (from R4-2113499).**

**R4-2115657 Draft CR to TS 38.141-2 test configuration corrections**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This is draft CR to TS 38.141-2 with proposal to correct in OTA test specification naming of test configurations and NRTC4 details description.

**Decision: Endorsed.**

**R4-2113500 Draft CR to TS 38.141-2 test configuration corrections**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This is draft CR to TS 38.141-2 with proposal to correct in OTA test specification naming of test configurations and NRTC4 details description.

**Decision: Endorsed.**

**R4-2113501 Draft CR to TS 38.141-2 test configuration corrections**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This is draft CR to TS 38.141-2 with proposal to correct in OTA test specification naming of test configurations and NRTC4 details description.

**Decision: Endorsed.**

##### 5.1.5.4 eAAS specifications maintenance

**Topic #3: Test configuration for NC operation**

**R4-2113071 Correction on the test configuration for NC operation 37.145-1 R15**

*Type: draftCR For: Endorsement  
 37.145-1 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Not pursued.**

**R4-2113072 Correction on the test configuration for NC operation 37.145-1 R16**

*Type: draftCR For: Endorsement  
 37.145-1 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Not pursued.**

**R4-2113073 Correction on the test configuration for NC operation 37.145-1 R17**

*Type: draftCR For: Endorsement  
 37.145-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Withdrawn.**

**R4-2113074 Correction on the test configuration for NC operation 37.145-2 R15**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Decision: Not pursued.**

**R4-2113075 Correction on the test configuration for NC operation 37.145-2 R16**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Not pursued.**

**R4-2113076 Correction on the test configuration for NC operation 37.145-2 R17**

*Type: draftCR For: Endorsement  
 37.145-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Withdrawn.**

**Topic #5: Array antenna model extension**

**R4-2113313 CR to TR 37.842: Addition of array antenna model extension in subclause 5.3.3**

*Type: CR For: Agreement  
 37.842 v13.3.0 CR-0017 rev Cat: F (Rel-13)  
  
 Source: Ericsson*

**Abstract:**

At last RAN4 meeting an extension of the antenna array model originally defined in TR 37.842 to support sub-arrays was agreed. The extension of the model and corresponding relevant model parameters was communicated to ITU-R WP 5D and CEPT in an LS (R4-210

**Decision: Not pursued.**

**Topic #8: additional spurious emission limits for bands 50, 51, 75, 76**

**R4-2113987 TS 37.105: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.105 v15.13.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Revised to R4-2115658 (from R4-2113987).**

**R4-2115658 TS 37.105: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.105 v15.13.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113988 TS 37.105: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.105 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113989 TS 37.105: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.105 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113990 TS 37.145-1: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.145-1 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113991 TS 37.145-1: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.145-1 v16.7.0 CR- rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113992 TS 37.145-1: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.145-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113993 TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113994 TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113995 TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76**

*Type: draftCR For: Endorsement  
 37.145-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Correction of the additional unwanted emission limit as it is not aligned with core specifications

**Decision: Endorsed.**

**R4-2113996 TS 37.145-1: Clarifications and corrections on extreme test environment**

*Type: draftCR For: Endorsement  
 37.145-1 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Clarifications and corrections on extreme test environment, aligning with 38.141-1

**Decision: Revised to R4-2115659 (from R4-2113996).**

**R4-2115659 TS 37.145-1: Clarifications and corrections on extreme test environment**

*Type: draftCR For: Endorsement  
 37.145-1 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Clarifications and corrections on extreme test environment, aligning with 38.141-1

**Decision: Endorsed.**

**R4-2113997 TS 37.145-1: Clarifications and corrections on extreme test environment**

*Type: draftCR For: Endorsement  
 37.145-1 v16.7.0 CR- rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Clarifications and corrections on extreme test environment, aligning with 38.141-1

**Decision: Endorsed.**

**R4-2113998 TS 37.145-1: Clarifications and corrections on extreme test environment**

*Type: draftCR For: Endorsement  
 37.145-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Clarifications and corrections on extreme test environment, aligning with 38.141-1

**Decision: Endorsed.**

**R4-2113999 TS 37.145-2: Clarifications and corrections on extreme test environment**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Clarifications and corrections on extreme test environment, aligning with 38.141-2

**Decision: Revised to R4-2115660 (from R4-2113999).**

**R4-2115660 TS 37.145-2: Clarifications and corrections on extreme test environment**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Clarifications and corrections on extreme test environment, aligning with 38.141-2

**Decision: Endorsed.**

**R4-2114000 TS 37.145-2: Clarifications and corrections on extreme test environment**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Clarifications and corrections on extreme test environment, aligning with 38.141-2

**Decision: Endorsed.**

**R4-2114001 TS 37.145-2: Clarifications and corrections on extreme test environment**

*Type: draftCR For: Endorsement  
 37.145-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Clarifications and corrections on extreme test environment, aligning with 38.141-2

**Decision: Endorsed.**

**Topic #10: OBUE table header corrections**

**R4-2114402 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-15**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

During RAN4#98-e meeting, OBUE tables were corrected for the MSR and AAS specifications in a series of CRs (in particular Rel-15 CRs to TS 37.145-2 in R4-2103792 and R4-2103887). In this CR, additional OBUE table header corrections are provided to correct

**Decision: Revised to R4-2115661 (from R4-2114402).**

**R4-2115661 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-15**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, Nokia*

**Abstract:**

During RAN4#98-e meeting, OBUE tables were corrected for the MSR and AAS specifications in a series of CRs (in particular Rel-15 CRs to TS 37.145-2 in R4-2103792 and R4-2103887). In this CR, additional OBUE table header corrections are provided to correct

**Decision: Endorsed.**

**R4-2114403 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-16**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

During RAN4#98-e meeting, OBUE tables were corrected for the MSR and AAS specifications in a series of CRs (in particular Rel-16 CRs to TS 37.145-2 in R4-2102427 and R4-2103784). In this CR, additional OBUE table header corrections are provided to correct

**Decision: Revised to R4-2115662 (from R4-2114403).**

**R4-2115662 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-16**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,Nokia*

**Abstract:**

During RAN4#98-e meeting, OBUE tables were corrected for the MSR and AAS specifications in a series of CRs (in particular Rel-16 CRs to TS 37.145-2 in R4-2102427 and R4-2103784). In this CR, additional OBUE table header corrections are provided to correct

**Decision: Approved.**

**R4-2114404 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-17**

*Type: draftCR For: Endorsement  
 37.145-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei,Nokia*

**Abstract:**

During RAN4#98-e meeting, OBUE tables were corrected for the MSR and AAS specifications in a series of CRs (in particular Rel-17 CRs to TS 37.145-2 in R4-2102428 and R4-2102568). In this CR, additional OBUE table header corrections are provided to correct

**Decision: Approved.**

#### 5.1.6 BS EMC requirements Maintenance

**Refer to Email discussion summary of [100-e][303] NR\_EMC, AI 5.1.3,5.1.6,6.1.2.5,9.5.4– Wubin Zhou**

**Sub-topic 2-1: MU value for the effective radiated RF power measurements**

**R4-2112768 Discuss on EMC measurement uncertainty for radiated emission**

*Type: discussion For: Approval  
 Source: ZTE Corporation*

**Abstract:**

In this contribution, we give some discussion on the EMC measurement uncertainty.

**Decision: Noted.**

**R4-2112770 CR to TS 38.113: Radiated emission measurement uncertainty(R15)**

*Type: CR For: Agreement  
 38.113 v15.14.0 CR-0041 rev Cat: F (Rel-15)  
  
 Source: ZTE Corporation*

**Abstract:**

Add the uncertainty of radiation emission above 12.75 GHz.

The maximum measurement frequency of radiated emission is limited to 26 GHz.

**Decision: Not pursued.**

**R4-2112772 CR to TS 38.113: Radiated emission measurement uncertainty(R16)**

*Type: CR For: Agreement  
 38.113 v16.4.0 CR-0042 rev Cat: A (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Withdrawn.**

**R4-2113187 CR to TS 38.113 on Spatial Exclusion description, Release 15**

*Type: draftCR For: Endorsement  
 38.113 v15.14.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

CR updating Spatial Exclusion description in TS 38.113 Rel 15

**Decision: Revised to R4-2115665 (from R4-2113187).**

**R4-2115665 CR to TS 38.113 on Spatial Exclusion description, Release 15**

*Type: draftCR For: Endorsement  
 38.113 v15.14.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

CR updating Spatial Exclusion description in TS 38.113 Rel 15

**Decision: Endorsed.**

**R4-2113188 CR to TS 38.113 on Spatial Exclusion description, Release 16**

*Type: draftCR For: Endorsement  
 38.113 v16.4.0 CR- rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR updating Spatial Exclusion description in TS 38.113 Rel 16

**Decision: Endorsed.**

#### 5.1.9 Demodulation and CSI requirements maintenance (38.101-4/38.104)

##### 5.1.9.1 UE demodulation requirements

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**Email discussion for [100-e][320] Demod\_Maintenance\_UE, AI 5.1.9.1, 5.1.9.2,5.2.2.4.1, 6.1.9.4.1, 6.1.3.3, 6.1.5.2– Manasa Raghavan**

**R4-2115610 Email discussion summary for [100-e][320] Demod\_Maintenance\_UE**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115792 (from R4-2115610).**

**R4-2115792 Email discussion summary for [100-e][320] Demod\_Maintenance\_UE**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2113125 | Draft CR on CSI reference measurement channels | Intel | Postponed |  |
| R4-2115668 | Draft CR on TS38.101-4 Correction of parameter configurations in Rel-15 | Ericsson | Endorsed |  |
| R4-2111893 | CR to RI reporting parameter settings | Anritsu | Endorsed |  |
| R4-2111896 | CR to reporting granularity for PMI TCs | Anritsu | Endorsed |  |
| R4-2111843 | Draft CR to Reference Channel Parameters in UE Category M1 | Anritsu | Endorsed |  |
| R4-2112957 | Draft CR FR1 EN-DC power imbalance requirements | DOCOMO | Endorsed |  |
| R4-2113773 | draft CR: Updates to PDSCH FRC in TS 38.101-4 for Rel-16 | Huawei | Endorsed |  |
| R4-2115669 | Draft CR for Abbreviations for V2X demodulation | LGE | Endorsed |  |
| R4-2115670 | Draft CR to 38.101-4 on Applicability for multi-TRxP test cases-R16 | Apple | Endorsed |  |
| R4-2115671 | Draft CR to 38.101-4: Correction of SNR levels for 0.001% BLER PDSCH requirement | Ericsson, Apple | Endorsed |  |
| R4-2115672 | CR to TS38.101-4 on URLLC requirements (Rel-16) | MediaTek | Endorsed |  |

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**Introduction of a new propagation definition**

**R4-2111874 Introduction of a new propagation definition**

*Type: draftCR For: Endorsement  
 38.101-4 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Anritsu Corporation*

**Abstract:**

Added TDLA30-70Hz to Table B.2.2-1.

**Decision: Not pursued.**

**R4-2111875 Introduction of a new propagation definition**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: A (Rel-16)  
  
 Source: Anritsu Corporation*

**Abstract:**

Added TDLA30-70Hz to Table B.2.2-1.

**Decision: Withdrawn.**

**R4-2111876 Introduction of a new propagation definition**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Anritsu Corporation*

**Abstract:**

Added TDLA30-70Hz to Table B.2.2-1.

**Decision: Withdrawn.**

**Sub-topic 1-1 TDD UL-DL pattern alignment for intra-band EN-DC performance TC**

**R4-2111892 TDD UL-DL pattern alignment for intra-band EN-DC performance TC**

*Type: discussion For: Endorsement  
 Source: Anritsu Corporation*

**Abstract:**

In this contribution we raised the issue with a UL/DL configuration alignment between LTE and NR for TDD intra-band EN-DC UE.

**Decision: Noted.**

##### 5.1.9.2 CSI requirements

**Correction on RI reporting parameters**

**R4-2111893 CR to RI reporting parameter settings**

*Type: draftCR For: Endorsement  
 38.101-4 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Anritsu Corporation*

**Abstract:**

Typo with CSI-IM resource type. Periodic -> Aperiodic.

**Decision: Endorsed.**

**R4-2111894 CR to RI reporting parameter settings**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: A (Rel-16)  
  
 Source: Anritsu Corporation*

**Abstract:**

Typo with CSI-IM resource type. Periodic -> Aperiodic.

**Decision: Endorsed.**

**R4-2111895 CR to RI reporting parameter settings**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Anritsu Corporation*

**Abstract:**

Typo with CSI-IM resource type. Periodic -> Aperiodic.

**Decision: Endorsed.**

**Correction for PMI TCs**

**R4-2111896 CR to reporting granularity for PMI TCs**

*Type: draftCR For: Endorsement  
 38.101-4 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Anritsu Corporation*

**Abstract:**

PDSCH & PDSCH DMRS Precoding configuration for ramdom Precoding are added to test parameters in PMI TCs.

**Decision: Endorsed.**

**R4-2111897 CR to reporting granularity for PMI TCs**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: A (Rel-16)  
  
 Source: Anritsu Corporation*

**Abstract:**

PDSCH & PDSCH DMRS Precoding configuration for ramdom Precoding are added to test parameters in PMI TCs.

**Decision: Endorsed.**

**R4-2111898 CR to reporting granularity for PMI TCs**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Anritsu Corporation*

**Abstract:**

PDSCH & PDSCH DMRS Precoding configuration for ramdom Precoding are added to test parameters in PMI TCs.

**Decision: Endorsed.**

**Correction on CSI measurement channel**

**R4-2113125 Draft CR on CSI reference measurement channels**

*Type: draftCR For: Endorsement  
 38.101-4 v15.10.0 CR- rev Cat: (Rel-15)  
  
 Source: Intel Corporation*

**Decision: Postponed.**

**R4-2113126 Draft CR on CSI reference measurement channels**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: (Rel-16)  
  
 Source: Intel Corporation*

**Decision: Withdrawn.**

**R4-2113127 Draft CR on CSI reference measurement channels**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Withdrawn.**

**Other corrections**

**R4-2113624 draftCR on TS38.101-4 Correction of parameter configurations in Rel-15**

*Type: draftCR For: Endorsement  
 38.101-4 v15.10.0 CR- rev Cat: (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correct parameter configurations in CQI test cases and correct formula for PMI test

**Decision: Revised to R4-2115668 (from R4-2113624).**

**R4-2115668 draftCR on TS38.101-4 Correction of parameter configurations in Rel-15**

*Type: draftCR For: Endorsement  
 38.101-4 v15.10.0 CR- rev Cat: (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correct parameter configurations in CQI test cases and correct formula for PMI test

**Decision: Endorsed.**

**R4-2113625 draftCR on TS38.101-4 Correction of parameter configurations in Rel-16**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correct parameter configurations in CQI test cases and correct formula for PMI test

**Decision: Endorsed.**

**R4-2113626 draftCR on TS38.101-4 Correction of parameter configurations in Rel-17**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Correct parameter configurations in CQI test cases and correct formula for PMI test

**Decision: Endorsed.**

##### 5.1.9.3 BS demodulation requirements

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**Email discussion for [100-e][319] Demod\_Maintenance\_BS, AI 5.1.9.3, 6.1.9.4.3, 6.1.10.4 – Aijun Cao**

**R4-2115609 Email discussion summary for [100-e][319] Demod\_Maintenance\_BS**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115791 (from R4-2115609).**

**R4-2115791 Email discussion summary for [100-e][319] Demod\_Maintenance\_BS**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision | Comments |
| [R4-2112691](javascript:void(0);) | Draft CR to 38.141-2: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A | ROHDE & SCHWARZ | Endorsed |  |
| [R4-2112653](javascript:void(0);) | Draft CR to 38.141-1: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A | ROHDE & SCHWARZ | Endorsed |  |
| [R4-2113757](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113757.zip) | draftCR: UCI overhead for channel bits calculation in PUSCH FRC in TS 38.141-1 (Rel-15) | Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung | Endorsed |  |
| [R4-2112835](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112835.zip) | Draft CR to 38.141-1: BS UL TA test condition AWGN level correction (8.2.5) | Keysight Technologies UK Ltd | Endorsed |  |
| R4-2115682 | Draft CR to 38.104: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A (Rel-16) | ROHDE & SCHWARZ | *Endorsed* |  |
| R4-2115683 | Draft CR to 38.104: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A (Rel-17) | ROHDE & SCHWARZ | *Endorsed.* |  |
| [R4-2115673](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2111970.zip) | CR for TS 38.104:On NR PUSCH UL TA performance requirement(Rel-16) | CATT | Endorsed |  |
| [R4-2115674](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112325.zip) | CR to TS 38.104 Update on UL timing adjustment performance requirements | ZTE Wistron Telecom AB | Endorsed |  |
| [R4-2115675](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112398.zip) | draft CR for 38.104 R16 channel model name correction | Ericsson | Endorsed |  |
| [R4-2113367](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113367.zip) | Draft CR to 37.145-2: Correction of AWGN level description for performance requirements | Ericsson, Nokia, Nokia Shanghai Bell | Not pursued merged to R4-2114406  R4-2115676 withdrawn |  |
| [R4-2115677](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113628.zip) | draftCR 38104 FR2 PUCCH format 2 intraSlot frequency hopping correction for one and two symbols cases | Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, Ericsson | Endorsed |  |
| [R4-2115678](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113754.zip) | draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.104 (Rel-15) | Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung | Endorsed |  |
| [R4-2115679](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113755.zip) | draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.104 (Rel-16) | Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung | Endorsed |  |
| [R4-2115680](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113760.zip) | draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.141-2 (Rel-15) | Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung | Endorsed |  |
| [R4-2115681](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113761.zip) | draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.141-2 (Rel-16) | Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung | Endorsed |  |
| [R4-2114405](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114405.zip) | Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-15 | Huawei | Revised to R4-2115813 |  |
| [R4-2115813](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114405.zip) | Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-15 | Huawei | Endorsed |  |

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**Corrections on PUSCH FRC**

**R4-2113754 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.104 (Rel-15)**

*Type: draftCR For: Endorsement  
 38.104 v15.14.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Revised to R4-2115678 (from R4-2113754).**

**R4-2115678 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.104 (Rel-15)**

*Type: draftCR For: Endorsement  
 38.104 v15.14.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**R4-2113755 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.104 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Revised to R4-2115679 (from R4-2113755).**

**R4-2115679 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.104 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**R4-2113756 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC TS 38.104 (Rel-17)**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**R4-2113757 draftCR: UCI overhead for channel bits calculation in PUSCH FRC in TS 38.141-1 (Rel-15)**

*Type: draftCR For: Endorsement  
 38.141-1 v15.9.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**R4-2113758 draftCR: UCI overhead for channel bits calculation in PUSCH FRC in TS 38.141-1 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**R4-2113759 draftCR: UCI overhead for channel bits calculation in PUSCH FRC in TS 38.141-1 (Rel-17)**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**R4-2113760 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.141-2 (Rel-15)**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Revised to R4-2115680 (from R4-2113760).**

**R4-2115680 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.141-2 (Rel-15)**

*Type: draftCR For: Endorsement  
 38.141-2 v15.10.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**R4-2113761 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.141-2 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Revised to R4-2115681 (from R4-2113761).**

**R4-2115681 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.141-2 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**R4-2113762 draftCR: UCI and PTRS overhead for channel bits calculation in PUSCH FRC in TS 38.141-2 (Rel-17)**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon, Nokia, Nokia Shanghai Bell, Samsung*

**Decision: Endorsed.**

**AWGN Noise level for BS demodulation**

**R4-2114405 Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-15**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

TBD value (and [] brackets) for the AWGN power level at the BS inputs is resolved for the NR radiated performance requirements.

**Decision: Revised to R4-2115813 (from R4-2114405).**

**R4-2115813 Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-15**

*Type: draftCR For: Endorsement  
 37.145-2 v15.11.0 CR- rev Cat: F (Rel-15)  
  
 Source: Huawei, Ericsson, Nokia, Nokia Shanghai Bell*

**Abstract:**

TBD value (and [] brackets) for the AWGN power level at the BS inputs is resolved for the NR radiated performance requirements.

**Decision: Endorsed.**

**R4-2114406 Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-16**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: A (Rel-16)  
  
 Source: Huawei, Ericsson, Nokia, Nokia Shanghai Bell*

**Abstract:**

TBD value (and [] brackets) for the AWGN power level at the BS inputs is resolved for the NR radiated performance requirements.

**Decision: Endorsed.**

**R4-2114407 Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-17**

*Type: draftCR For: Endorsement  
 37.145-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei, Ericsson, Nokia, Nokia Shanghai Bell*

**Abstract:**

TBD value (and [] brackets) for the AWGN power level at the BS inputs is resolved for the NR radiated performance requirements.

**Decision: Endorsed.**

#### 5.1.11 Testability Maintenance (38.810)

### 5.2 LTE maintenance (up to Rel-15)

#### 5.2.2 Other WIs or R16 TEI

##### 5.2.2.1 BS RF requirements

**Correction In-band blocking for multi-band Base Stations**

**R4-2112294 Draft CR to 36.104: Correction In-band blocking for multi-band Base Stations**

*Type: draftCR For: Endorsement  
 36.104 v15.12.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The table notes in the In-band blocking tables for E-UTRA with NB-IoT in-band/guard band operation are updated to include both the missing update from 2016 and the recent clarification from RAN4#99e.

**Decision: Endorsed.**

**R4-2112295 Draft CR to 36.104: Correction In-band blocking for multi-band Base Stations**

*Type: draftCR For: Endorsement  
 36.104 v16.10.0 CR- rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The table notes in the In-band blocking tables for E-UTRA with NB-IoT in-band/guard band operation are updated to include both the missing update from 2016 and the recent clarification from RAN4#99e.

**Decision: Endorsed.**

**R4-2112296 Draft CR to 36.104: Correction In-band blocking for multi-band Base Stations**

*Type: draftCR For: Endorsement  
 36.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The table notes in the In-band blocking tables for E-UTRA with NB-IoT in-band/guard band operation are updated to include both the missing update from 2016 and the recent clarification from RAN4#99e.

**Decision: Endorsed.**

**R4-2112297 Draft CR to 36.141: Correction In-band blocking for multi-band Base Stations**

*Type: draftCR For: Endorsement  
 36.141 v15.13.0 CR- rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The table notes in the In-band blocking tables for E-UTRA with NB-IoT in-band/guard band operation are updated to include both the missing update from 2016 and the recent clarification from RAN4#99e.

**Decision: Endorsed.**

**R4-2112298 Draft CR to 36.141: Correction In-band blocking for multi-band Base Stations**

*Type: draftCR For: Endorsement  
 36.141 v16.10.0 CR- rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The table notes in the In-band blocking tables for E-UTRA with NB-IoT in-band/guard band operation are updated to include both the missing update from 2016 and the recent clarification from RAN4#99e.

**Decision: Endorsed.**

**R4-2112299 Draft CR to 36.141: Correction In-band blocking for multi-band Base Stations**

*Type: draftCR For: Endorsement  
 36.141 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The table notes in the In-band blocking tables for E-UTRA with NB-IoT in-band/guard band operation are updated to include both the missing update from 2016 and the recent clarification from RAN4#99e.

**Decision: Endorsed.**

##### 5.2.2.4 Demodulation and CSI requirements

**Refer to Email discussion summary of [100-e][320] Demod\_Maintenance\_UE, AI 5.1.9.1, 5.1.9.2,5.2.2.4.1, 6.1.9.4.1, 6.1.3.3, 6.1.5.2– Manasa Raghavan**

###### 5.2.2.4.1 UE demodulation requirements

**Correction on Reference channel for UE Cat M1**

**R4-2111843 Draft CR to Reference Channel Parameters in UE Category M1**

*Type: draftCR For: Endorsement  
 36.101 v15.15.0 CR- rev Cat: F (Rel-15)  
  
 Source: Anritsu Corporation*

**Abstract:**

Corrected Note 5 to fix an inconsistency of scheduling in Table A.3.3.2.1-4. Max t-put is also corrected accordingly.

**Decision: Endorsed.**

**R4-2111844 Draft CR to Reference Channel Parameters in UE Category M1**

*Type: draftCR For: Endorsement  
 36.101 v16.10.0 CR- rev Cat: A (Rel-16)  
  
 Source: Anritsu Corporation*

**Abstract:**

Corrected Note 5 to fix an inconsistency of scheduling in Table A.3.3.2.1-4. Max t-put is also corrected accordingly.

**Decision: Endorsed.**

**R4-2111845 Draft CR to Reference Channel Parameters in UE Category M1**

*Type: draftCR For: Endorsement  
 36.101 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Anritsu Corporation*

**Abstract:**

Corrected Note 5 to fix an inconsistency of scheduling in Table A.3.3.2.1-4. Max t-put is also corrected accordingly.

**Decision: Endorsed.**

###### 5.2.2.4.2 CSI requirements

###### 5.2.2.4.3 BS demodulation requirements

## 6 Rel-16 maintenance for both NR and LTE

### 6.1 NR maintenance

#### 6.1.1 NR-based access to unlicensed spectrum

##### 6.1.1.3 BS RF requirement

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**Email discussion for [100-e][304] NR\_unlic\_BSRF\_Maintenance**

**, AI 6.1.1.3, 6.1.1.4– Fei Xue**

**R4-2115595 Email discussion summary for [100-e][304] NR\_unlic\_BSRF\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115776 (from R4-2115595).**

**R4-2115776 Email discussion summary for [100-e][304] NR\_unlic\_BSRF\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2115684 | Maintenance CR to TS 38.104: NR-U BS RF requirements | ZTE | Endorsed |  |
| R4-2113941  (Cat A CR) | Maintenance CR to TS 38.104: NR-U BS RF requirements | ZTE | Endorsed |  |
| R4-2115812 | Draft CR to TS 38.141-1 – Test configuration for non-contiguous transmission testing for band n46 and n96 | Nokia | Endorsed |  |
| R4-2113493  (Cat A) | Draft CR to TS 38.141-1 – Test configuration for non-contiguous transmission testing for band n46 and n96 | Nokia | Endorsed |  |
| R4-2115685 | Maintenance CR to TS 38.141-1: NR-U BS conformance testing requirements | ZTE | Endorsed |  |
| R4-2113943  (Cat A) | Maintenance CR to TS 38.141-1: NR-U BS conformance testing requirements | ZTE | Endorsed |  |
| R4-2115686 | Maintenance CR to TS 38.141-2: NR-U BS conformance testing requirements | ZTE | Endorsed |  |
| R4-2113945  (Cat A) | Maintenance CR to TS 38.141-2: NR-U BS conformance testing requirements | ZTE | Endorsed |  |

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**Maintenance CR to TS 38.104**

**R4-2113940 Maintenance CR to TS 38.104: NR-U BS RF requirements**

*Type: CR For: Approval  
 38.104 v16.8.0 CR-0344 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Revised to R4-2115684 (from R4-2113940).**

**R4-2115684 Maintenance CR to TS 38.104: NR-U BS RF requirements**

*Type: CR For: Approval  
 38.104 v16.8.0 CR-0344 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Endorsed.**

**R4-2113941 Maintenance CR to TS 38.104: NR-U BS RF requirements**

*Type: CR For: Approval  
 38.104 v17.2.0 CR-0345 rev Cat: A (Rel-17)  
  
 Source: ZTE Corporation*

**Decision: Endorsed.**

##### 6.1.1.4 BS conformance testing

###### 6.1.1.4.1 Non-contiguous transmission testing

**Topic #2 NR-U non-contiguous transmission testing**

**R4-2113491 NR-U non-contiguous transmission testing for wideband operation**

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

**Abstract:**

In this contribution we provide our further considerations and proposal on non-contiguous transmission.

**Decision: Noted.**

**R4-2113938 Discussion on NR-U non-contiguous spectrum operation**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113492 Draft CR to TS 38.141-1 – Test configuration for non-contiguous transmission testing for band n46 and n96**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This CR introduces to 38.141-1 new test configuration for non-contiguous transmission testing for NR-U operation for bands n46 and n96.

**Decision: Revised to R4-2115812 (from R4-2113492).**

**R4-2115812 Draft CR to TS 38.141-1 – Test configuration for non-contiguous transmission testing for band n46 and n96**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This CR introduces to 38.141-1 new test configuration for non-contiguous transmission testing for NR-U operation for bands n46 and n96.

**Decision: Endorsed.**

**R4-2113493 Draft CR to TS 38.141-1 – Test configuration for non-contiguous transmission testing for band n46 and n96**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This CR introduces to 38.141-1 new test configuration for non-contiguous transmission testing for NR-U operation for bands n46 and n96.

**Decision: Endorsed.**

**R4-2113494 Draft CR to TS 38.141-2 – Test configuration for non-contiguous transmission testing for band n46 and n96**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This CR introduces to 38.141-2 new test configuration for non-contiguous transmission testing for NR-U operation for bands n46 and n96.

**Decision: Not pursued.**

**R4-2113495 Draft CR to TS 38.141-2 – Test configuration for non-contiguous transmission testing for band n46 and n96**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This CR introduces to 38.141-2 new test configuration for non-contiguous transmission testing for NR-U operation for bands n46 and n96.

**Decision: Withdrawn.**

**R4-2113942 Maintenance CR to TS 38.141-1: NR-U BS conformance testing requirements**

*Type: CR For: Approval  
 38.141-1 v16.8.0 CR-0242 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Revised to R4-2115685 (from R4-2113942).**

**R4-2115685 Maintenance CR to TS 38.141-1: NR-U BS conformance testing requirements**

*Type: CR For: Approval  
 38.141-1 v16.8.0 CR-0242 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Endorsed.**

**R4-2113943 Maintenance CR to TS 38.141-1: NR-U BS conformance testing requirements**

*Type: CR For: Approval  
 38.141-1 v17.2.0 CR-0243 rev Cat: A (Rel-17)  
  
 Source: ZTE Corporation*

**Decision: Endorsed.**

**R4-2113944 Maintenance CR to TS 38.141-2: NR-U BS conformance testing requirements**

*Type: CR For: Approval  
 38.141-2 v16.8.0 CR-0366 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Revised to R4-2115686 (from R4-2113944).**

**R4-2115686 Maintenance CR to TS 38.141-2: NR-U BS conformance testing requirements**

*Type: CR For: Approval  
 38.141-2 v16.8.0 CR-0366 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Endorsed.**

**R4-2113945 Maintenance CR to TS 38.141-2: NR-U BS conformance testing requirements**

*Type: CR For: Approval  
 38.141-2 v17.2.0 CR-0367 rev Cat: A (Rel-17)  
  
 Source: ZTE Corporation*

**Decision: Endorsed.**

###### 6.1.1.4.2 Others

**Topic #3: MU values for NR-U BS type 1-H**

**R4-2113939 Discussion on MU for EIRP/EIS in TS 38.141-2**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Approved.**

##### 6.1.1.7 Demodulation and CSI requirements (38.101-4/38.104)

###### 6.1.1.7.1 General

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**Email discussion for [100-e][321] NR\_unlic\_Demod\_Maintenance, AI 6.1.1.7– Pierpaolo Vallese**

**R4-2115611 Email discussion summary for [100-e][321] NR\_unlic\_Demod\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115793 (from R4-2115611).**

**R4-2115793 Email discussion summary for [100-e][321] NR\_unlic\_Demod\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW on Aug 19th**

**Issue 1-1-1: Downlink transmission duration values set for CQI Tests**

Motivation

R4-2112096 proposes to change the values in Table 6.2A.3.1.2-1, Table 6.2A.4.1.2-1 according to the following modification, aligning them to the values in the related test for NR unlicensed PCell:

|  |  |  |
| --- | --- | --- |
| Downlink transmission duration values set | slot | {4,6,7} |

R4-2112251 proposes to change the values in Table 6.2.3.1.2-1, Table 6.2.4.1.2-1 according to the following modification, aligning them to the values in the related test for NR PCell + NR unlicensed SCell:

|  |  |  |
| --- | --- | --- |
| Downlink transmission duration values set | slot | {3,4,6,7} |

Companies are encouraged to express their view on the changes proposed and express their support for one of the options

Proposals

* Option 1: Change Table 6.2A.3.1.2-1, Table 6.2A.4.1.2-1 and align the “Downlink transmission duration values set” for CQI tests to {4, 6, 7};
* Option 2: Change Table 6.2.3.1.2-1, Table 6.2.4.1.2-1 and align the “Downlink transmission duration values set” for CQI tests to {3,4, 6, 7};

Agreement: Option 1: Change Table 6.2A.3.1.2-1, Table 6.2A.4.1.2-1 and align the “Downlink transmission duration values set” for CQI tests to {4, 6, 7};

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2112400 | draft CR for 38.104 for NR-U PUCCH format 0 and 1 | Ericsson | Endorsed |  |
| R4-2113251 | DraftCR NR-U PRACH demodulation requirements 38.104 | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2113253 | DraftCR NR-U BS demod conducted performance requirements 38.141-1 | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2114182 | DraftCR on PDSCH Reference measurement channel for NR-U | Intel Corporation | Endorsed |  |
| R4-2115696 | Draft CR to 38.101-4 on CQI reporting requirements in Scenario A for NR-U-R16 | Apple | Endorsed |  |
| R4-2115697 | draftCR: Updates to NR-U CQI requirements for scenario C in TS 38.101-4 (Rel-16) | Huawei, HiSilicon | Endorsed |  |
| R4-2115698 | CR to TS38.101-4 on PDSCH requirements for standalone NR-U (Rel-16) | MediaTek inc. | Endorsed |  |
| R4-2115687 | Correction on PUCCH format2 and format3 performance requirement for TS 38.104 | Samsung | Endorsed |  |
| R4-2115688 | Correction on PUCCH format2 and format3 performance requirement for TS 38.141-1 | Samsung | Endorsed |  |
| R4-2115689 | Correction on PUCCH format2 and format3 performance requirement for TS 38.141-2 | Samsung | Endorsed |  |
| R4-2115690 | draft CR for 38.141-1 for NR-U PUCCH format 0 and 1 and CG-UCI multiplexing on PUSCH | Ericsson | Endorsed |  |
| R4-2115691 | draft CR for 38.141-2 for NR-U PUCCH format 0 and 1 | Ericsson | Endorsed |  |
| R4-2115692 | DraftCR NR-U BS demod radiated performance requirements 38.141-2 | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2115693 | draftCR: Updates to interlaced PUSCH related performance requirements in TS 38.104 (Rel-16) | Huawei, HiSilicon | Endorsed |  |
| R4-2115694 | draftCR: Updates to interlaced PUSCH performance requirements in TS 38.141-1 (Rel-16) | Huawei, HiSilicon | Endorsed |  |
| R4-2115695 | draftCR: Updates to interlaced PUSCH performance requirements in TS 38.141-2 (Rel-16) | Huawei, HiSilicon | Endorsed |  |

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**R4-2112251 draftCR for newly introduced NR-U UE Performance tests**

*Type: draftCR For: Discussion  
 38.101-4 v16.5.0 CR- rev Cat: (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Decision: Not pursued.**

###### 6.1.1.7.2 UE demodulation requirements

**Corrrections on PDSCH requirements**

**R4-2114035 CR to TS38.101-4 on PDSCH requirements for standalone NR-U (Rel-16)**

*Type: draftCR For: (not specified)  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2115698 (from R4-2114035).**

**R4-2115698 CR to TS38.101-4 on PDSCH requirements for standalone NR-U (Rel-16)**

*Type: draftCR For: (not specified)  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Endorsed.**

**R4-2114037 CR to TS38.101-4 on PDSCH requirements for standalone NR-U (Rel-17)**

*Type: draftCR For: (not specified)  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Endorsed.**

**Corrections on RMC**

**R4-2114182 DraftCR on PDSCH Reference measurement channel for NR-U**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Intel Corporation*

**Decision: Endorsed.**

**R4-2114183 DraftCR on PDSCH Reference measurement channel for NR-U**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Endorsed.**

###### 6.1.1.7.3 CSI requirements

**Corrections on CSI TCs**

**R4-2112096 Draft CR to 38.101-4 on CQI reporting requirements in Scenario A for NR-U-R16**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

**Decision: Revised to R4-2115696 (from R4-2112096).**

**R4-2115696 Draft CR to 38.101-4 on CQI reporting requirements in Scenario A for NR-U-R16**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

**Decision: Endorsed.**

**R4-2112097 Draft CR to 38.101-4 on CQI reporting requirements in Scenario A for NR-U-R17**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Apple*

**Decision: Endorsed.**

**R4-2113771 draftCR: Updates to NR-U CQI requirements for scenario C in TS 38.101-4 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Revised to R4-2115697 (from R4-2113771).**

**R4-2115697 draftCR: Updates to NR-U CQI requirements for scenario C in TS 38.101-4 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2113772 draftCR: Updates to NR-U CQI requirements for scenario C in TS 38.101-4 (Rel-17)**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

###### 6.1.1.7.4 BS demodulation requirements

**R4-2113250 NR-U discussion and simulation results**

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

**Decision: Noted.**

**R4-2113769 Updated simulation results for PUCCH format 3 for NR-U**

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

**Decision: Noted.**

**R4-2113770 Summary of simulation results for NR-U BS performance requirements**

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

**Decision: Noted.**

**Corrections on PUCCH format2 and format3 TCs**

**R4-2112036 Correction on PUCCH format2 and format3 performance requirement for TS 38.104**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Samsung*

**Decision: Revised to R4-2115687 (from R4-2112036).**

**R4-2115687 Correction on PUCCH format2 and format3 performance requirement for TS 38.104**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Samsung*

**Decision: Endorsed.**

**R4-2112037 Correction on PUCCH format2 and format3 performance requirement for TS 38.141-1**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Samsung*

**Decision: Revised to R4-2115688 (from R4-2112037).**

**R4-2115688 Correction on PUCCH format2 and format3 performance requirement for TS 38.141-1**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Samsung*

**Decision: Endorsed.**

**R4-2112038 Correction on PUCCH format2 and format3 performance requirement for TS 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Samsung*

**Decision: Revised to R4-2115689 (from R4-2112038).**

**R4-2115689 Correction on PUCCH format2 and format3 performance requirement for TS 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Samsung*

**Decision: Endorsed.**

**R4-2112039 Correction on PUCCH format2 and format3 performance requirement for TS 38.104**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Samsung*

**Decision: Endorsed.**

**R4-2112040 Correction on PUCCH format2 and format3 performance requirement for TS 38.141-1**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Samsung*

**Decision: Endorsed.**

**R4-2112041 Correction on PUCCH format2 and format3 performance requirement for TS 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Samsung*

**Decision: Endorsed.**

**Corrections on PUCCH format 0 and 1 TCs**

**R4-2112400 draft CR for 38.104 for NR-U PUCCH format 0 and 1**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Endorsed.**

**R4-2112401 draft CR for 38.141-1 for NR-U PUCCH format 0 and 1 and CG-UCI multiplexing on PUSCH**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Revised to R4-2115690 (from R4-2112401).**

**R4-2115690 draft CR for 38.141-1 for NR-U PUCCH format 0 and 1 and CG-UCI multiplexing on PUSCH**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Endorsed.**

**R4-2112402 draft CR for 38.141-2 for NR-U PUCCH format 0 and 1**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Revised to R4-2115691 (from R4-2112402).**

**R4-2115691 draft CR for 38.141-2 for NR-U PUCCH format 0 and 1**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Endorsed.**

**R4-2112404 draft CR for 38.104 for NR-U PUCCH format 0 and 1**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Endorsed.**

**R4-2112405 draft CR for 38.141-1 for NR-U PUCCH format 0 and 1 and CG-UCI multiplexing on PUSCH**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Endorsed.**

**R4-2112406 draft CR for 38.141-2 for NR-U PUCCH format 0 and 1**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Endorsed.**

**Corrections on PRACH requirements**

**R4-2113251 DraftCR NR-U PRACH demodulation requirements 38.104**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update final PRACH performance requirements

**Decision: Endorsed.**

**R4-2113252 DraftCR NR-U PRACH demodulation requirements 38.104**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update final PRACH performance requirements

**Decision: Endorsed.**

**R4-2113253 DraftCR NR-U BS demod conducted performance requirements 38.141-1**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update final PRACH performance requirements

**Decision: Endorsed.**

**R4-2113254 DraftCR NR-U BS demod conducted performance requirements 38.141-1**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update final PRACH performance requirements

**Decision: Endorsed.**

**R4-2113255 DraftCR NR-U BS demod radiated performance requirements 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update final PRACH performance requirements

**Decision: Revised to R4-2115692 (from R4-2113255).**

**R4-2115692 DraftCR NR-U BS demod radiated performance requirements 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update final PRACH performance requirements

**Decision: Endorsed.**

**R4-2113256 DraftCR NR-U BS demod radiated performance requirements 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Update final PRACH performance requirements

**Decision: Endorsed.**

**Corrections on interlaced PUSCH TCs**

**R4-2113763 draftCR: Updates to interlaced PUSCH related performance requirements in TS 38.104 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Revised to R4-2115693 (from R4-2113763).**

**R4-2115693 draftCR: Updates to interlaced PUSCH related performance requirements in TS 38.104 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2113764 draftCR: Updates to interlaced PUSCH related performance requirements in TS 38.104 (Rel-17)**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2113765 draftCR: Updates to interlaced PUSCH performance requirements in TS 38.141-1 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Revised to R4-2115694 (from R4-2113765).**

**R4-2115694 draftCR: Updates to interlaced PUSCH performance requirements in TS 38.141-1 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2113766 draftCR: Updates to interlaced PUSCH performance requirements in TS 38.141-1 (Rel-17)**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2113767 draftCR: Updates to interlaced PUSCH performance requirements in TS 38.141-2 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Revised to R4-2115695 (from R4-2113767).**

**R4-2115695 draftCR: Updates to interlaced PUSCH performance requirements in TS 38.141-2 (Rel-16)**

*Type: draftCR For: Endorsement  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2113768 draftCR: Updates to interlaced PUSCH performance requirements in TS 38.141-2 (Rel-17)**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**Big CRs?**

**R4-2112403 draft bigCR for 38.141-1 for NR-U BS demodulation**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Withdrawn.**

**R4-2112407 draft bigCR for 38.141-1 for NR-U BS demodulation**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

remove SNR brackets and correction

**Decision: Withdrawn.**

**R4-2113291 Big CR NR-U BS demod performance requirements on 38.141-2**

*Type: CR For: Approval  
 38.141-2 v16.8.0 CR-0363 rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Withdrawn.**

**R4-2113292 Big CR NR-U BS demod performance requirements on 38.141-2**

*Type: CR For: Approval  
 38.141-2 v17.2.0 CR-0364 rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Withdrawn.**

#### 6.1.2 Integrated Access and Backhaul for NR

##### 6.1.2.1 RF requirements

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**Email discussion for [100-e][306] NR\_IAB\_Maintenance\_Part2, AI 6.1.2.1,6.1.2.2.3, 6.1.2.2.4– Huiping Shan**

**R4-2115597 Email discussion summary for [100-e][306] NR\_IAB\_Maintenance\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115778 (from R4-2115597).**

**R4-2115778 Email discussion summary for [100-e][306] NR\_IAB\_Maintenance\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW On Aug24**

**Issue 1-1: Single RB with high PSD for test model**

* Proposals
  + Option 1: To add to test model for IAB single RB allocation with maufacture declared power boosting value for transmitter OBUE and spurious emission tests (Nokia R4-2112266)
  + Option 2: To not change current test models for IAB (Ericsson R4-2114324)

**Discussion:**

QC: How we can disable this case? PUCCH transmission case how to consider?

E///: We are referring the scenario with all the power in single RB. This is not valid scenario for IAB-MT.

Huawei: This is not typical usage scenario for IAB-MT.

Nokia: If more than 6 dB power boosting over single RB, then we observe the IM3 issue.

QC: We need to have test with single RB and power boosting.

E///: In previous agreed WF, this test point already ruled out and now we come back the test point proposal again.

Samsung: We still prefer keeping the current core requirements and conformance test cases as it is. We agree single RB can be deployed but not necessary as in channel edge. The situation of UE and IAB-MT is different.

E///: The PSD of IAB-MT should be similar as UE to parent IAB node. Not sure 6dB come from?

Nokia: 6dB come from the analysis in our paper. The channel allocation pending on deployment choice.

QC: It’s difficulty to control the allocation always not under channel edge. We can have a test case with single RB and reasonable power setting.

Huawei: IAB-MT focused on backhaul link. We are ok to capture in TR.

Agreement:

Keep in the TR: from existing RAN4 RF requirements aspect, there is no RAN4 RF requirements covering the scenario single PRB with high PSD transmission (certain level PSD power boosting compared to the full PRB allocation PSD).

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** |
| [R4-2114227](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114227.zip) | CR to TS 37.941 – Corrections | Huawei | Endorsed |
| [R4-2114320](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114320.zip) | CR on conducted performance amsungskin 38.176-1 – TX | Ericsson | Endorsed |
| [R4-2114322](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114322.zip) | CR on OTA performance amsungskin 38.176-2 –RX | Ericsson | Endorsed |
| [R4-2114323](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114323.zip) | CR on OTA performance amsungskin 38.176-2-general and TX | Ericsson | Endorsed |
| R4-2115699 | Draft CR to TS 38.176-2 with editorial updates | Nokia, Nokia Shaghai Bell | Endorsed |
| R4-2115700 | Draft CR to TS 38.176-2: Corrections to OTA emissions | Nokia, Nokia Shaghai Bell | Endorsed |
| R4-2115701 | Maintenance CR to TS 38.176-1 | ZTE Corporation | Endorsed |
| R4-2115702 | CR on conducted performance specification 38.176-1-others | Ericsson | Endorsed |
| R4-2115703 | CR on general chapter in TS 38.174 | Ericsson | Endorsed |
| R4-2115704 | Reply LS on power class and P-max for IAB-MT cell selection | CATT | Approved |

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**Sub-topic 1-1 LS response to RAN2 for P-max**

**R4-2115704 Reply LS on power class and P-max for IAB-MT cell selection**

*Type: LS out For: Approval*

*To: RAN2  
Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2111925 Draft reply LS on power class and P-max for IAB-MT cell selection**

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

**Decision: Noted.**

**R4-2113675 Draft reply LS to RAN2 on power class and P-max for IAB-MT cell selection**

*Type: LS out For: Approval  
 to RAN2  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2113946 Discussion on reply LS on power class and P-max for IAB-MT cell selection**

*Type: LS out For: Approval  
 to RAN2  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2114328 LS reply on power class and P-max for IAB-MT cell selection**

*Type: discussion For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we provide our LS response on the RAN2 LS.

**Decision: Noted.**

**CR on general part of TS 381.74**

**R4-2114319 CR on general chapter in TS 38.174**

*Type: draftCR For: Endorsement  
 38.174 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

add missing reference

**Decision: Revised to R4-2115703 (from R4-2114319).**

**R4-2115703 CR on general chapter in TS 38.174**

*Type: draftCR For: Endorsement  
 38.174 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

add missing reference

**Decision: Endorsed.**

##### 6.1.2.2 RF conformance testing

###### 6.1.2.2.1 General

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**Email discussion for [100-e][305] NR\_IAB\_Maintenance\_Part1, AI 6.1.2.2.1, 6.1.2.2.2– Golebiowski, Bartlomiej**

**R4-2115596 Email discussion summary for [100-e][305] NR\_IAB\_Maintenance\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115777 (from R4-2115596).**

**R4-2115777 Email discussion summary for [100-e][305] NR\_IAB\_Maintenance\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2112267 | Draft CR to TS 38.176-1: Addition of test model with single RB allocation for transmitter operating band unwanted emission and spurious emission tests | Nokia, Nokia Shanghai Bell | Not Pursued |  |
| R4-2113489 | Draft CR to TS 38.176-1 – alignment for test models acronyms | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2113490 | Draft CR to TS 38.176-2 – alignment for test models acronyms | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2112268 | Draft CR to TS 38.176-2: Addition of test model with single RB allocation for transmitter operating band unwanted emission and spurious emission tests. | Nokia, Nokia Shanghai Bell | Not Pursued |  |
| R4-2115705 | Maintenance CR to TS 38.176-2 | ZTE Corporation | Endorsed | Revision of R4-2114159 |
| R4-2115706 | Draft CR to TR 38.809: Test efficiency optimization | Nokia, Nokia Shanghai Bell | Endorsed | Revision of R4-2113677  *Title to be corrected in Chair notes, this is draft CR to TR, not to TS.* |
| R4-2115708 | Draft CR to TS 38.176-1: Test efficiency optimization | Nokia, Nokia Shanghai Bell | Endorsed | Revision of R4-2113678 |
| R4-2115707 | Draft CR to TS 38.176-2: Test efficiency optimization | Nokia, Nokia Shanghai Bell | Endorsed | Revision of R4-2113679 |
| R4-2114325 | IAB with Luant modem testing | Ericsson | Noted |  |
| R4-2114326 | CR on removal of Luant modem in conducted performance specification | Ericsson | Not Pursued |  |
| R4-2114327 | CR on removal of Luant modem in radiated performance specification | Ericsson | Not Pursued |  |

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**Issue 2-3: IAB with Luant modem testing**

**R4-2114325 IAB with Luant modem testing**

*Type: discussion For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view related to luant modem testing.

**Decision: Noted.**

**R4-2114326 CR on removal of Luant modem in conducted performance specification**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR to remove Luant modem from specification

**Decision: Not pursued.**

**R4-2114327 CR on removal of Luant modem in radiated performance specification**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR to remove Luant modem from specification

**Decision: Not pursued.**

**R4-2114159 Maintenance CR to TS 38.176-2**

*Type: CR For: Approval  
 38.176-2 v16.0.0 CR-0001 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Session Chair: Move to this AI from AI 6.1.2.2.4**

**Decision: Revised to R4-2115705 (from R4-2114159).**

**R4-2115705 Maintenance CR to TS 38.176-2**

*Type: CR For: Approval  
 38.176-2 v16.0.0 CR-0001 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Session Chair: Move to this AI from AI 6.1.2.2.4**

**Decision: Endorsed.**

###### 6.1.2.2.2 Common test issues for conducted and radiated conformance testing

6.1.2.2.2.1 Test Model with High PSD and narrow RBs allocation

**Topic #1: Single RB with high PSD for test model**

**R4-2112266 Proposal on single RB with high PSD test model for IAB**

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

**Abstract:**

In this contribution we further discuss details and provide a proposal for test configuration for IAB using single RB with high PSD allocation

**Decision: Noted.**

**R4-2114324 IAB with high PSD testing**

*Type: discussion For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view related to single PRB high PSD testing

**Decision: Noted.**

**CR**

**R4-2112267 Draft CR to TS 38.176-1: Addition of test model with single RB allocation for transmitter operating band unwanted emission and spurious emission tests**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Also use test model with single RB allocation with a higher PSD declared by the vendor for transmitter operating band unwanted emission and spurious emission tests.

**Decision: Not pursued.**

**R4-2112268 Draft CR to TS 38.176-2: Addition of test model with single RB allocation for transmitter operating band unwanted emission and spurious emission tests**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Also use test model with single RB allocation with a higher PSD declared by the vendor for transmitter operating band unwanted emission and spurious emission tests.

**Decision: Not pursued.**

6.1.2.2.2.2 MU clean-up

6.1.2.2.2.3 Others

**Issue 2-1: Alignment for test models acronyms used in IAB test specifications**

**R4-2113489 Draft CR to TS 38.176-1 – alignment for test models acronyms**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This draft CR introduces corrections to test model acronyms used for test models for some of the IAB tests.

**Decision: Endorsed.**

**R4-2113490 Draft CR to TS 38.176-2 – alignment for test models acronyms**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This draft CR introduces corrections to test model acronyms used for test models for some of the IAB tests.

**Decision: Endorsed.**

**Issue 2-2: Test efficiency optimization update**

**R4-2113676 On test efficiency optimization**

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

**Decision: Noted.**

**R4-2113677 Draft CR to TS 38.809: Test efficiency optimization**

*Type: draftCR For: Endorsement  
 38.809 v16.3.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Revised to R4-2115706 (from R4-2113677).**

**R4-2115706 Draft CR to TR 38.809: Test efficiency optimization**

*Type: draftCR For: Endorsement  
 38.809 v16.3.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Endorsed.**

**R4-2113679 Draft CR to TS 38.176-2: Test efficiency optimization**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

Session Chair Note: Move to this AI from AI 6.2.2.4

**Decision: Revised to R4-2115707 (from R4-2113679).**

**R4-2115707 Draft CR to TS 38.176-2: Test efficiency optimization**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Endorsed.**

**R4-2113678 Draft CR to TS 38.176-1: Test efficiency optimization**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

Session Chair Note: Move to this AI from AI 6.2.2.3

**Decision: Revised to R4-2115708 (from R4-2113678).**

**R4-2115708 Draft CR to TS 38.176-1: Test efficiency optimization**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Endorsed.**

###### 6.1.2.2.3 Conducted conformance testing

**Maintenance for 38.176-1**

**R4-2114158 Maintenance CR to TS 38.176-1**

*Type: CR For: Approval  
 38.176-1 v16.0.0 CR-0001 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Revised to R4-2115701 (from R4-2114158).**

**R4-2115701 Maintenance CR to TS 38.176-1**

*Type: CR For: Approval  
 38.176-1 v16.0.0 CR-0001 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Endorsed.**

**R4-2114227 CR to TS 37.941 - Corrections**

*Type: draftCR For: Agreement  
 38.176-1 v16.0.0 CR- rev Cat: (Rel-16)  
  
 Source: Huawei*

**Abstract:**

draft CR with corrections to the IAB conducted conformance TS

**Decision: Endorsed.**

**R4-2114320 CR on conducted performance specificaiton 38.176-1 - TX**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

further improvement on the 38.176-1 in TX part

**Decision: Endorsed.**

**R4-2114321 CR on conducted performance specificaiton 38.176-1-others**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

further improvement on the 38.176-1 in others

**Decision: Revised to R4-2115702 (from R4-2114321).**

**R4-2115702 CR on conducted performance specification 38.176-1-others**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

further improvement on the 38.176-1 in others

**Decision: Endorsed.**

###### 6.1.2.2.4 Radiated conformance testing

**Maintenance for 38.176-2**

**R4-2113502 Draft CR to TS 38.176-2 with editorial updates**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This draft CR introduces editorial corrections and updates to 38.176-2 specification excluding demodulation part in clause 8.

**Decision: Revised to R4-2115699 (from R4-2113502).**

**R4-2115699 Draft CR to TS 38.176-2 with editorial updates**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Abstract:**

This draft CR introduces editorial corrections and updates to 38.176-2 specification excluding demodulation part in clause 8.

**Decision: Endorsed.**

**R4-2113503 Draft CR to TS 38.176-2: Corrections to OTA emissions**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Decision: Revised to R4-2115700 (from R4-2113503).**

**R4-2115700 Draft CR to TS 38.176-2: Corrections to OTA emissions**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shaghai Bell*

**Decision: Endorsed.**

**R4-2114322 CR on OTA performance specificaiton 38.176-2 -RX**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

further improvement on the 38.176-2 in others

**Decision: Endorsed.**

**R4-2114323 CR on OTA performance specificaiton 38.176-2-general and TX**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

further improvement on the 38.176-2 in TX

**Decision: Endorsed.**

##### 6.1.2.5 EMC performance requirements

**Refer to Email discussion summary of [100-e][303] NR\_EMC, AI 5.1.3,5.1.6,6.1.2.5,9.5.4– Wubin Zhou**

**R4-2112739 CR to TS 38.175: IAB test configurations**

*Type: CR For: Agreement  
 38.175 v16.2.0 CR-0017 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

Add TS 38.176-1 and TS 38.176-2 into the references.

Add test configurations for IAB EMC test conditions.

Correct the editorial errors in clause 8 and clause 9.

**Decision: Revised to R4-2115666 (from R4-2112739).**

**R4-2115666 CR to TS 38.175: IAB test configurations**

*Type: CR For: Agreement  
 38.175 v16.2.0 CR-0017 rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

Add TS 38.176-1 and TS 38.176-2 into the references.

Add test configurations for IAB EMC test conditions.

Correct the editorial errors in clause 8 and clause 9.

**Decision: Endorsed.**

**R4-2113189 CR to TS 38.175 on IAB EMC performance requirements**

*Type: draftCR For: Endorsement  
 38.175 v16.2.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CR on performance criteria for IAB EMC

**Decision: Not pursued.**

**R4-2114408 Draft CR to TS 38.175: further extension of spatial exclusion considerations for EMC RI test for IAB, Rel-16**

*Type: draftCR For: Endorsement  
 38.175 v16.2.0 CR- rev Cat: B (Rel-16)  
  
 Source: Huawei*

**Abstract:**

This CR provides addittional text for the completion of the spatial exclusion feature in the IAB EMC specification.

**Decision: Revised to R4-2115667 (from R4-2114408).**

**R4-2115667 Draft CR to TS 38.175: further extension of spatial exclusion considerations for EMC RI test for IAB, Rel-16**

*Type: draftCR For: Endorsement  
 38.175 v16.2.0 CR- rev Cat: B (Rel-16)  
  
 Source: Huawei*

**Abstract:**

This CR provides addittional text for the completion of the spatial exclusion feature in the IAB EMC specification.

**Decision: Endorsed.**

##### 6.1.2.6 Demodulation and CSI requirements

**R4-2114031 Draft CR to TS 38.176-1: Correction of applicability rules for demodulation performance requirements**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2115768 (from R4-2114031).**

**R4-2115768 Draft CR to TS 38.176-1: Correction of applicability rules for demodulation performance requirements**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Intel Corporation*

**Decision: Endorsed.**

**R4-2114032 Draft CR to TS 38.176-2: Correction of applicability rules for demodulation performance requirements**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2115769 (from R4-2114032).**

**R4-2115769 Draft CR to TS 38.176-2: Correction of applicability rules for demodulation performance requirements**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Intel Corporation*

**Decision: Endorsed.**

###### 6.1.2.6.1 General

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**Email discussion for [100-e][322] NR\_IAB\_Demod\_Maintenance, AI 6.1.2.6– Axel Mueller**

**R4-2115612 Email discussion summary for [100-e][322] NR\_IAB\_Demod\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115794 (from R4-2115612).**

**R4-2115794 Email discussion summary for [100-e][322] NR\_IAB\_Demod\_Maintenance**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW on August 19th**

**Issue 2-2-1: Include UE/MT capability signalling in manufacturer’s declaration table (TS 38.176-1/2 section 4.6)**

* Proposals
  + Option 1 [Nokia, Ericsson]: Yes, include.
  + Option 2 []: No don’t include.

Discussion: We are fine to option 1, as well as for 2-2-3 with option 1.

Agreement: Option 1: Include

**Issue 2-2-2: Include declaration of PMI/RI testing in manufacturer’s declaration table (TS 38.176-1/2 section 4.6)**

* Proposals
  + Option 1 []: Yes, include.
  + Option 2 [Nokia, Ericsson]: No don’t include.

Dsicussion:

Intel: We are not sure who will decide the test for PMI and RI?

Nokia: The manufacture declaration designed for capability; which not match with the agreement with PMI and RI. Infra-vendors wil decide whether PMI, RI test applied.

Agreement: Option 2.

**Issue 2-2-3: Include the “Requirements applicability” tables from the UE test specs to the MT test specs. Replace “FDD” with “TDD”.**

* Proposals
  + Option 1 [Nokia]: Yes, include.
  + Option 2 [Nokia]: No don’t include.
  + Option 3: Using text instead of table.

Discussion:

Huawei: We don’t think this really necessary.

Intel: This is following RAN1/RAN2 design for IAB-MT, this has no impact on IAB with BS approach test.

Nokia: Both methods works.

Intel: In current IAB, no test applicable rule for mandatory feature with capability signalling.

Ercisson: This is for IAB-MT, we support to include this.

Further discuss how to capture the test applicability for features mandatory with capability signalling in the “applicability of requirements” sections.

**Issue 2-2-4: Include statement on optionality of RI/PMI testing in “applicability of requirements” sections**

* Proposals
  + Option 1 [Nokia, Ericsson]: Yes, include.
  + Option 2 []: No don’t include.

Agreement: Option 1.

**Issue 2-1-2: Synchronisation NOTE 2 text**

* Proposals
  + Option 1 []: RAN4 to add the synchronisation note as per prior agreement:   
    “In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal.”
  + Option 2 [Nokia]: RAN4 to add the synchronisation note as per prior agreement with the following change:   
    “In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal. The method of synchronization with the TE is left to test implementation.”
  + Option 2: Other options not precluded.

**Agreement:**

RAN4 to add the synchronisation note as per prior agreement with the following change:   
“In tests performed with signal generators, a synchronization signal may be provided between the IAB node and the signal generator, or a common (e.g., GNSS) source may be provided to both IAB node and the signal generator, to enable correct timing of the wanted signal. The method of synchronization with the TE is left to test implementation.”

**Conclusion after 1st round**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2115719 | WF on Rel-16 NR IAB demodulation requirements | Nokia, Nokia Shanghai Bell | Approved |  |
| R4-2115768 | Draft CR to TS 38.176-1: Correction of applicability rules for demodulation performance requirements | Intel Corporation | Endorsed |  |
| R4-2115769 | Draft CR to TS 38.176-2: Correction of applicability rules for demodulation performance requirements | Intel Corporation | Endorsed |  |
| R4-2115709 | draftCR to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix | Nokia Germany | Endorsed |  |
| R4-2115710 | Draft CR to 38.176-1: Antenna terminology | Ericsson | Endorsed |  |
| R4-2115711 | draftCR on IAB conducted conformance testing (Manufacturer declarations) to TS 38.176-1 | Huawei, HiSilicon | Endorsed |  |
| R4-2115712 | draftCR to TS 38.176-1 IAB-DU performance requirements | Nokia Germany | Endorsed |  |
| R4-2115713 | Draft CR to 38.176-1: IAB-MT applicability and declarations | Ericsson | Endorsed |  |
| R4-2115714 | Draft CR to 38.176-2: IAB-MT applicability and declarations | Ericsson | Endorsed |  |
| R4-2115715 | draftCR on IAB-MT conducted performance requirements (General and Demodulation) in TS 38.174 | Huawei, HiSilicon | Endorsed |  |
| R4-2115717 | draftCR on IAB-MT conducted conformance testing (CSI reporting and Interworking) to TS 38.176-1 | Huawei, HiSilicon | Endorsed |  |
| R4-2115716 | draftCR on IAB-MT radiated conformance testing (General and Demodulation) to TS 38.176-2 | Huawei, HiSilicon | Endorsed |  |
| R4-2115718 | draftCR to TS 38.174 IAB-MT CSI reporting radiated performance requirements | Nokia Germany | Endorsed |  |

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**R4-2115719 WF on Rel-16 NR IAB demodulation requirements**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**Sub-topic 1-1: 5MHz CBW**

**R4-2114544 On 5MHz CBW in the IAB Rel-16 Specifications**

*Type: discussion For: Discussion  
 Source: Nokia Germany*

**Abstract:**

The paper discussed a need for 5MHz CBW in IAB TSs.

**Decision: Noted.**

**Corrections on Appendix**

**R4-2112021 draftCR to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia Germany*

**Abstract:**

draftCR to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix

**Decision: Revised to R4-2115709 (from R4-2112021).**

**R4-2115709 draftCR to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia Germany*

**Abstract:**

draftCR to TS 38.176-2 IAB-DU performance requirements and parts of DU and MT appendix

**Decision: Endorsed.**

**Correction on Antenna terminology**

**R4-2113357 Draft CR to 38.176-1: Antenna terminology**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Corrects antenna connector term

**Decision: Revised to R4-2115710 (from R4-2113357).**

**R4-2115710 Draft CR to 38.176-1: Antenna terminology**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Corrects antenna connector term

**Decision: Endorsed.**

**Correction on Manufacture declaration**

**R4-2113802 draftCR on IAB conducted conformance testing (Manufacturer declarations) to TS 38.176-1**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2115711 (from R4-2113802).**

**R4-2115711 draftCR on IAB conducted conformance testing (Manufacturer declarations) to TS 38.176-1**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

###### 6.1.2.6.2 IAB-DU performance requirements

**R4-2114540 draftCR to TS 38.176-1 IAB-DU performance requirements**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia Germany*

**Decision: Revised to R4-2115712 (from R4-2114540).**

**R4-2115712 draftCR to TS 38.176-1 IAB-DU performance requirements**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia Germany*

**Decision: Endorsed.**

###### 6.1.2.6.3 IAB-MT performance requirements

**Sub-topic 2-1: Test setup for CSI reporting**

**R4-2113358 Declaration of IAB-MT optional features**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Proposals for remaining issue on declaration and applicability

**Decision: Noted.**

**R4-2114033 View on IAB-MT performance requirements applicability definition in conformance specifications**

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

**Decision: Noted.**

**R4-2114543 On IAB-MT Performance Requirements**

*Type: discussion For: Discussion  
 Source: Nokia Germany*

**Abstract:**

Discussion of several issues related to IAB demodulation and CSI reporting requirements left after the release of first TSs.

**Decision: Noted.**

**R4-2113355 Draft CR to 38.176-1: IAB-MT applicability and declarations**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Finalizes declaration and applicability rules

**Decision: Revised to R4-2115713 (from R4-2113355).**

**R4-2115713 Draft CR to 38.176-1: IAB-MT applicability and declarations**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Finalizes declaration and applicability rules

**Decision: Endorsed.**

**R4-2113356 Draft CR to 38.176-2: IAB-MT applicability and declarations**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Finalizes declaration and applicability rules

**Decision: Revised to R4-2115714 (from R4-2113356).**

**R4-2115714 Draft CR to 38.176-2: IAB-MT applicability and declarations**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Finalizes declaration and applicability rules

**Decision: Endorsed.**

**R4-2113800 draftCR on IAB-MT conducted performance requirements (General and Demodulation) in TS 38.174**

*Type: draftCR For: Endorsement  
 38.174 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2115715 (from R4-2113800).**

**R4-2115715 draftCR on IAB-MT conducted performance requirements (General and Demodulation) in TS 38.174**

*Type: draftCR For: Endorsement  
 38.174 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113801 draftCR on IAB-MT conducted conformance testing (CSI reporting and Interworking) to TS 38.176-1**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2115717 (from R4-2113801).**

**R4-2115717 draftCR on IAB-MT conducted conformance testing (CSI reporting and Interworking) to TS 38.176-1**

*Type: draftCR For: Endorsement  
 38.176-1 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2113803 draftCR on IAB-MT radiated conformance testing (General and Demodulation) to TS 38.176-2**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2115716 (from R4-2113803).**

**R4-2115716 draftCR on IAB-MT radiated conformance testing (General and Demodulation) to TS 38.176-2**

*Type: draftCR For: Endorsement  
 38.176-2 v16.0.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Endorsed.**

**R4-2114542 draftCR to TS 38.174 IAB-MT CSI reporting radiated performance requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia Germany*

**Decision: Revised to R4-2115718 (from R4-2114542).**

**R4-2115718 draftCR to TS 38.174 IAB-MT CSI reporting radiated performance requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia Germany*

**Decision: Endorsed.**

#### 6.1.3 5G V2X with NR sidelink

##### 6.1.3.3 Demodulation requirements (38.101-4)

###### 6.1.3.3.1 General

**Refer to Email discussion summary of [100-e][320] Demod\_Maintenance\_UE, AI 5.1.9.1, 5.1.9.2,5.2.2.4.1, 6.1.9.4.1, 6.1.3.3, 6.1.5.2– Manasa Raghavan**

**R4-2112668 Draft CR for Abbreviations for V2X demodulation**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: (Rel-16)  
  
 Source: LG Electronics Inc.*

**Decision: Revised to R4-2115669 (from R4-2112668).**

**R4-2115669 Draft CR for Abbreviations for V2X demodulation**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: (Rel-16)  
  
 Source: LG Electronics Inc.*

**Decision: Endorsed.**

**R4-2112671 Draft CR for Abbreviations for V2X demodulation**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: (Rel-17)  
  
 Source: LG Electronics Inc.*

**Decision: Endorsed.**

###### 6.1.3.3.2 Single link test

###### 6.1.3.3.3 Multiple link test

#### 6.1.5 Enhancements on MIMO for NR

##### 6.1.5.2 Others

**Refer to Email discussion summary of [100-e][320] Demod\_Maintenance\_UE, AI 5.1.9.1, 5.1.9.2,5.2.2.4.1, 6.1.9.4.1, 6.1.3.3, 6.1.5.2– Manasa Raghavan**

**Sub-topic 4-1 Applicability of requirements for multi-TRxP**

**R4-2112101 Draft CR to 38.101-4 on Applicability for multi-TRxP test cases-R16**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

Session Chair Note: Move to this AI from AI 6.1.5.1.3

**Decision: Revised to R4-2115670 (from R4-2112101).**

**R4-2115670 Draft CR to 38.101-4 on Applicability for multi-TRxP test cases-R16**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

**Decision: Endorsed.**

**R4-2112102 Draft CR to 38.101-4 on Applicability for multi-TRxP test cases-R17**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Apple*

Session Chair Note: Move to this AI from AI 6.1.5.1.3

**Decision: Endorsed.**

**R4-2112688 Discussion on applicability for multi-TRxP demodulation requirements**

*Type: discussion For: Discussion  
 Source: Apple*

Session Chair Note: Move to this AI from AI 6.1.5.1.3

**Decision: Noted.**

#### 6.1.9 Maintenance for other WIs

##### 6.1.9.1 BS RF requirements

**Relative calibration approach**

**R4-2113294 Applying relative calibration approach on BS OTA conformance testing**

*Type: discussion For: Agreement  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2112235 Relative calibration approach using reference receiver**

*Type: discussion For: Information  
 37.941 v CR- rev Cat: (Rel-16)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Noted.**

**R4-2112236 Draft CR to TR 37.941: Relative calibration approach**

*Type: draftCR For: Endorsement  
 37.941 v15.2.0 CR- rev Cat: F (Rel-15)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Not pursued.**

**R4-2112237 Draft CR to TR 37.941: Relative calibration approach**

*Type: draftCR For: Endorsement  
 37.941 v16.2.0 CR- rev Cat: A (Rel-16)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Withdrawn.**

**Clarification of power boosted NB-IoT RB placement**

**R4-2112269 Draft CR to TS 38.141-1: Clarification of power boosted NB-IoT RB placement**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Specify the FCC emission limits in US 3.45-3.55 GHz band as additional regional operating band unwanted emissions requirements for Band n77.

**Decision: Endorsed.**

**R4-2112270 Draft CR to TS 38.141-1: Clarification of power boosted NB-IoT RB placement**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Clarify that the power boosted NB-IoT RB shall be placed at the lower and upper edges of the BS RF bandwidth.

**Decision: Endorsed.**

**MSR band table update**

**R4-2112290 Draft CR to 37.104: MSR band table update**

*Type: draftCR For: Endorsement  
 37.104 v16.10.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The CR introduces revised band tables are introduced where the RAT support is described in separate columns for each RAT, which also reduces the number of table notes from 13 to 6.

**Decision: Revised to R4-2115650 (from R4-2112290).**

**R4-2115650 Draft CR to 37.104: MSR band table update**

*Type: draftCR For: Endorsement  
 37.104 v16.10.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The CR introduces revised band tables are introduced where the RAT support is described in separate columns for each RAT, which also reduces the number of table notes from 13 to 6.

**Decision: Endorsed.**

**R4-2112291 Draft CR to 37.104: MSR band table update**

*Type: draftCR For: Endorsement  
 37.104 v17.2.0 CR- rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR introduces revised band tables are introduced where the RAT support is described in separate columns for each RAT, which also reduces the number of table notes from 13 to 6.

**Decision: Endorsed.**

**R4-2112292 Draft CR to 37.141: MSR band table update**

*Type: draftCR For: Endorsement  
 37.141 v16.10.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The CR introduces revised band tables are introduced where the RAT support is described in separate columns for each RAT, which also reduces the number of table notes from 13 to 6.

**Decision: Revised to R4-2115651 (from R4-2112292).**

**R4-2115651 Draft CR to 37.141: MSR band table update**

*Type: draftCR For: Endorsement  
 37.141 v16.10.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The CR introduces revised band tables are introduced where the RAT support is described in separate columns for each RAT, which also reduces the number of table notes from 13 to 6.

**Decision: Endorsed.**

**R4-2112293 Draft CR to 37.141: MSR band table update**

*Type: draftCR For: Endorsement  
 37.141 v17.2.0 CR- rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR introduces revised band tables are introduced where the RAT support is described in separate columns for each RAT, which also reduces the number of table notes from 13 to 6.

**Decision: Endorsed.**

**FR2 Rx OOB test MU value Math correction**

**R4-2113030 about BS conformance test FR2 Rx out of band test MU calculation**

*Type: discussion For: Agreement  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2113028 Draft CR to 37.941: BS OTA test, FR2 Rx OOB test MU value Math correction (14.2.4, 17)**

*Type: draftCR For: Endorsement  
 37.941 v15.2.0 CR- rev Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Revised to R4-2115652 (from R4-2113028).**

**R4-2115652 Draft CR to 37.941: BS OTA test, FR2 Rx OOB test MU value Math correction (14.2.4, 17)**

*Type: draftCR For: Endorsement  
 37.941 v15.2.0 CR- rev Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Endorsed.**

**R4-2113029 Draft CR to 37.941: BS OTA test, FR2 Rx OOB test MU value Math correction (14.2.4, 17)**

*Type: draftCR For: Endorsement  
 37.941 v16.2.0 CR- rev Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Endorsed.**

**R4-2114398 Draft CR to TR 37.941: correction of the FR2 upper frequency (43.5 GHz), Rel-16**

*Type: draftCR For: Endorsement  
 37.941 v16.2.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

It was observed, that for the FR2 MU derivations, the upper frequency range was not captured correctly and does not consider band n259.

**Decision: Revised to R4-2115653 (from R4-2114398).**

**R4-2115653 Draft CR to TR 37.941: correction of the FR2 upper frequency (43.5 GHz), Rel-16**

*Type: draftCR For: Endorsement  
 37.941 v16.2.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

It was observed, that for the FR2 MU derivations, the upper frequency range was not captured correctly and does not consider band n259.

**Decision: Endorsed.**

**R4-2114399 Draft CR to TR 37.941: inputs on MU/TT derivation for 47 GHz (band n262), Rel-16**

*Type: draftCR For: Endorsement  
 37.941 v16.2.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Based on the work in NR\_47GHz\_Band-Perf, MU values for the band n262 (47.2 – 48.2 GHz) are added for TX requirements. The missing MU values for RX requirements are to be added, once agreed (possibly during the August RAN4 meeting).

**Decision: Revised to R4-2115636 (from R4-2114399).**

**R4-2115636 Draft CR to TR 37.941: inputs on MU/TT derivation for 47 GHz (band n262), Rel-16**

*Type: draftCR For: Endorsement  
 37.941 v16.2.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Based on the work in NR\_47GHz\_Band-Perf, MU values for the band n262 (47.2 – 48.2 GHz) are added for TX requirements. The missing MU values for RX requirements are to be added, once agreed (possibly during the August RAN4 meeting).

**Decision: Endorsed.**

##### 6.1.9.4 Demodulation and CSI requirements

###### 6.1.9.4.1 UE demodulation requirements

**Refer to Email discussion summary of [100-e][320] Demod\_Maintenance\_UE, AI 5.1.9.1, 5.1.9.2,5.2.2.4.1, 6.1.9.4.1, 6.1.3.3, 6.1.5.2– Manasa Raghavan**

**Correction to EN-DC power imbalance TCs**

**R4-2112957 draft CR FR1 EN-DC power imbalance requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Decision: Endorsed.**

**R4-2112958 draft CR FR1 EN-DC power imbalance requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: NTT DOCOMO, INC.*

**Decision: Endorsed.**

**Corrections to URLLC TCs**

**R4-2113369 Draft CR to 38.101-4: Correction of SNR levels for 0.001% BLER PDSCH requirement**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson, Apple*

**Abstract:**

Includes span margin in SNR levels

**Decision: Revised to R4-2115671 (from R4-2113369).**

**R4-2115671 Draft CR to 38.101-4: Correction of SNR levels for 0.001% BLER PDSCH requirement**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson, Apple*

**Abstract:**

Includes span margin in SNR levels

**Decision: Endorsed.**

**R4-2113370 Draft CR to 38.101-4: Correction of SNR levels for 0.001% BLER PDSCH requirement**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson, Apple*

**Abstract:**

Includes span margin in SNR levels

**Decision: Endorsed.**

**R4-2113773 draft CR: Updates to PDSCH FRC in TS 38.101-4 for Rel-16**

*Type: draftCR For: Endorsement  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2113774 draft CR: Updates to PDSCH FRC in TS 38.101-4 for Rel-17**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2114036 CR to TS38.101-4 on URLLC requirements (Rel-16)**

*Type: draftCR For: (not specified)  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2115672 (from R4-2114036).**

**R4-2115672 CR to TS38.101-4 on URLLC requirements (Rel-16)**

*Type: draftCR For: (not specified)  
 38.101-4 v16.5.0 CR- rev Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Endorsed.**

**R4-2114038 CR to TS38.101-4 on URLLC requirements (Rel-17)**

*Type: draftCR For: (not specified)  
 38.101-4 v17.1.0 CR- rev Cat: A (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Endorsed.**

###### 6.1.9.4.2 CSI requirements

###### 6.1.9.4.3 BS demodulation requirements

**Refer to Email discussion summary of [100-e][319] Demod\_Maintenance\_BS, AI 5.1.9.3, 6.1.9.4.3, 6.1.10.4 – Aijun Cao**

**Corrections on NR PUSCH UL TA TCs**

**R4-2111970 CR for TS 38.104:On NR PUSCH UL TA performance requirement(Rel-16)**

*Type: CR For: Agreement  
 38.104 v16.8.0 CR-0338 rev Cat: F (Rel-16)  
  
 Source: CATT*

**Decision: Revised to R4-2115673 (from R4-2111970).**

**R4-2115673 CR for TS 38.104:On NR PUSCH UL TA performance requirement(Rel-16)**

*Type: CR For: Agreement  
 38.104 v16.8.0 CR-0338 rev Cat: F (Rel-16)  
  
 Source: CATT*

**Decision: Endorsed.**

**R4-2111971 CR for TS 38.104:On NR PUSCH UL TA performance requirement(Rel-17)**

*Type: CR For: Agreement  
 38.104 v17.2.0 CR-0339 rev Cat: A (Rel-17)  
  
 Source: CATT*

**Decision: Not pursued.**

**R4-2112325 CR to TS 38.104 Update on UL timing adjustment performance requirements**

*Type: CR For: Approval  
 38.104 v17.2.0 CR-0340 rev Cat: A (Rel-17)  
  
 Source: ZTE Wistron Telecom AB*

**Decision: Revised to R4-2115674 (from R4-2112325).**

**R4-2115674 CR to TS 38.104 Update on UL timing adjustment performance requirements**

*Type: CR For: Approval  
 38.104 v17.2.0 CR-0340 rev Cat: A (Rel-17)  
  
 Source: ZTE Wistron Telecom AB*

**Decision: Endorsed.**

**R4-2112835 Draft CR to 38.141-1: BS UL TA test condition AWGN level correction (8.2.5)**

*Type: draftCR For: Endorsement  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Endorsed.**

**R4-2112836 Draft CR to 38.141-1: BS UL TA test condition AWGN level correction (8.2.5)**

*Type: draftCR For: Endorsement  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Endorsed.**

**Correction on Channel model name**

**R4-2112398 draft CR for 38.104 R16 channel model name correction**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

correction for channel model name

**Decision: Revised to R4-2115675 (from R4-2112398).**

**R4-2115675 draft CR for 38.104 R16 channel model name correction**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

correction for channel model name

**Decision: Endorsed.**

**R4-2112399 draft CR for 38.104 R17 channel model name correction**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

correction for channel model name

**Decision: Endorsed.**

**R4-2113367 Draft CR to 37.145-2: Correction of AWGN level description for performance requirements**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson, Nokia, Nokia Shanghai Bell*

**Abstract:**

Corrects unclear description of AWGN level

**Decision: Not pursued.**

**R4-2115676 Draft CR to 37.145-2: Correction of AWGN level description for performance requirements**

*Type: draftCR For: Endorsement  
 37.145-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson, Nokia, Nokia Shanghai Bell*

**Abstract:**

Corrects unclear description of AWGN level

**Decision: Withdrawn.**

**Correction on AWGN level description for performance**

**R4-2113368 Draft CR to 37.145-2: Correction of AWGN level description for performance requirements**

*Type: draftCR For: Endorsement  
 37.145-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Ericsson, Nokia, Nokia Shanghai Bell*

**Abstract:**

Corrects unclear description of AWGN level

**Decision: Withdrawn.**

**Correction on FRC tables**

**R4-2112519 Correction to FRC parameters table G-FR1-A4-29A**

*Type: discussion For: Agreement  
 38.141-1 v CR- rev Cat: (Rel-17)  
  
 Source: ROHDE & SCHWARZ*

**Abstract:**

Correction to FRC parameters for G-FR1-A4-29A

Session Chair Note: Move to this AI from AI 5.1.5.2

**Decision: Noted.**

**R4-2112653 Draft CR to 38.141-1: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A**

*Type: draftCR For: Approval  
 38.141-1 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: ROHDE & SCHWARZ*

**Abstract:**

Correcting FRC parameter table A.4-2A, G-FR1-A4-29A.

Code block CRC size, Number of code blocks- C, Code block size parameters are wrong, need to be corrected.

Session Chair Note: Move to this AI from AI 5.1.5.2

**Decision: Endorsed.**

**R4-2112732 Draft CR to 38.141-1: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A**

*Type: draftCR For: Approval  
 38.141-1 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: ROHDE & SCHWARZ*

**Abstract:**

Correcting FRC parameter table A.4-2A, G-FR1-A4-29A.

Code block CRC size, Number of code blocks- C, Code block size parameters are wrong, need to be corrected

Session Chair Note: Move to this AI from AI 5.1.5.3

**Decision: Endorsed.**

**R4-2112691 Draft CR to 38.141-2: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A**

*Type: draftCR For: Approval  
 38.141-2 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: ROHDE & SCHWARZ*

Session Chair Note: Move to this AI from AI 5.1.5.2

**Decision: Endorsed.**

**R4-2112761 Draft CR to 38.141-2: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A**

*Type: draftCR For: Approval  
 38.141-2 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: ROHDE & SCHWARZ*

Session Chair Note: Move to this AI from AI 5.1.5.3

**Decision: Endorsed.**

**R4-2115682 Draft CR to 38.104: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A (Rel-16)**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
  
 Source: ROHDE & SCHWARZ*

**Abstract:**

**Discussion:**

**Decision: Endorsed.**

**R4-2115683 Draft CR to 38.104: FRC table and parameter update for Table A.4-2A, G-FR1-A4-29A (Rel-17)**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
  
 Source: ROHDE & SCHWARZ*

**Abstract:**

**Discussion:**

**Decision: Endorsed.**

##### 6.1.9.5 NR MIMO OTA test methods (38.827)

**Refer to Email discussion summary of [100-e][331] NR\_MIMO\_OTA, AI 6.1.9.5, 9.1– Bozhi Li**

**R4-2112981 Draft CR to TR38.827:correct Positioning ambiguities**

*Type: draftCR For: Endorsement  
 38.827 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

**Decision: Revised to R4-2115760 (from R4-2112981).**

**R4-2115760 Draft CR to TR38.827:correct Positioning ambiguities**

*Type: draftCR For: Endorsement  
 38.827 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

**Decision: Endorsed.**

**R4-2112982 Draft CR to TR38.827:power validation**

*Type: draftCR For: Endorsement  
 38.827 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

**Decision: Revised to R4-2115761 (from R4-2112982).**

**R4-2115761 Draft CR to TR38.827:power validation**

*Type: draftCR For: Endorsement  
 38.827 v16.3.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

**Decision: Endorsed.**

#### 6.1.10 R16 TEI

##### 6.1.10.1 BS RF requirements

##### 6.1.10.4 Demodulation and CSI requirements

**Refer to Email discussion summary of [100-e][319] Demod\_Maintenance\_BS, AI 5.1.9.3, 6.1.9.4.3, 6.1.10.4 – Aijun Cao**

**Correction on FR2 PUCCH format 2 TCs**

**R4-2113628 draftCR 38104 FR2 PUCCH format 2 intraSlot frequency hopping correction for one and two symbols cases**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, Ericsson*

**Abstract:**

Specification mismatch between 38.104 V16/V17 and 38.104 V15/38.141-2. Intra-slot frequency hopping is set to “N/A” in Table 11.3.2.4.1.1-1, and to “enabled” in Table 11.3.2.4.2.1-1.

**Decision: Revised to R4-2115677 (from R4-2113628).**

**R4-2115677 draftCR 38104 FR2 PUCCH format 2 intraSlot frequency hopping correction for one and two symbols cases**

*Type: draftCR For: Endorsement  
 38.104 v16.8.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, Ericsson*

**Abstract:**

Specification mismatch between 38.104 V16/V17 and 38.104 V15/38.141-2. Intra-slot frequency hopping is set to “N/A” in Table 11.3.2.4.1.1-1, and to “enabled” in Table 11.3.2.4.2.1-1.

**Decision: Endorsed.**

**R4-2113629 draftCR 38104 FR2 PUCCH format 2 intraSlot frequency hopping correction for one and two symbols cases**

*Type: draftCR For: Endorsement  
 38.104 v17.2.0 CR- rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, Ericsson*

**Abstract:**

Specification mismatch between 38.104 V16/V17 and 38.104 V15/38.141-2. Intra-slot frequency hopping is set to “N/A” in Table 11.3.2.4.1.1-1, and to “enabled” in Table 11.3.2.4.2.1-1.

**Decision: Endorsed.**

### 6.2 LTE maintenance and TEI

#### 6.2.1 BS RF requirements

#### 6.2.4 Demodulation and CSI requirements

##### 6.2.4.1 UE demodulation requirements

##### 6.2.4.2 CSI requirements

##### 6.2.4.3 BS demodulation requirements

### 6.3 Rel-16 UE feature list maintenance

### 6.4 LS response for WP5D (RP-210747) on recommendations ITU-R M.2070 and ITU -R M.2071 on Unwanted Emissions of IMT-Advanced

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**Email discussion for [100-e][318] LS\_Response\_BSRF(RP-210747,R4-2111719)**

**, AI 6.4,12 (R4-2112288, R4-2114225, R4-2114226, R4-2113039)– Johan Sköld**

**R4-2115608** Email discussion summary for [100-e][318] LS\_Response\_BSRF(RP-210747,R4-2111719)

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115789 (from R4-2115608).**

**R4-2115789** Email discussion summary for [100-e][318] LS\_Response\_BSRF(RP-210747,R4-2111719)

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2115646 | LS out - New blocking requirement for Band 1 BSs for protection from RMR in 1900-1910 | Huawei, Keysight | Approved |  |
| R4-2115647 | LS on Revision of Recommendations ITU-R M.2070 and ITU-R M.2071 on Unwanted Emissions of IMT-Advanced | Ericsson | Approved |  |

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**Topic #1: LS response for WP5D on ITU-R M.2070**

**R4-2115647 LS on Revision of Recommendations ITU-R M.2070 and ITU-R M.2071 on Unwanted Emissions of IMT-Advanced**

*Type: LS out For: Approval*

To: TSG RAN *Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2112289 LS reply on Revision of Recommendations ITU-R M.2070 and ITU-R M.2071 on Unwanted Emissions of IMT-Advanced**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper proposes to ask TS RAN to postpone the response to ITU-R WP5D . An annex shows parts of the updates needed for M.2070 (E-UTRA BS and MSR BS).

**Decision: Revised to R4-2115591 (from R4-2112289).**

**R4-2115591 LS reply on Revision of Recommendations ITU-R M.2070 and ITU-R M.2071 on Unwanted Emissions of IMT-Advanced**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper proposes to ask TS RAN to postpone the response to ITU-R WP5D . An annex shows parts of the updates needed for M.2070 (E-UTRA BS and MSR BS).

**Decision: Noted.**

**R4-2113089 WP5D LS on unwanted emission of IMT-Advanced**

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

**Decision: Noted.**

## 7 Rel-17 maintenance for both NR and LTE

### 7.1 Introduction of FR2 FWA UE with maximum TRP of 23dBm for n257 and n258

**Refer to Email discussion summary of [100-e][323] NR\_R17\_SpectrumWI\_Demod, AI 8.27.5, 8.3.5, 7.1 (R4-2113458)– Kazuyoshi Uesaka**

**R4-2113458 Correction of Noc power level for n257/n258 PC5**

*Type: CR For: Agreement  
 38.101-4 v17.1.0 CR-0267 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Update Noc power level according to R4-2108505

**Decision: Agreed.**

## 8 Rel-17 spectrum related Work Items for NR

### 8.3 Introduction of NR 47 GHz band

#### 8.3.2 BS RF requirements maintenance (38.104)

#### 8.3.3 BS conformance (38.141)

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**Email discussion for [100-e][307] NR\_47GHz\_Band\_BSRF\_NWM, AI 8.3.2, 8.3.3, R4-2114399– Iwo Angelow**

**R4-2115598** Email discussion summary for [100-e][307] NR\_47GHz\_Band\_BSRF\_NWM

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115779 (from R4-2115598).**

**R4-2115779** Email discussion summary for [100-e][307] NR\_47GHz\_Band\_BSRF\_NWM

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW on Aug 18th**

**Issue # Derivation of Rx MU**

Rx MU has been discussed in the last RAN4 meetings without progress. According to the agreed WF in R4-2118608, RAN4 to agree on final Rx MU during RAN4#100-e. In order to progress and conclude this work in RAN4#100-e, it was proposed in R4-2112275 to agree on RF signal generator uncertainty first (1.03 dB is proposed as a compromise, it should be noted there are other proposals on RF signal generator uncertainty of 0.97 and 1.6 dB). The following is proposed:

1) agree on compromise 1.03 dB RF signal generator uncertainty

2) agree to not consider the ‘Add estimated uncertainty contribution 0.2 from other terms’ in the NR 47 GHz band

3) handle TR 37.941 maintenance independent from the completion of this work item so that the work item can be completed at TSG RAN#93-e as expected

**Discussion:**

RF signal generator uncertainty: 0.9dB -1.6 dB

Keysight: Now TE vendors including Keysight, R&S, Anristru proposed uncertainty for RF SG as 1.6dB which comes from the hardware measurement.

Ercisson: Is there any possibility to have better MU with mature products in near future?

Keysight: This value comes from the reality currently we can achieve.

Nokia: With internal checking, a better value can be achieved than 1.6 dB.

Keysight: We didn’t have the available commercial products currently.

T-Mobile USA: We need a solution to achieve better performance.

Keysight: The value 1.6 comes from measurement, there is no room to further comprise.

Huawei: TE vendors’ analysis always welcome. We need to respect the input from TE vendors.

Nokia: Up to 43.5GHz, no changes compared to 28 GHz; why we have such big difference with just 5GHz increased for operating frequency?

Keysight: Value for 42GHz is quite challenge; to higher frequency range, the values increased as well.

Huawei: I’m worry how the values for 71GHz in another WI. A comprised solution: taking the values from TE vendors now, meanwhile a note: further improvement not precluded in the future.

Nokia: We also worry about the values for 71 GHz. Including the values in TS with [], meanwhile to capture TR the background and the possibility to further optimize the performance in future.

Keysight: For 71GHz, similar discussion foreseen. We can accept the solutions proposed by Nokia and Huawei.

Huawei: Not sure [ ] whether allowed or not.

Nokia: I think CR with [] should be OK. 1.5dB as MU.

Keysight: 1.6 dB should be SG MU. For Proposal 2, we can discuss. We proposed 0.1.

R&S: 1.6dB is the value we can achieve currently.

‘Add estimated uncertainty contribution 0.2 from other terms’

Tentative Agreement (Need to be confirmed by 1st round):

For SG MU as 1.6dB, meanwhile no additional uncertainty increased for other terms.

Including the values in TS with [] and Note if needed, meanwhile to capture TR 37.941 the background and the possibility to further optimize the performance in future.

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision | Comments |
| R4-2115634 | TP to TR 38.847: BS conformance aspects | Nokia, Nokia Shanghai Bell Noted | Approved |  |
| R4-2115635 | CR to 38.141-2: Introduction of n262 | Nokia, Nokia Shanghai Bell Noted | Agreed |  |
| R4-2115636 | Draft CR to TR 37.941: inputs on MU/TT derivation for 47 GHz (band n262), Rel-16 | Huawei | Endorsed |  |

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**R4-2112275 Proposals on BS Receiver Measurement Uncertainties in NR 47 GHz band**

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

**Abstract:**

This contribution provides some discussion and proposals to agree on the final BS Receiver Measurement Uncertainties in NR 47 GHz band in this meeting.

**Decision: Noted.**

**R4-2113734 47GHz band - Measurement uncertainties for BS requirements**

*Type: other For: Approval  
 Source: Ericsson, Nokia, T-Mobile USA, Dish Network*

**Abstract:**

This contribution discusses the measurement uncertainties for BS requirements at 47GHz

**Decision: Noted.**

**R4-2113916 47 GHz band MU and TT for NR BS RF requirement**

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

**Decision: Noted.**

**R4-2113917 Draft CR to 38.141-2: BS FR2 Rx MU TT table and requirement update for n262 (4.1.2.2, 7.3.5, 7.9.5, C.2)**

*Type: draftCR For: Endorsement  
 38.141-2 v17.2.0 CR- rev Cat: B (Rel-17)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz*

**Decision: Not pursued.**

**R4-2114365 TP to TR 38.847: BS conformance aspects**

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

**Decision: Revised to R4-2115634 (from R4-2114365).**

**R4-2115634 TP to TR 38.847: BS conformance aspects**

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

**Decision: Approved.**

**R4-2114366 CR to 38.141-2: Introduction of n262**

*Type: CR For: Approval  
 38.141-2 v17.2.0 CR-0368 rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Revised to R4-2115635 (from R4-2114366).**

**R4-2115635 CR to 38.141-2: Introduction of n262**

*Type: CR For: Approval  
 38.141-2 v17.2.0 CR-0368 rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Agreed.**

#### 8.3.5 Demodulation and CSI requirements

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**Email discussion for [100-e][323] NR\_R17\_SpectrumWI\_Demod, AI 8.27.5, 8.3.5, 7.1 (R4-2113458)– Kazuyoshi Uesaka**

**R4-2115614 Email discussion summary for [100-e][323] NR\_R17\_SpectrumWI\_Demod**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115795 (from R4-2115614).**

**R4-2115795 Email discussion summary for [100-e][323] NR\_R17\_SpectrumWI\_Demod**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** |
| R4-2115631 | Summary of simulation results for 35MHz and 45MHz channel bandwidth for FR1 FDD | Huawei, HiSilicon | Noted |
| R4-2115632 | Way forward on UE demodulation on NR 47GHz band | Ericsson | Approved |
| R4-2115633 | CR on UE demodulation and CSI repotting for 35MHz and 45MHz channel bandwidth for FR1 FDD | Huawei, HiSilicon | Agreed |
| R4-2115808 | CR: TS 38.101-4: n262 demodulation requirements | Ericsson | Agreed |
| R4-2113458 | Correction of Noc power level for n257/n258 PC5 | Ericsson | Agreed |
| R4-2113460 | draft CR: TS 38.101-4: n262 demodulation requirements | Ericsson | Not Pursued |  |

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**R4-2115631 Summary of simulation results for 35MHz and 45MHz channel bandwidth for FR1 FDD**

*Type: other For: Information  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2115632 Way forward on UE demodulation on NR 47GHz band**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

##### 8.3.5.1 UE demodulation (38.101-4)

**R4-2112250 Extension of PDSCH Demodulation Requirements to 47 GHz band**

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

**Decision: Noted.**

**R4-2113135 Applicability of UE demodulation requirements for 47GHz band**

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

**Decision: Noted.**

**R4-2113459 Applicability of FR2 UE demodulation requirements for NR 47GHz band**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the applicability of the existing FR2 UE demodulation requirements to NR 47GHz band (n262).

**Decision: Noted.**

**R4-2113460 draft CR: TS 38.101-4: n262 demodulation requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This draft CR introduces Noc for power level and test applicability for n262.

**Decision: Not pursued.**

**R4-2115808 CR: TS 38.101-4: n262 demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v17.1.0 CR-Xxxx rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This draft CR introduces Noc for power level and test applicability for n262.

**Decision: Agreed.**

**R4-2113796 Discussion on NR UE demodulation for 47GHz band**

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

**Decision: Noted.**

##### 8.3.5.2 BS demodulation (38.104)

### 8.4 Introduction of 900 MHz spectrum to 5G NR applicable for Rail Mobile Radio

#### 8.4.3 BS RF requirements

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**Email discussion for [100-e][317] RAIL\_900\_1900MHz\_BSRF, AI 8.4.3, 8.5.3– Michal Szydelko**

**R4-2115607** Email discussion summary for [100-e][317] RAIL\_900\_1900MHz\_BSRF

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115790 (from R4-2115607).**

**R4-2115790** Email discussion summary for [100-e][317] RAIL\_900\_1900MHz\_BSRF

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115637 | WF on BS RF requirements for RMR900 and RMR1900 | Huawei | Approved |

**R4-2115637 WF on BS RF requirements for RMR900 and RMR1900**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

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**R4-2113749 RMR 900 MHz - BS RF**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses BS RF requirements aspects when introducing the new RMR 900MHz band

**Decision: Noted.**

**R4-2114368 On 900MHz RMR RAN4 BS RF requirements impact due to ECC Decision (20)**

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

**Decision: Noted.**

### 8.5 Introduction of 1900 MHz spectrum to 5G NR applicable for Rail Mobile Radio

#### 8.5.3 BS RF requirements

**Refer to Email discussion summary of [100-e][317] RAIL\_900\_1900MHz\_BSRF, AI 8.4.3, 8.5.3– Michal Szydelko**

**R4-2113752 RMR 1900 MHz - BS RF**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses BS RF requirements aspects when introducing the new RMR 1900MHz band

**Decision: Noted.**

**R4-2114371 On 1900MHz RMR RAN4 BS RF requirements impact due to ECC Decision (20)**

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

**Decision: Noted.**

*Type: discussion For: Approval  
 Source: Skyworks Solutions Inc.*

**Abstract:**

In this contribution we discuss the need to reduce the number of NRU UL CA cases to make theMPR/ A-MPR cases manageable

**Decision: Noted.**

### 8.27 Introduction of channel bandwidths 35MHz and 45MHz for NR

#### 8.27.5 UE demodulation and CSI requirements

**Refer to Email discussion summary of [100-e][323] NR\_R17\_SpectrumWI\_Demod, AI 8.27.5, 8.3.5, 7.1 (R4-2113458)– Kazuyoshi Uesaka**

**R4-2112153 Simulation results for PDSCH demodulation requirements for 35MHz and 45MHz**

*Type: discussion For: Information  
 Source: China Telecom*

**Decision: Noted.**

**R4-2113805 draftCR on UE demodulation and CSI repopting for 35MHz and 45MHz channel bandwidth for FR1 FDD**

*Type: draftCR For: Endorsement  
 38.101-4 v17.1.0 CR- rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Not pursued.**

**R4-2115633 CR on UE demodulation and CSI reporting for 35MHz and 45MHz channel bandwidth for FR1 FDD**

*Type: CR For: Agreement  
 38.101-4 v17.1.0 CR-XXX rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Agreed.**

## 9 Rel-17 non-spectrum related work items for NR

### 9.1 Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) requirements for NR UEs

#### 9.1.1 General

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**Email discussion for [100-e][331] NR\_MIMO\_OTA, AI 6.1.9.5, 9.1– Bozhi Li**

**R4-2115622 Email discussion summary for [100-e][331] NR\_MIMO\_OTA**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115807 (from R4-2115622).**

**R4-2115807 Email discussion summary for [100-e][331] NR\_MIMO\_OTA**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW Discussion Aug 23**

Topic #1: General and Testing methodologies

**Issue 1-2: Reference validation targets for FR1**

* Background
  + for CDL-C Uma, reference channel emulation curves in R4-2114383 was endorsed in 1st round
  + for CDL-C Umi, interested companies (Keysight, Spirent, CMCC, CAICT) have aligned on PDP, Autocorrelation, V/H ratio except spatial correlation
* Proposal
  + Have another round of harmonization to minimize the differences in spatial correlation (Spirent).

Moderator comment: further discuss on spatial correlation, and capture available agreements for both CDL-C UMa and CDL-C UMi into R4-2115759 (REV of R4-2114383).

**Discussion:**

Keysight: We think we can align the reference curves for both CDL\_C UMa and CDL-C UMi cases.

CAICT: We target to define the reference curve in this meeting for both cases. Sugguest to define the limit in next meeting.

Keysight: We can take offline and try to conclude in Nov 2021 RAN4 meeting.

Sprient: CDL-Umi almost all the parameters except spatial correlation well aligned, for spatial correlation, average approach now adopted based on off-line. We start to apply OTA measurement to get the limit.

Agreement: Companies are encouraged to bring proposals and analysis for pass limit of channel validation and target to conclude in Nov 2021 RAN4 meeting.

Further discuss the details and captured to WF.

**Issue 1-3: FR2 probe blocking issue**

* Proposals
  + Option 1: The blocking issue of probe#3 should be closed due to the fact that the optimized weight of Probe#3 is almost zero.(CMCC)
  + Option 2: Probe 3’s blocking issue can be ignored when the following situation is satisfied: Either “The improved three-step approach gives the results that Probe 3 experiences blocking small enough” or “A declaration of the weight of Probe 3 is small enough in the implementation of the selected FR2 MIMO OTA channel model.” (OPPO)
  + Option 3: If the blocking effects still need to be quantified to resolve this blocking issue, keep this discussion open and interested parties are encouraged to provide simulation results. (Keysight)

**GTW Discussion**

Apple: The blocking issue due to multiple test system.

Keysight: The overall consensus, previous block issue already resolved. The issue mentioned by Apple already concluded.

Agreement: The baseline assumption there is no remaining open blocking issue pending on further confirmation by Nov 2021 RAN4 meeting.

**Issue 1-4: FR2 probe weights**

* Proposals
  + Proposal 1: An initial reference set of probe weight is published to performance requirements for FR2 and aligning simulation, and feedback from TE/CE vendors is encouraged to reach a consensus on a set of weights. (R4-2114534)

**GTW Discussion**

Apple: We would like to see measurement result to have alignment between simulation and measurement.

Keysight: Set-up probe weights may match with real test system. We can’t share the probe weights. We would see the comparable PSP calibration.

QC: In FR2 MIMO OTA, we agreed to include both measure and simulation effort.

Keysight: Till no now, no measurement provided and only focus on simulation and hard to be aligned.

Agreement:

Given probe weights belongs to implementation, no further effort on alignment of probe weights.

**Issue 2-2: measurement device handling**

Agreement: RAN4 will discuss how to handle measurement device before starting the measurement campaign.

**Issue 2-3-1: Percentile value of CDF**

Agreement:

The percentile value of CDF to derive final TRMS requirements will be discussed after lab alignment is finalized and before test campaign.

**Issue 2-4: FR1 MU assessment**

* Proposals
  + Option 1: RAN4 should discuss the MU assessment for FR1 MIMO OTA, example expanded uncertainty should be analysed (R4-2112980 by vivo, CAICT)
  + Option 2: a very preliminary MU assessment could be considered in RAN4 with the understanding that RAN5 is responsible to work on and finalize the MU/TT.(Keysight,Apple)
* WF
  + TBA

**Moderator comment:** Majority supports option 1 (OPPO, Huawei, HiSilicon, CAICT, Samsung, vivo); Keysight and Apple support Option 2. Keysight requests clarifications on how the MU is planned to be used for requirement definitions in RAN4.

**Discussion:**

vivo: MU assessment is traditional work in RAN4 taken the experience of LTE MIMO OTA. The MU will impact final requirements introduction. OTA requirements are based on test results; we need to consider MU impact for the margin.

Keysight: Except LTE MIMO OTA, all other OTA WI/SIs, final MU/TT defined in RAN5 which is aligned with NR MIMO OTAWID. MU margin in RAN4 and together TT margin in RAN5.

Huawei: Seems option 1 not contradicted with each other. We need to some insight on MU impact on RAN4 to define RAN4 requirements.

CAICT: Share same view as vivo, the MU assessment impact lab alignment activity .

Samsung: Share same view as vivo. For FR2 test enhancement SI, MU assessment also addressed in RAN4.

Keysight: For FR2 test enhancement SI, preliminary MU assessment in RAN4, but final MU and TT would be finalized and decided in RAN5.

Apple: We should respect RAN4 and RAN5 work duty. We can combine option 1 and option 2.

vivo: What the preliminary MU meaning? Better we define example expanded MU in RAN4 as starting point.

Agreement:

RAN4 should discuss the preliminary MU assessment for FR1 MIMO OTA including example expanded uncertainty, final MU and TT will be decided by RAN5.

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2112976 | 3GPP TS 38.151 v0.5.0 | vivo | Email Approval |  |
| R4-2112977 | Rapporteur input to TS38.151 | vivo | Approved |  |
| R4-2112979 | TP to TS38.151 on Minimum Number of Slots and Power Control | vivo | Approved |  |
| R4-2115756 | WF on NR MIMO OTA | vivo, CAICT | Approved |  |
| R4-2115757 | TP on Channel Model and DUT Positioning Clarifications | Keysight Technologies UK Ltd | Approved |  |
| R4-2115758 | Time plan for FR1 lab alignment and requirement development | CAICT, OPPO | Approved |  |
| R4-2115759 | Reference Channel Emulation Curves for Validation Purposes | Keysight Technologies UK Ltd, Spirent Communications, CMCC, CAICT | Approved |  |
| R4-2115760 | Draft CR to TR38.827:correct Positioning ambiguities | Vivo | Endorsed |  |
| R4-2115761 | Draft CR to TR38.827:power validation | Vivo | Endorsed |  |
| R4-2115811 | TP to TS38.151 on FR2 PAS similarity percentage | Huawei | Approved |  |

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**R4-2115756 WF on NR MIMO OTA**

*Type: other For: Approval  
 Source: vivo, CAICT, OPPO*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115811 TP to TS38.151 on FR2 PAS similarity percentage**

*Type: pCR For: Approval  
 38.151 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2112976 3GPP TS 38.151 v0.5.0**

*Type: draft TS For: Approval  
 38.151 v0.5.0 CR- rev Cat: (Rel-17)  
  
 Source: vivo*

**Decision: Email approval**

**R4-2112977 Rapporteur input to TS38.151**

*Type: pCR For: Approval  
 38.151 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: vivo*

**Decision: Approved.**

**R4-2114381 TP on Channel Model and DUT Positioning Clarifications**

*Type: pCR For: Approval  
 38.151 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Revised to R4-2115757 (from R4-2114381).**

**R4-2115757 TP on Channel Model and DUT Positioning Clarifications**

*Type: pCR For: Approval  
 38.151 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Approved.**

#### 9.1.2 Performance requirements

##### 9.1.2.1 Performance Requirements for FR1

**R4-2112573 Discussion on FR1 performance requirements**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2112980 Proposal on preliminary FR1 MIMO OTA MU value assessment**

*Type: discussion For: Approval  
 Source: vivo,CAICT*

**Decision: Noted.**

**R4-2113312 Time plan for FR1 lab alignment and requirement development**

*Type: discussion For: Approval  
 Source: CAICT, OPPO*

**Decision: Revised to R4-2115758 (from R4-2113312).**

**R4-2115758 Time plan for FR1 lab alignment and requirement development**

*Type: discussion For: Approval  
 Source: CAICT, OPPO*

**Decision: Approved.**

**R 4-2113914 Refinement on lab alignment activity**

*Type: discussion For: Approval  
 Source: OPPO*

**Decision: Noted.**

##### 9.1.2.2 Performance Requirements for FR2

**R4-2112245 Discussion on FR2 MIMO OTA performance requirements**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2113033 Proposal on FR2 MIMO simulator alignment**

*Type: discussion For: Approval  
 Source: MediaTek Beijing Inc.*

**Abstract:**

Proposal: Do a fundamental scenario simulation as Fig 1 firstly, for FR2 MIMO OTA simulator alignment.

**Decision: Noted.**

**R4-2114504 Discussion on FR2 MIMO OTA simulation**

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

**Decision: Noted.**

#### 9.1.3 Testing methodologies

##### 9.1.3.1 Testing parameters for Performance

**R4-2112978 TP to TS38.151 on BS beam configuration**

*Type: pCR For: Approval  
 38.151 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: vivo,CAICT*

**Decision: Merged.**

**R4-2114528 TP to TS 38.151 on FR1 2x2 BS beam selection**

*Type: pCR For: Approval  
 38.151 v0.5.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Merged.**

**R4-2114529 update simulation results on FR1 2x2 channel models**

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

**Decision: Noted.**

**R4-2114534 Discussion on probe weight**

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

**Decision: Noted.**

**R4-2114535 TP to TS38.151 v0.4.0 on FR2 Base Station beam configuration**

*Type: pCR For: (not specified)  
 38.151 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Merged.**

##### 9.1.3.2 Optimization of test methodologies

**R4-2112862 Consideration on Probe#3 of FR2 MIMO OTA**

*Type: discussion For: Approval  
 Source: CMCC*

**Decision: Noted.**

**R4-2112979 TP to TS38.151 on Minimum Number of Slots and Power Control**

*Type: pCR For: Approval  
 38.151 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: vivo*

**Decision: Approved.**

**R4-2113915 The FR2 blocking issue**

*Type: discussion For: Approval  
 Source: OPPO*

**Decision: Noted.**

**R4-2114380 On Blocking Issue for FR2 MIMO OTA**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

##### 9.1.3.3 Channel model validation

**R4-2113854 Channel Model Targets**

*Type: other For: Approval  
 Source: Spirent Communications*

**Abstract:**

Proposal 1. Use the targets presented in this contribution for the different spatial channel model parameters validation.

**Decision: Noted.**

**R4-2113858 Reference Channel Emulation Curves for FR1**

*Type: discussion For: Approval  
 Source: CAICT, CMCC*

**Decision: Noted.**

**R4-2114025 Reference curves for FR1 CDL-C Uma**

*Type: discussion For: Approval  
 Source: CAICT, Keysight Technologies UK Ltd, Spirent Communications, CMCC*

**Decision: Withdrawn.**

**R4-2114382 Reference Channel Emulation Curves**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2114383 Reference Channel Emulation Curves for Validation Purposes**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd, Spirent Communications, CMCC, CAICT*

**Decision: Revised to R4-2115759 (from R4-2114383).**

**R4-2115759 Reference Channel Emulation Curves for Validation Purposes**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd, Spirent Communications, CMCC, CAICT*

**Decision: Approved.**

**R4-2114503 Discussion on FR2 channel model validation**

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

**Decision: Noted.**

### 9.2 Introduction of UE TRP (Total Radiated Power) and TRS (Total Radiated Sensitivity) requirements and test methodologies for FR1 (NR SA and EN-DC)

#### 9.2.1 General and work plan

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**Email discussion for [100-e][332] FR1\_TRP\_TRS\_Part1, AI 9.2.1, 9.2.2, 9.2.3– Ruixin Wang**

**R4-2115623 Email discussion summary for [100-e][332] FR1\_TRP\_TRS\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115805 (from R4-2115623).**

**R4-2115805 Email discussion summary for [100-e][332] FR1\_TRP\_TRS\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW on Aug 23**

**Issue 3-1-1: EN-DC power splitting**

* Proposals
  + Proposal 1: The scheme of 50%-50% power splitting with only fixed 50% power for LTE, e.g., for PC3, 20dBm LTE and no upper power limit setting for NR is adopted for EN-DC TRP measurement. (QC, Xiaomi, vivo, CAICT, OPPO)
  + Proposal 2: The EN-DC power configuration for the TRP/TRS test shall follow the RAN5 LTE anchor agnostic approach. (Apple, Samsung)
  + Proposal 3: adopt Option 2a (maximize NR power) for ENDC SISO OTA test. (Samsung, AT&T, Apple, NTT DOCOMO)
  + Proposal 4: For FR1 EN-DC TRP test, Power splitting between LTE and NR uses similar configurations as conducted test of UE maximum output power which is p-NR-FR1 = p-MaxEUTRA-r15 = 20 for Power Class 3 UE, p-NR-FR1 = p-MaxEUTRA-r15 = 23 for Power Class 2 UE, i.e. option 1a in the WF. (Huawei)

**Discussion:**

Samsung: we think equal power split among EN-DC would be bring fragmentation.

Apple: For proposal 1 and 4 quite similar with equally power split among EN-DC. We are worrying for the feasibility of the power split. It’s possible to well control power on LTE carrier during this test. We slightly prefer option 2 and also OK for option 3.

R&S: It’s already adopted in CCSA with proposal 1. We didn’t see the problem in real field test. We are open for the proposals. We need to ensue both RAT active i.e. relative lower power still allocated to LTE carrier.

vivo: For proposal 1 test issue, we share same view as R&S. It’s already adopted in CCSA. In real field, LTE power need to be guarantee for connection, proposal 1 aligned with real field.

QC: Share same view as vivo and R&S. Both options workable. In last RAN-P, we decide no requirements for LTE carrier under TRP-TRS WI. But we think proposal 1 allow flexibility and taken as generic approach which can provide the possibility for operators if they want to test both LTE and NR.

Xiaomi: If we configure maximum power over NR, then EN-DC test is similar as NR SA test. We need to ensure LTE connection with 50-50%.

AT&T: For CTIA, TRP test, maximum NR power adopted.

Huawei: We proposed proposal 4. We prefer consistent configuration as conducted test which as proposal 4 already in conducted test. Meanwhile proposal 2 and proposal 3 also exists in conducted test. We have concern on proposal 1 with no power limitation on NR carrier. We are open to proposals which aligned with conducted test.

Samsung: We agree with Huawei, there is issue on proposal 1. LTE is not necessary to be configured as minimum, it can be configured relative lower than NR carrier e.g 10dB lower than NR carrier which the transmission power on LTE carrier is ignored and we can ensure the connection with proper power setting.

Apple: It’s not possible to verify the setting then test come to be failed with proposal 1. We target to verify antenna performance which means maximum NR power more reasonable. We propose to remove proposal 1.

CAICT: We support proposal 1 since its’ adopted in CCSA test and this set-up aligned with field test.

R&S: We can’t verify the setting no matter maximum power or equal split power; we fully rely on test setting with signalling configured.

Keysight: For TRP, not sure why maximum power not enable.

OPPO: We support proposal 1.

DCM: We have similar view with Samsung. In this test, we should consider maximum power on NR carrier. We support proposal 3.

vivo: we think all the options have test limitation in test.

Samsung: EN-DC with power splitting rely on Pcmax setting, for same mobile model, the results cann’t repeatable.

Huawei: The equal power splitting already used in conducted test case, any issue on conducted test?

vivo: For proposal 3, how to configure LTE carrier power; how to avoid the issue mentioned by Keysight and Samsung?

Apple: UE may have power prioritization between NR and LTE with RAN1 design. We need to define RB allocation for LTE carrier with proposal 1, 3 and 4.

QC: Same question as vivo, these issues applied for all the proposals.

Xiaomi: What’s the difference between EN-DC and SA test cases from performance aspect?

Samsung: For proposal 3 with minimized LTE power, the impact on NR ignorable. TRP was to measure antenna performance, not for interference case.

Apple: There is discussion on RF core maintenance, for A-MPR. But this not related to TRP\_TRS WI. Some UE only support EN-DC mode. For receiver side, MSD performance can be considered with 2nd priority.

vivo: For proposal 3, there is some limitation.

Further discuss the candidate options with following aspects need to be analysed including test feasibility and detailed test configuration:

* Further work on the detailed list which need to be analyzed

Agreement: RAN4 target to conclude EN-DC power setting-up under Nov 2021 RAN4 meeting

**Issue 3-1-2: UL power configuration for TRP and TRS**

* Proposals
  + Proposal: It is proposed to adopt the same power splitting scheme for EN-DC TRP and TRS measurements. (QC, vivo, Huawei, HiSilicon)

**Discussion:**

Samsung/Apple/AT&T: We prefer to keep it open waiting for TRP part decision.

Agreement: RAN4 target to conclude the UL power configuration of TRS together with TRP in Nov 2021 RAN4 meeting.

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2115753 | WF on FR1 TRP TRS | vivo | Approved |  |
| R4-2115754 | TP work split for TR 38.834 drafting | vivo, CAICT, Samsung, Qualcomm, Apple, Huawei, HiSilicon, OPPO, Xiaomi, R&S, MVG | Approved |  |
| R4-2113975 | TP to TR38.834 on general aspects | vivo | Approved |  |
| R4-2115752 | LS to RAN5 on FR1 TRP TRS WI progress (RAN4#100e) | vivo | Approved |  |
| R4-2113983 | TP for TR 38.834 v0.1.0 | OPPO | Not Pursued |  |
| R4-2113985 | TR 38.834 v0.1.0 | OPPO, vivo | Email Approval |  |
| R4-2113980 | Updated workplan of TRP TRS WI | vivo | Approved |  |

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**R4-2115753 WF on FR1 TRP TRS**

*Type: other For: Approval  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115754 TP work split for TR 38.834 drafting**

*Type: other For: Approval  
 Source:* vivo, CAICT, Samsung, Qualcomm, Apple, Huawei, HiSilicon, OPPO, Xiaomi, R&S, MVG

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2112364 General considerations of OTA requirements**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2112861 Requirements of NR Band n41 Test Configuration and Multiple Antenna Test Methodology**

*Type: discussion For: Approval  
 Source: CMCC*

**Decision: Noted.**

**R4-2113975 TP to TR38.834 on general aspects**

*Type: pCR For: Approval  
 38.834 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: vivo*

**Decision: Approved.**

**R4-2113977 Views on general aspects of TRP TRS WI**

*Type: discussion For: Approval  
 Source: vivo*

**Decision: Noted.**

**R4-2113979 LS to RAN5 on FR1 TRP TRS WI progress (RAN4#100e)**

*Type: LS out For: Approval  
 to RAN5  
 Source: vivo*

**Decision: Revised to R4-2115752 (from R4-2113979).**

**R4-2115752 LS to RAN5 on FR1 TRP TRS WI progress (RAN4#100e)**

*Type: LS out For: Approval  
 to RAN5  
 Source: vivo*

**Decision: Approved.**

**R4-2113980 Updated workplan of TRP TRS WI**

*Type: Work Plan For: Approval  
 Source: vivo*

**Decision: Approved.**

**R4-2113985 TR 38.834 v0.1.0**

*Type: draft TR For: Approval  
 38.834 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: OPPO, vivo*

**Abstract:**

Draft TR for 38.834 v0.1.0

**Decision: Email Approval**

#### 9.2.2 SA test methodology

**R4-2112363 Views on test cases which employ hand phantoms**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2113911 Parameter configuration for SA TRP**

*Type: discussion For: Approval  
 Source: OPPO*

**Decision: Noted.**

**R4-2113976 Discussion on SA test method**

*Type: discussion For: Approval  
 Source: vivo*

**Decision: Noted.**

**R4-2114026 On FR1 SA TRP-TRS test**

*Type: discussion For: (not specified)  
 Source: Huawei Tech.(UK) Co.. Ltd*

**Abstract:**

discussion on SA TRP and TRS test conditions

**Decision: Noted.**

#### 9.2.3 EN-DC test methodology

**R4-2112249 Discussion on EN-DC test methodology**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2112362 EN-DC power configuration for TRP/TRS**

*Type: discussion For: Decision  
 Source: Apple*

**Decision: Noted.**

**R4-2112574 Discussion on power-split and measurement channels**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2112607 on EN-DC power setting**

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

**Decision: Noted.**

**R4-2113912 Power split and DPS**

*Type: discussion For: Approval  
 Source: OPPO*

**Decision: Noted.**

**R4-2113978 Discussion on EN-DC test method**

*Type: discussion For: Approval  
 Source: vivo*

**Decision: Noted.**

**R4-2113983 TP for TR 38.834 v0.1.0**

*Type: other For: Endorsement  
 38.834 v CR- rev Cat: (Rel-17)  
  
 Source: OPPO*

**Decision: Not pursued.**

**R4-2114530 on FR1 EN-DC TRP-TRS test methodology**

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

**Decision: Noted.**

#### 9.2.4 UE with multiple antennas test methodology

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**Email discussion for [100-e][333] FR1\_TRP\_TRS\_Part2, AI 9.2.4, 9.2.5– Qifei Liu**

**R4-2115624 Email discussion summary for [100-e][333] FR1\_TRP\_TRS\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115806 (from R4-2115624).**

**R4-2115806 Email discussion summary for [100-e][333] FR1\_TRP\_TRS\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision | Comments |
| R4-2115824 | WF on FR1 TRP TRS for UE with multi-antenna | OPPO | Approved |  |

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**R4-2115755 WF on FR1 TRP TRS for UE with multi-antenna**

*Type: other For: Approval  
 Source: OPPO*

**Abstract:**

**Discussion:**

**GTW August 27th**

OPPO: Tx antenna switch included in WID. This is first meeting, we prefer to not taking this as 2nd priority and we see many companies supporting to further study “TAS ON”.

Suggestion 1: Add new bullet whether treating this as 2nd priority.

Suggestion 2: Treating TAS OFF as first priority and baseline.

vivo: We are interesting on “TAS ON” and planned to bring contribution on this technical issue.

In WID, we list to decide the test set-up for UE with Tx antenna switch. Given the WID, it aims for define minimum performance requirements. TAS ON bring uncertainty and we hope open discussion on “TAS ON” not impact the progress of this WID. That’s the background we prefer to take this 2nd priority.

Apple: We think minimum OTA requirements will be test under “TAS off”. Our preference is “TAS ON” not related with minimum OTA requirements. We prefer to take this “TAS ON” with 2nd priority.

R&S: We generally agree with OPPO. We think it’s bit early to take this as 2nd priority since it’s first meeting we have technical discussion. We are fine with suggestion from OPPO. We think “TAS OFF” is specific test mode; with “TAS ON” doesn’t mean we will have different minimum requirements and it’s a test set-up issue.

Huawei: I think all companies agree “TAS Off” is baseline, “TAS ON” can be discussed.

Suggestion 3: “will be” ->”can be”

Vivo: We think the common understanding “TAS OFF”.

CAICT: We believe no big difference. “TAS OFF” is first priority and we are open to discuss “TAS ON”.

CMCC: We prefer not to take “TAS ON” as 2nd priority.

**Decision: Revised to R4-2115824 (from R4-2115755).**

**R4-2115824 WF on FR1 TRP TRS for UE with multi-antenna**

*Type: other For: Approval  
 Source: OPPO*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R 4-2112610 on multi-antenna TRPTRS test**

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

**Decision: Noted.**

**R4-2112863 Consideration on Tx Antenna Switching Methodology**

*Type: discussion For: Approval  
 Source: CMCC, Xiaomi*

**Decision: Noted.**

**R4-2113913 Views on Transmit Switching**

*Type: discussion For: Approval  
 Source: OPPO*

**Decision: Noted.**

**R4-2113986 Tx/Rx switching OTA testing considerations**

*Type: discussion For: Approval  
 38.834 v CR- rev Cat: (Rel-17)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Noted.**

**R4-2114531 on FR1 TRP-TRS test methodology for UE with multi-antenna switching**

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

**Decision: Noted.**

#### 9.2.5 Others

### 9.5 NR repeater

#### 9.5.1 General

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**Email discussion for [100-e][308] NR\_Repeater\_General, AI 9.5.1– Valentin Gheorghiu**

**R4-2115599 Email discussion summary for [100-e][308] NR\_Repeater\_General**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115780 (from R4-2115599).**

**R4-2115780 Email discussion summary for [100-e][308] NR\_Repeater\_General**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW on Aug 18th**

**Issue 2-1: Repeater class characterization**

* Proposals
  + Option 1: Power class is used to differentiate the output power levels and emission requirements. No repeater class definition exists in the spec.
  + Option 2: Deployment scenario is used to differentiate repeater classes
  + Option 3: Similar to BS power classes(based on MCL)
  + Option 4: Other definition/differentiation for classes

**Discussion:**

CATT: The deployment scenario for repeater is different; for WA repeater, whether they can be deployed together with WA or MA BS. Also in UTRA and E-UTRA, no class defined for repeater.

E///: Power level depending on deployment scenario; we don’t see any difference compared to BS classes. We assume similar definition as BS will be applied i.e. associated with MCL.

Nokia: We think deployment scenario should be the baseline to define requirements. Option 2 can be starting point and option 3 can be considered additionally.

Agreement: Option 2, the detailed definition from BS specification can be considered as starting points.

**Issue 2-2: Classes for FR1 DL**

* Proposals
  + Option 1: Introduce WA, MR, LA
  + Option 2: Introduce WA, MR, LA and home class
  + Option 3: WA and LA
  + Option 4: WA, LA and home class
* Recommended WF
  + Option 2

Option 2 is the most comprehensive. If other option is preferred, please state arguments why some classes are not needed.

**Discussion:**

CMCC: Home class is important for realistic scenario i.e. inside the train scenario. We would like to have relaxed requirements for home class compared to local area with cost limitation.

Ericsson: The scenario pointed by CMCC can be included into LA. The power limitation is maximum limitation; repeater can employ lower power. Is there any difference from RF requirements besides power?

Huawei: Not sure whether the requirements can be relaxed for home repeater.

CMCC: The co-located emission requirements would not applicable for home repeater. The maximum power can be different, and test with maximum.

Nokia: We didn’t see the need of introducing home class which already covered by LA class. The maximum power can be declared with the limitation. I think HST not clear mentioned in WI scope with specific optimized requirements.

ZTE: LA and Home BS emission requirements in LTE, there is difference. Can we consider to introduce Home BS first?

E///: The BS conformance testing is based on BS declaration for power. Co-location requirements also declaration basis, Emission requirements is the deployment scenario related. We think what CMCC proposed can be covered by local area class.

QC: We think focus on 3 classes firstly, and check the requirements case by cases whether there is a need.

Agreement: Introduce WA, MR and LA classes. Further checking the need of home class during requirements introduction phase.

**Issue 2-3: Classes for FR2 DL**

* Proposals
  + Option 1: Introduce WA, MR and LA
  + Option 2: WA and LA
  + Option 3: no class defined
* Recommended WF
  + Option 1

**Discussion:**

CATT: Is there any requirements pending on classes? ACLR maynot measureable or needed.

Ericsson: We can first agree option 1 pending on further checking on whether there is requirments difference among these classes.

Huawei: In IAB-MT, no MR class for FR2. Questionable for MR with assiocated requirements?

Nokia: For IAB-MT, we don’t have MR. We are fine with option 1 and further narrow down if we didn’t see difference from requirements aspect.

Ericsson: There is MR for 2-O, we could cover MR and LA in a single Class.

Agreement: Option 1 as baseline pending on further checking whether there is difference among classes from RF requirements aspect.

**Issue 2-4: Classes for FR1 UL**

* Proposals
  + Option 1: 2 classes: LA like with maximum output power less than any UE and MR like without upper limit
  + Option 2: 2 output power classes: upper limit same as UE(e.g. LA) and one without upper limit that is well planned by operator (e.g. WA)
  + Option 3: Other option
* Recommended WF
  + Option 2

**Discussion:**

Nokia: What’s the reference of PC, PC1.5, 3 or PC 5?

QC: Highest PC class for the supported bands.

Nokia: We think it’s better to have unique upper limit for all bands. Since the PC class maybe introduced to certain bands in future.

Ericsson: If the upper limit over PC on current UE specification, then how to guarantee co-existence? Better to align with IAB-MT naming with LA and WA.

QC: For TDD, we need to have fixed values. For FDD bands, no big issue.

CMCC: We think PC of repeater should be larger than any UE classes supported by that bands. 2 reason: guarantee the gain to avoid the shrink issue; aggregated signal power with simultaneously input signals.

Nokia: There is only one class associated with power limitation. For another class, no co-existence can be ensured by 3GPP specifications.

Huawei: We capture the information into TR. We think the IAB-MT study can be refered.

ZTE: Do we need to do the co-existence considering no power control for repeater? Any plan ?

Huawei: IAB-MT has less PC; for repeater it relies on UE PC which has more PC compared to IAB-MT.

QC: Agree with Huawei. UTRA and E-UTRA is specified for FDD, no critical issue. In UE specification, ACLR is pending on PC based on co-existence study.

Ericsson: UE with mobility and repeater assumed as stationary. We have similar issue as IAB-MT, same conclusion can be applied. No co-existence simulation needed.

Agreement: Introduce two classes, one with power limitation and another one without power limitation.

For the class with power limitation: the exact power limitation can be further discussed

* Option 1: With fixed values
* Option 2: With maximum value over the supported classes as per band basis
* Other options not precluded

**Issue 2-5: Classes for FR2 UL**

* Proposals
  + Option 1: 2 classes: WA and LA
  + Option 2: No class defined
  + Option 3: 2 classes: LA and MR
  + Option 4: 3 classes: Planned(WA)- no power limit, Semi-unplanned (MR) – upper limit same as UE PC 1 and Fully-unplanned(LA) – output power same as UE PC3/5

**Discussion:**

DOCOMO: We are fine with option 1 with the assumption the maximum power can be declaration basis with the limitation.

Ericsson: We can define two classes similar as FR1.

CATT: Similar as FR2 DL, the requirements difference associated with different classes? What’s requirements EIRP or TRP? OK with option 1 and pending on further checking on the requirements?

Ericsson: We see the difference compared to DL, for UL we do have classes from co-existence aspect. The situation is different.

ZTE: We need to introduce LA and medium class to limit the interference in UL.

CATT: For the co-existence of UE have different situation as repeater.

QC: in FR2, the system is TDM. At certain time, only one signal will be efficiently amplified with beamforming in FR2.

Ericsson: For IAB-MT, we have 2 classes.

Agreement: Introduce two classes, one with power limitation and another one without power limitation. These can be checked whether there are difference among classes from requirement aspect.

Further discuss the power limitation value for the class with power limitation:

* Option 1: EIRP and TRP specified for PC1 in UE specification 101-2.
* Other options not excluded

**Conclusion after 1st round**

**Agreements reached in 1st round:**

**Issue 4-1: Handling of conformance specs**

Agreement: Introduce two new specifications for the repeater conformance testing as below:

• 38.1xx – NR; Repeater conformance testing – Part 1: Conducted conformance testing

• 38.1xx – NR; Repeater conformance testing – Part 2: Radiated conformance testing

**Issue 4-3: Repeaters and CLI**

Agreement: CLI will not be considered in the current WI

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115770 | WF on System Parameters for Repeaters | Nokia | Approved |
| R4-2115771 | WF on TDD Repeater Switching Requirements | Qualcomm Incorporated | Approved |
| R4-2115772 | Skeleton of TS 38.106 | CMCC | Approved |

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**R4-2115770 WF on System Parameters for Repeaters**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115771 WF on TDD Repeater Switching Requirements**

*Type: other For: Approval  
 Source: Quaclomm*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2112234 Handling of conformance testing for repeaters**

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

**Decision: Noted.**

##### 9.5.1.1 System parameters

**R4-2111915 Discussion on repeater system parameters**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2113665 Multi-band operation of NR repeaters**

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

**Decision: Noted.**

##### 9.5.1.2 Repeater Class/Type

**R4-2111916 Discussion on repeater class and type**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112197 discussion on repeater classes**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112764 Views on NR repeater classes**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2113204 Discussion on repeater classes and types**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113363 On repeater classes and types**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on repeater classes

**Decision: Noted.**

**R4-2113666 Identifying classes and types for NR repeaters**

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

**Decision: Noted.**

**R4-2114229 Repeater class**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

discussion and draft proposal for the repeater class definitions

**Decision: Noted.**

**R4-2114481 Repeater classes for access link**

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

**Abstract:**

Discuss repeater classes for the access side

**Decision: Noted.**

##### 9.5.1.3 TDD repeater switching requirements

**R4-2111917 Discussion on TDD repeater requirements**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112196 discussion on TDD related requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113207 Discussion on timing requirement for TDD repeater**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113362 Repeater TDD requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

TDD related considerations

**Decision: Noted.**

**R4-2113667 TDD repeater switching requirements**

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

**Decision: Noted.**

**R4-2113984 Discussions on TDD switching requirements**

*Type: other For: Discussion  
 Source: Qualcomm CDMA Technologies*

**Decision: Noted.**

**R4-2114228 Repeater switching requirement**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discussion on the TDD repeater switching requirements

**Decision: Noted.**

##### 9.5.1.4 Others

**R4-2112187 Discussion on NR repeater core specification structure**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112188 Skeleton TS 38.106 NR Repeater radio transmission and reception v0.0.1**

*Type: draft TS For: Approval  
 38.106 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: CMCC*

**Decision: Revised to R4-2115772 (from R4-2112188).**

**R4-2115772 Skeleton TS 38.106 NR Repeater radio transmission and reception v0.0.1**

*Type: draft TS For: Approval  
 38.106 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: CMCC*

**Decision: Approved.**

**R4-2113668 Considerations on TDD repeater synchronization and CLI**

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

**Decision: Noted.**

#### 9.5.2 Conductive RF core requirements

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**Email discussion for [100-e][309] NR\_Repeater\_RF\_Part1, AI 9.5.2– Chunxia Guo**

**R4-2115630 Email discussion summary for [100-e][309] NR\_Repeater\_RF\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115781 (from R4-2115630).**

**R4-2115781 Email discussion summary for [100-e][309] NR\_Repeater\_RF\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW Aug 20th**

**Issue 1-1-1: DL output power methodology**

* Proposals
  + Option 1: define the same output power limits as BS/IAB spec. (CMCC, Ericsson, Nokia)
  + Option 2: define DL power limits to prevent the potential coexistence issues (ZTE)
  + Option 3: output power level like NR FR1 BS (CATT)
* Recommended WF
  + If it is approved to define the same classes as BS/IAB spec for DL, then the same output power limits for each class also apply for FR1 repeater.

Moderator’s suggestion for GTW:

* The same maximum output power limits of WA, MR, LA as NR BS spec still apply for repeater DL. Repeater could declare its output power as long as it equals to or less than the allowed maximum value for each classes respectively.
* If home class is defined for repeater DL, the same maximum output power limits as E-UTRA BS spec still apply.

**GTW Discussion:**

Agreements:

The same maximum output power limits of WA, MR, LA as NR BS spec still apply for repeater DL. Repeater could declare its output power as long as it equals to or less than the allowed maximum value for each classes respectively.

If home class is defined for repeater DL, the same maximum output power limits as E-UTRA BS spec still apply.

**Issue 1-2-1: UL output power upper limits**

* Proposals
  + Option 1: define class dependent output power upper limit, if so please list the potential output power limits
    - Power limits like MR and LA BS (CATT)
    - the power limits of IAB could be taken as baseline. (ZTE)
    - WA and LA with the same definition as IAB-MT spec (Nokia)
  + Option 2: define two levels of power, one with power less than any UE power class and the other with output power larger than any UE power class (CMCC)
  + Option 3: UL maximum output power is the same as the maximum UE power class for at least one UL class (Ericsson)

**GTW Discussion:**

E///: In IAB, we assuming TDD bands with beam-forming. For repeater, do we need to add some clarification for UL beamforming gain assumption.

CMCC: For antenna gain, in LTE experience considering loss, the efficient gain is 0 dB similar as UE side.

E///: There is difference compared to UE from mobility aspect, repeater is static. Further discuss the assumption gain of repeater.

Nokia: We didn’t see the need to make the difference among FDD and TDD. We should the take same value as 24 dBm from co-existence aspect. We already anther UL class without limitation.

CMCC: In UE side, we have PC over than 24dBm without issues, why that can’t deployed for repeater.

QC: In near future, we will have 26dB PC for FDD bands, then what will be applied for FDD repeater.

Agreement:

* For FDD, align with IAB-MT requirements and use 24dBm as the power limitation
* For TDD,
  + Option 1: reuse 24dBm the same as IAB-MT
  + Option 2: UE power class based power limitation, e.g. 26dBm or 29dBm
* RAN4 will further discuss the antenna gain assumption for repeater and associated co-existence impact.

**Issue 2-1: the baseline for repeater UL ACLR related requirements?**

* Proposals
  + Option 1: refer to BS spec no matter UE power classes
  + Option 2: refer to UE spec no matter UE power classes
  + Option 3: refer to BS spec for repeater with higher power than any UE power class and refer to UE spec for repeater power lower than any UE spec
* Recommended WF
  + At least for repeater with output power higher than UE output power, UL ACLR should be aligned with BS spec. FFS how to consider antenna gain in the comparison.

Moderator’s suggestion for GTW:

* For repeater with output power higher than [UE maximum output power under existing PCs], UL ACLR should be aligned with BS spec.
* For repeater with output power equal to or less than UE power class, UL ACLR should be aligned with corresponding UE ACLR requirements.

**GTW discussion:**

CATT: Not sure how UL ACLR can be measured if aligned with BS spec requirements.

Nokia: We should define requirements in dBm to avoid the confusion. The measurement ability can be further addressed in conformance phase.

Ercisson: The issue same as BS, we can use maximum out power. We agree with Nokia to decouple the test issue and core requirements definition.

Agreements:

* For repeater with output power higher than [UE maximum output power under existing PCs], UL ACLR should be aligned with BS spec.
* For repeater with output power equal to or less than UE power class, UL ACLR should be aligned with corresponding UE ACLR requirements.
* Test issue can be further discussed and addressed under conformance phase.

**Sub-Topic #2-2 DL ACLR**

Moderator’s suggestion for GTW about DL ACLR

We should at first figure out the frequency location of adjacent channel when define ACLR

* Option 1: limited within passband. This implies the amplification gain of adjacent channel is the same as that of passband
* Option 2: outside passband. This implies the amplification of adjacent channel could be suppressed compared with passband
* Option 3: may be limited within passband and outside passband and/or partial within the passband. If so how could we assume the amplification gain?

Does the passband only contain carriers from the same operator? (Proposed by Ericsson)

* Previous understanding is that passband should only contain carriers from the same operator. If so, we should add it to the passband definition we agreed to be clear.

**GTW Discussion:**

Huawei: It’s indicated in UTRA Repeater TR, the passband only contains carriers from same operator.

Ericsson: Better to clarify and capture into the pass band definition.

Nokia: We agree we need to clarify the definition first. If we restricted to same operator, the co-existence would be better.

CATT: For ACLR, the analogy filter can’t work to improve the performance. ACLR need using digital filter to achieve the performance.

QC: Considering Tunnel, two operators on adjacent channels, we should collect the operators’ input.

ZTE: Not sure whether we can exclude the cases with multiple operators’ cases?

CMCC: In our deployment, the repeater only with our dedicated carriers.

Ericsson: It’s possible to control the noise within the passband which repeater aims to amplify. In our understanding, the passband shall belong to the same operator.

Agreements:

The baseline assumption for specifying RAN4 requirements that: the passband should only contain carriers from the same operator or collaborating operators. This assumption also will be included into pass band definition.

Ericsson: We need at least for outside of passband, FFS for the inside of passband.

CMCC: Even the passband only containing the carriers from same operators, we still need to guarantee the co-existence performance with adjacent channel.

Huawei: We are OK with Ericsson’s proposal. We can check the in-band issue and come back whether there is a need for inside of pass band.

ZTE: How to ensure the performance within the passband assuming repeater without any digital filter processing?

CATT: We share same understanding as CMCC, ACLR shall be applied for both inside and outside of passband. Repeater is different compared to BS. The test difficulty would be another issue.

CMCC: It’s hard to achieve the performance as BS in adjacent channel. We can have a relaxed requirement under adjacent channel within and outside of pass band.

Ericsson: We should consider the inside and outside of passband as separate cases.

Nokia: Same comments as E///, the situation inside and outside is different from requirements and co-existence aspect.

Huawei: We also need to consider the minimum channel bandwidth and minimum bandwidth of pass-band.

CATT: Not sure do we need both requirements for ACLR and out of band gain requirements.

E///: ACLR and out of band gain both needed. We can further how the ACLR requirements will be specified or EVM requirements can help.

Agreement: Further discuss the inside and outside cases for potential ACLR requirements with following aspect:

* Co-existence on adjacent channel within and outside of pass-band
* Achievable performance considering repeater implementation
* If requirements specified for inside of pass band, the requirements maybe be relaxed compared to BS ACLR

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115720 | WF on conducted output power and emission requirements | CATT | Approved |
| R4-2115721 | WF on other conducted requirements | CMCC | Approved |

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**R4-2115720 WF on conducted output power and emission requirements**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115721 WF on other conducted requirements**

*Type: other For: Approval  
 Source: CMCC*

**Abstract:**

**Discussion:**

**GTW Aug 25**

**EVM requirements**

CATT: We prefer to define several EVM limit requirements without linked modulation orders.

Nokia: We are fine to linkage with modulation orders.

QC: We are fine to linkage with modulation orders. As we need to verify EVM under certain assumption of modulation orders.

Huawei: Similar view as QC. Lowest value with highest modulation order. We are worrying for EVM linked to QPSK.

E///: We can improve the definition under specification drafting. For MTC, we see the scenario with EVM linked with QPSK.

CommScope: It’s useful to linked with modulation orders. The value from 104 is reasonable.

CATT: We can further work for specifying requirements, BS manner mayn’t work

Nokia: Emission requirements should be take care of co-existence issue other than EVM requirements.

**Agreement:**

**Agreement 1-1: Define EVM limits in the spec.**

**Agreement 1-2: 256 QAM scenario should be considered for repeater spec. 256 QAM is not necessary for FR2 UL.**

**Agreement 1-3: If EVM are based on declaration, regardless of declaration of basic limits or modulation scheme, the declaration for DL and UL are independent.**

**Agreement 1-4: Define following EVM levels linked to different modulation scheme and repeater declare which EVM level is supported.**

* **EVM level linked to 256QAM**
* **FFS: EVM level linked to low data rate e.g. QPSK**
* **EVM level linked to 64QAM**

**RAN4 will further discuss how to specify EVM into specification**

**NF equivalent requirements**

Huawei: We are OK with agreement 2-1. Option 2 linked with gain.

Nokia: We agree NF is important. Meanwhile it maynot feasible to measure NF in FR2. Maximum output power seems related gain.

Ericsson: Option 2, we don't want to amplify with output without input. From interference aspect, we want to ensure the performance.

CommScope: NF is not in standard; we don’t want to specify NF in specs. We are open to discuss option 2.

CATT: For option 3, how to specify requirements with option 3? Seems both option 2 and option 3 require some side condition i.e. the gain assumption.

CMCC: We prefer option 1 which is direct metric. Option 2 merged gain and noise floor together.

E///: Why NF is important? NF vs NF with gain. Option 2 more reasonable to reflect performance.

Huawei: High gain + low NF equal to Low gain + High NF from output power aspect.

Nokia: Seems we are discussing different requirements. One refer to define reference requirements, others refer to co-existence and interference.

CMCC: Option 2 is NF + gain. Questionable how to define the requirements.

Ericsson: We should understand why we define requirements.

CommScope: NF impact the manufacture and depending on the deployment scenario. We don’t see the need to limit NF. This is can be handled by NW deployment.

ZTE: For in-band wanted signal, first one can be verified by EVM. Second one can be verified by in-band emission.

CMCC: We can use NF analyser to verify NF.

Agreement:

Further discuss the purpose of introducing NF equivalent requirements including:

1. Verify SINR degradation with internal noise floor
2. Ensure the interference co-existence performance inside the passband

FFS whether dedicated NF requirements need to be introduced, or can be implicitly verified by other requirements including EVM requirements and emission requirements.

The potential options for defining NF requirements if dedicated NF requirements introduced:

* Option 1: NF
* Option 2: maximum passband output power level with no input signal
* Option 3: minimum input level with which output signal quality achieved

**Decision: Approved.**

**GTW on August 27th**

Ericsson: Both ACRR and OOB gain can be used to regulate both. ACRR regulate the re-amplification & distortion of other carriers and OOB gain regulate the response to unwanted emissions more convenient.

ACLR with power ratio still needed which generated by the wanted signal (a signal out of pass band) ; and ACRR with gain ratio for other unwanted signal (a signal out of pass band) sarts

CATT: Out of band gain is absolute requirements, and ACRR is relative requirements. We can further discuss the requirements introduction. ACRR is co-existence with UTRA for E-UTRA Repeater. We need to discuss the scenario for NR repeater.

Nokia: What E/// proposed is one of candidate option. ACRR is relative, we also need to consider the absolute emission level; we believe more study needed.

CMCC: If OOB gain used for unwanted emission, we need to define one uniform amplified gain for whole band. When we define ACRR requirements, the performance maybe reflected by ACLR requirements.

Ericsson: Both ACRR and ACLR related to filter performance. But ACLR include the PA impact (linearity). ACRR is about the PA gain out of pass band.

We need to think both ACLR and ACRR with different input signal locations.

Nokia: We don’t think it’s need to uniform amplified gain for OOB gain. We can consider both ACRR and out of band gain to ensure the performance.

QC: We think both ACLR and ACRR needed since they related to different PA performance as mentioned by Ericsson.

CMCC: ACLR caused by PA linearity, and suppressed by filter by out of pass band. We think ACRR not needed.

QC: With good linearity PA, we can pass ACLR but we mayn’t pass ACRR which pending on filter performance.

Ericsson: ACLR with input signal in the passband; we measure the output signal with and out of pass band. ACRR with output signal out of pass band. We may think combined test together with input signal both within and outside of passband.

Additional Agreement:

ACLR and ACRR regulate different aspects of repeater performance.

The baseline assumption is RAN4 will define ACLR (out of pass band) and ACRR RF core requirements pending on further checking by Nov 2021 RAN4 meeting

FFS test feasibility of these requirements which can further discussed in RF conformance phase

##### 9.5.2.1 Transmitted power related requirements

**R4-2111918 Discussion on NR repeater conducted output power**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112199 discussion on repeater power related conducted requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113205 Discussion on Repeaters Conducted power related requirements**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113360 Repeater conducted output power**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on conducted power requriements

**Decision: Noted.**

**R4-2113669 Conducted power related requirements consideration for NR repeaters**

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

**Decision: Noted.**

**R4-2114482 Repeater conducted and power-related requirements**

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

**Abstract:**

Discussion of vaious power related requirements

**Decision: Noted.**

##### 9.5.2.2 Emission requirements

**R4-2111920 Discussion on NR repeater conducted emission requirements**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112200 discussion on repeater emission related conducted requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113364 Repeater conducted emissions requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on emissions requirements

**Decision: Noted.**

**R4-2113670 Repeater conducted unwanted emissions**

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

**Decision: Noted.**

##### 9.5.2.3 Others

**R4-2111922 Discussion on NR repeater other requirements for FR1**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112198 discussion on other RF conducted requirements for NR repeater**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113206 Discussion on repeater EVM requirements**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113359 Repeater other conducted requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on conducted requriements

**Decision: Noted.**

**R4-2113671 Signal quality and OOB gain considerations for FR1 NR repeaters**

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

**Decision: Noted.**

#### 9.5.3 Radiated RF core requirements

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**Email discussion for [100-e][310] NR\_Repeater\_RF\_Part2, AI 9.5.3– Richard Kybett**

**R4-2115600 Email discussion summary for [100-e][310] NR\_Repeater\_RF\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115782 (from R4-2115600).**

**R4-2115782 Email discussion summary for [100-e][310] NR\_Repeater\_RF\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115722 | WF on NR Repeater FR2 RF | Huawei | Approved |
| R4-2115723 | WF on FR2 OOB gain further studies | Ericsson | Approved |

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**R4-2115722 WF on NR Repeater FR2 RF**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115723 WF on FR2 OOB gain further studies**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2114230 Repeater radiated RF requirements**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discuss radiated RF requirements

**Decision: Noted.**

##### 9.5.3.1 Transmitted power related requirements

**R4-2111919 Discussion on NR repeater radiated output power**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112201 discussion on repeater power related radiated requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112765 Views on output power requirements for FR2 NR repeater**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2113361 Repeater radiated power requirement**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on radiated power requirements

**Decision: Noted.**

**R4-2113672 Radiated power related requirements considration for NR repeaters**

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

**Decision: Noted.**

##### 9.5.3.2 Emission requirements

**R4-2111921 Discussion on NR repeater radiated emission requirements**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112203 discussion on repeater emission related radiated requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112766 Views on spurious emission requirements for FR2 NR repeater**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2113365 Repeaters radiated unwanted emissions**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on emissions requirements

**Decision: Noted.**

**R4-2113673 Repeater OTA unwanted emissions**

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

**Decision: Noted.**

##### 9.5.3.3 Others

**R4-2111923 Discussion on NR repeater other requirements for FR2**

*Type: other For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2112202 discussion on other RF radiated requirements for NR repeater**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113366 Repeater radiated other requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on radiated requirements

**Decision: Noted.**

**R4-2113674 Signal quality and OOB gain considerations for FR2 NR repeaters**

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

**Decision: Noted.**

#### 9.5.4 EMC core requirements

**Refer to Email discussion summary of [100-e][303] NR\_EMC, AI 5.1.3,5.1.6,6.1.2.5,9.5.4– Wubin Zhou**

**R4-2112841 TP to TS38.114: NR repeaters EMC Core requirements**

*Type: pCR For: Approval  
 38.114 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: ZTE Corporation*

**Decision: Postponed.**

**R4-2112864 3GPP TS 38.114 v0.1.0**

*Type: draft TS For: Approval  
 38.114 v0.1.0 CR- rev Cat: (Rel-17)  
  
 Source: ZTE Corporation*

**Abstract:**

3GPP TS 38.114 v0.1.0

**Decision: Withdrawn.**

**R4-2113190 TPs to TS 38.114 on RF Repeater EMC section 8 (Emission)**

*Type: pCR For: Approval  
 38.114 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

TPs to TS 38.114 on RF Repeater section 8 (Emission)

**Decision: Postponed.**

**R4-2113191 TPs to TS 38.114 on RF Repeater EMC section 9 (Immunity)**

*Type: pCR For: Approval  
 38.114 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

TPs to TS 38.114 on RF Repeater section 9 (Immunity)

**Decision: Postponed.**

**R4-2114563 TP to TR 38.114: EMC requirements for NR repeater**

*Type: pCR For: Approval  
 38.114 v0.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei*

**Abstract:**

TP to TS 38.114, based on the previous analyses of the TS 38.113.

**Decision: Postponed.**

### 9.6 Introduction of DL 1024QAM for NR FR1

#### 9.6.1 General

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**Email discussion for [100-e][311] NR\_DL1024QAM\_BSRF, AI 9.6.1,9.6.2, 9.6.3– Thomas Chapman**

**R4-2115601 Email discussion summary for [100-e][311] NR\_DL1024QAM\_BSRF**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115783 (from R4-2115601).**

**R4-2115783 Email discussion summary for [100-e][311] NR\_DL1024QAM\_BSRF**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW on Aug 18th**

**Issue 1-1: Gain for wide area scenario**

Under this issue, the observations on the gains of 1024QAM for WA class should be discussed.

* Observations
  + Observation 1: No gain (Huawei)
  + Observation 2: Gain for at least 20% of users (Ericsson)
* Recommended WF
  + Please comment on your views on the results, considering the simulation parameters, methodology and results themselves.

**Issue 1-2: Whether to exclude WA scenario**

This issue aims to decide on whether to include the WA scenario. Considerations raised by companies include the gains, comparison to LTE (for which 1024QAM is applicable) and technical challenges that exist for NR but not LTE (e.g. bandwidths, spectrum utilization etc.). Feedback on the issues highlighted by companies in their contributions is welcome.

* Proposals
  + Option 1: Exclude WA scenario (Huawei, CMCC, ZTE, CATT if no gain)
  + Option 2: Include WA scenario, but no EVM requirement for WA (Huawei, CMCC)
  + Option 3: Include WA scenario, with EVM requirement 3% (for all classes) (Huawei, CMCC)
  + Option 4: Include WA scenario (Ericsson, Nokia, Verizon, KDDI, SoftBank, NTT DOCOMO, AT&T, SK Telecom, T-Mobile USA)
* Recommended WF
  + Please discuss, comment and motivate a preferred conclusion

**Issue 1-3: EVM requirement**

* Proposals
  + Option 1: 3% (Huawei, CMCC)
  + Option 2: Not defined for WA class, TBC for MR, LA class (Huawei, CMCC)
  + Option 3: 2.5% (Nokia, Intel, ZTE, Ericsson)
  + Option 4: 2.5~3% (CATT)
* Recommended WF
  + Please discuss and motivate a conclusion for the EVM requirement. Refer to link simulation results (including comments to other companies link simulation results) as needed. It is recognized that the EVM discussion is linked to the BS class discussion, so if you prefer propose values for the two cases of (i) 1024 QAM applicable for all classes or (ii) 1024QAM not applicable for WA class.

**Discussion:**

Huawei: Question for SLS-results from Ericsson: we need to use sys-level to evaluate MCS CDF; in Ericsson results, MCS derived from Link-level.

QC: For power back-off, any consideration?

Ericsson: From link-level, 1024 QAM MCS can be used over 30dB. And from system level, 20% UE can observe such SNR region. In our simulation, no power back-off considered.

In previous meeting, we already have agreement power-back off can be enable for DL 1024QAM.

Huawei: No power back-off considered in our simulation. We believe the methodology from E/// for SLS not the real case since UE will report CQI, Rank2 information, based on the reporting from UE, BS will decide the corresponding MCS.

ZTE: If we can relax EVM for wide area BS, then we can enable DL 1024QAM for WA BS.

AT&T: In Ericsson paper, EVM 2.5% need to be ensured to achieve the performance benefits. The supporting is declaration basis. The proposal from last RAN4 meeting, SLS is just supplementary information; but still majorly focus on link-level simulation.

Nokia: We believe 2.5% EVM still needed; power back-off is BS declaration basis similar as 256QAM. All BS classes need to be included.

QC: We agree with AT&T and Nokia, 2.5% EVM need to be specified; the supporting can be optional with BS declaration basis.

Intel: We share view as QC, Nokia, AT&T based on our simulation results.

Huawei: For EVM requirements, 3% EVM still can achieve performance gain under 1 Layer. No much results from companies for 2 layer cases. EVM requirements also related the power back-off. We can comprise to option 2 or option 3.

ZTE: The motivation of relaxing EVM requirement was to support this feature without power back-off to avoid the coverage issue.

Ericsson: There are several operators mentioned that keeping the consistence of DL 1024 QAM when LTE refarming to NR is important.

ZTE: Not clear whether operators really deployed 1024QAM in LTE NW.

CATT: For 1Layer, 2.5%-3% EVM enough to achieve performance gain; for 2 Layer, neither 2.5% nor 3% can get performance gain. We suggest to decide EVM based on 1layer.

We suggest to define separate EVM for different BS classes.

Agreement:

Include WA scenario for DL 1024QAM:

* The supporting DL 1024QAM is BS declaration basis

Huawei: For EVM requirements, we proposed to declaration basis for supporting DL 1024QAM with WA BS class.

Further discuss below candidate options for EVM requirements:

* Option 3: 2.5% (Nokia, Intel, ZTE, Ericsson, AT&T , Qualcomm, T-Mbolie USA), ZTE OK for LA and MA classes
* Option 4: 2.5~3% i.e. 2.8% (CATT, Huawei), ZTE support for WA class
* Option 5: EVM as declaration basis for supporting DL 1024QAM for WA BS class within 2.5%~3% (Huawei comprised option)

AT&T: For option 5, clear reasonable range should be given, otherwise not workable.

ZTE: We can separate the discussion for WA and other classes.

Nokia: With option 5, it’s risk since the gain is questionable with this option.

Softbank: We agree with AT&T and Nokia.

Huawei: We would like to discuss EVM requirements for the classes together. We can consider option 4.

Ericsson: We think option 5 not workable.

**GTW on August 25**

* Option 1: 2.5% (Nokia, Intel, Ericsson, AT&T, Qualcomm, T-Mobile USA, Verizon, SoftBank, KDDI, NTT DoCoMo), ZTE OK for LA and MA classes
* Option 2: 2.8% (CATT, Huawei, CMCC), ZTE support for WA class
* Option 3: EVM as declaration basis for supporting DL 1024QAM for WA BS class with<=3% (Huawei compromised option, CMCC)

**Discussion:**

ZTE: Can we accept to separate WA class and LA/MA classes?

* LA/MA classes: 2.5%
* WA class: 2.8%

Ericsson: We don’t understand the difference compared to LTE. For option 3, not sure how it works.

AT&T: Based on evaluation, 2.5% required to achieve performance gain.

Nokia: Same view as E/// and AT&T.

QC: We support option 1.

Huawei: We proposed 3% based on simulation results. 3% can provide significant gain. We need to consider other aspects the impact with power back-off. We proposed to comprise as 2.8%. We proposed option 3, including WA with test method that vendors can declare the supported EVM requirements. This is related to power back-off.

CATT: Based on the results from us, 2.8% enough to get gain. The NR system more complicated compared to LTE with larger channel bandwidths and wide bands.

AT&T: The supporting is declaration basis, if vendors have issues to implement, they can declare without supporting.

CATT: We already agreed to conclude based on performance evaluation.

Nokia: Power back-off are well knowing from LTE phase for high modulation order including 256QAM we have same situation.

Huawei: We observe same performance under 2.5% and 2.8% for 1 layer. For 2 layers, not all companies provide the results. And from some of companies’ result, 2.5% not enough for 2 layers.

ZTE: We are open to further discuss in next meeting.

E///: In LTE, we have CA with 2 CC aggregated 40MHz or even large, same requirements applied. In NR initial phase, we did lot of evaluation work.

ZTE: The ACLR performance of NR is worse than LTE.

Option 1: 2.5% for all classes (E///, Nokia, AT&T, QC, T-Mobile USA, SoftBank)

Option 2: 2.5% for LA and MR classes; 2.8% for WA class. (ZTE, CATT 2nd preference)

Option 3: 2.8% for BS classes (Huawei, CATT)

Session Chair observation: The majority supporting on option 1 meanwhile several companies still keep consistent objection to agree option 1 during this RAN4 meeting.

Option 1 objected by Huawei, ZTE, CATT.

Option 2 objected by AT&T, T-Mobile USA, QC, Ericsson, Nokia, SoftBank

RAN4 will make decision on Nov 2021 RAN4 meeting with following options:

* Option 1: 2.5% for all classes
* Option 2: 2.5% for LA and MR classes; 2.8% for WA class
* Option 3: 2.8% for all BS classes

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** |
| R4-2113049 | CR for TS 38.104: 1024QAM, | Huawei | Postpone |
| R4-2113050 | Draft CR for TS 38.101-1 | Huawei | Postpone |
| R4-2115639 | Draft CR for TS 38.101-1 | Huawei | Withdraw |
| R4-2115638 | WF on 1024QAM requirements | Ericsson | Approve |

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**R4-2115638 WF on 1024QAM requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2113951 1024 QAM Deployment Scenarios**

*Type: other For: Approval  
 Source: Ericsson, Nokia, Nokia Shanghai Bell, Verizon, KDDI, SoftBank, NTT DOCOMO, AT&T, SK Telecom, T-Mobile USA*

**Abstract:**

In this contribution, the views of the sourcing companies will be summarized on BS classes.

**Decision: Noted.**

#### 9.6.2 BS TX RF requirements

##### 9.6.2.1 Deployment and link level simulation

**R4-2111976 Link level simulation results for 1024QAM for NR FR1**

*Type: other For: Approval  
 Source: CATT*

**Decision: Revised to R4-2115627 (from R4-2111976).**

**R4-2115627 Link level simulation results for 1024QAM for NR FR1**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2113047 Link simulation for support of 1024QAM**

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

**Decision: Noted.**

**R4-2113487 1024QAM simulation results**

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

**Abstract:**

In this paper we show further simulation results based on latest simulations assumption updates agreed during RAN4#99-e meeting.

**Decision: Noted.**

**R4-2113952 System and Link Simulation Results for DL 1024 QAM**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Following the results, Section 2.3, provided is the author’s analysis on the results and the proposed outcome on BS EVM requirement level and the BS class aspects. During past RAN4 meetings there were some company’s’ concerned that wide area base station

**Decision: Noted.**

##### 9.6.2.2 EVM requirements

**R4-2111977 BS TX RF requirements for 1024QAM for NR FR1**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2113048 BS RF requirements for support of 1024QAM**

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

**Decision: Noted.**

**R4-2113049 CR for TS 38.104: 1024QAM**

*Type: CR For: Agreement  
 38.104 v17.2.0 CR-0342 rev Cat: B (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Postponed.**

**R4-2115639 CR for TS 38.104: 1024QAM**

*Type: CR For: Agreement  
 38.104 v17.2.0 CR-0342 rev Cat: B (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Withdrawn.**

**R4-2113488 On EVM requirement for 1024QAM for FR1 DL**

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

**Abstract:**

In this contribution we continue discussion on EVM requirement for 1024QAM.

**Decision: Noted.**

**R4-2114184 Discussion on Tx EVM requirements for DL 1024QAM**

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

**Decision: Noted.**

**R4-2114214 Discussion on BS requirements for NR 1024QAM**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

##### 9.6.2.3 Others

**R4-2111978 BS test requirements for 1024QAM for NR FR1**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

#### 9.6.3 UE RX RF requirements

**R4-2111979 UE RX RF requirements for 1024QAM for NR FR1**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2113050 CR for TS 38.101-1: 1024QAM**

*Type: CR For: Agreement  
 38.101-1 v17.2.0 CR-0900 rev Cat: B (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Decision: Postponed.**

### 9.8 Enhancement for NR high speed train scenario in FR1

#### 9.8.3 UE demodulation requirements (38.101-4)

##### 9.8.3.1 General

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**Email discussion for [100-e][324] NR\_HST\_FR1\_Demod, AI 9.8.3– Xiaoran Zhang**

**R4-2115615 Email discussion summary for [100-e][324] NR\_HST\_FR1\_Demod**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115796 (from R4-2115615).**

**R4-2115796 Email discussion summary for [100-e][324] NR\_HST\_FR1\_Demod**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

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| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115724 | WF on FR1 HST demoulation | CMCC | Approved |

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**R4-2115724 WF on FR1 HST demodulation**

*Type: other For: Approval  
 Source: CMCC*

**Abstract:**

**Discussion:**

**GTW discussion on Aug 26**

**Issue 1-1: SCS configurations and applicability rules for SCS configuration**

CMCC: We are wondering test coverage issue so we prefer option 3.

QC: We define single requirement for different combinations under normal CA requirements. We believe no test coverage issue

DOCOMO: We should not apply CA CQI applicable rules for CA PDSCH requirements.

Apple: We didn’t see test coverage issue.

Agreement: Option 1.

**Issue 1-2: Applicability rule for HST-SFN joint transmission scheme and DPS transmission scheme**

Huawei: For single carrier case, no test applicable rule among HST-SFN and HST-DPS. We agreed to minimize test load other than test rule among HST-SFN and HST-DPS.

HST-DPS and HST-SFN is different feature and HST-DPS is mandatory and it’s not reasonable to skip the mandatory feature.

For CA, we have larger aggregated channel bandwidths, CA cases consume more complexity.

CMCC: In single carrier, we don’t have test applicable rules among HST-SFN and HST-DPS. Second thing, whether to introduce additional new capability signalling for CA cases.

QC: We think extending HST-SFN to CA, we don’t think this need separate capability signalling.

Apple：We already agreed to consider test applicable rules.

Intel: We can consider test applicable rule among single carrier and CA cases.

NTT DoCoMO: Our preference is option 1.

Ericsson: We already agree the condition to introduce DPS CA with test applicable rule with SFN CA.

Further discuss and make decision in Nov 2021 RAN4 meeting.

**Issue 1-3: Applicability rule between single carrier and CA**

Option 1 (baseline assumption)：

* UE skip single carrier test case if it explicitly passes corresponding CA test case
  + If UE pass the HST-SFN JT requirements for CA, UE can skip HST-SFN JT requirements for single carrier defined in Rel-16.
    - FFS :UE need to pass Rel-16 HST-DPS single carrier test according to the capability of active TCI state handling
    - UE need to pass Rel-16 FDD HST single tap test.
    - UE can skip Rel-16 TDD and Rel-15 HST single tap test.
  + If UE pass the HST-DPS requirements for CA, UE can skip HST-DPS requirements for single carrier defined in Rel-16.
    - FFS：UE don’t need to pass Rel-16 HST-SFN JT single carrier test if UE does not have the capability demodulationEnhancement-r16
    - FFS: UE need to pass Rel-16 HST-SFN JT single carrier test if UE have the capability demodulationEnhancement-r16
    - UE need to pass Rel-16 FDD HST single tap test.
    - UE can skip Rel-16 TDD and Rel-15 HST single tap tests.

**Decision: Approved.**

**R4-2113455 Summary for FR1 HST demodulation results**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This spread sheet summarizes the simulation results of FR1 HST demodulation requirements.

**Decision: Noted.**

##### 9.8.3.2 PDSCH requirements for CA scenarios

**R4-2112103 Discussion on PDSCH CA Requirements in HST**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2112504 Discussion on FR1 HST UE demodulation for CA scenario**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112511 Simulation results for HST-DPS for CA scenario**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113131 Views on HST CA PDSCH performance requirements**

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

**Decision: Noted.**

**R4-2113192 Discussion on PDSCH requirements for CA scenarios**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113219 Views on HST CA tests for FR1**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2113454 Update of simulation results for CA PDSCH with HST**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contributions updates our simulation results for PDSCH demodulation for HST CA.

**Decision: Noted.**

**R4-2113456 PDSCH demodulation requirements for CA with HST-SFN scenario**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the open issues of the PDSCH demodulation requirements for CA with HST-SFN scenario.

**Decision: Noted.**

**R4-2113790 Discussion on PDSCH CA scenarios for NR UE HST FR1 performance requirements**

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

**Decision: Noted.**

**R4-2113791 Simulation results on PDSCH CA scenarios for NR UE HST FR1 performance requirements**

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

**Decision: Noted.**

**R4-2114536 Views on FR1 HST PDSCH CA Tests**

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

**Decision: Noted.**

### 9.9 NR support for high speed train scenario in FR2

#### 9.9.1 General

**R4-2113792 Discussion on general issues for NR FR2 HST deployment scenario**

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

**Decision: Noted.**

#### 9.9.2 High speed train deployment scenario in FR2

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**Email discussion for [100-e][325] NR\_HST\_FR2\_Scenario, AI 9.9.1,9.9.2– Jackson Wang**

**R4-2115616 Email discussion summary for [100-e][325] NR\_HST\_FR2\_Scenario**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115797 (from R4-2115616).**

**R4-2115797 Email discussion summary for [100-e][325] NR\_HST\_FR2\_Scenario**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW Aug 19th**

**Issue 1-2-1: Schemes for Bi-directional deployment, Scenario-A**

* Proposals
  + Proposal 1 (ZTE, Samsung): Select scheme 1 as the transmission scheme for scenario-A bi-directional deployment.
  + Proposal 2 (Huawei, Ericsson): Do not consider Bi-directional deployment for Scenario A.
  + Proposal 3 (QC): Scheme 2 if bi-directional deployment is considered.

**Discussion:**

Ericsson: Why we need to discuss bi-directional deployment?

Samsung: Can we remove bi-directional deployment totally? Which is also pending on the issue of delay jump under uni-directional scenario.

Huawei: The uni-directional deployment still pending on checking on the RRM session conclusion.

QC: This will not impact RRM session conclusion.

Intel: This agreement has impact on the agreement in RRM session.

Nokia: We observed the hand-over delay issue under uni-directional deployment for Scenario A. We encourage companies to check, and hope we can capture the information into TR.

Agreement:

No dedicated performance RAN4 requirements will be specified for Bi-directional deployment for Scenario A by assuming the requirements will be specified under uni-directional deployment which pending on further confirmation in RRM session for the feasibility of uni-directional deployment.

Capture relevant information for the analysis of all possible deployment and schemes into TR, and some comparison analysis can be also included.

**Issue 1-3-3: Schemes for Bi-directional deployment, Scenario-B**

* Proposals
  + Proposal 1 (Samsung): Scheme-1 for Bi-directional deployment for Scenario B
  + Proposal 2 (Qualcomm): Scheme-2 for Bi-directional deployment for Scenario B
  + Proposal 3 (Huawei): Scheme-3 for Bi-directional deployment for Scenario B
  + Proposal 4 (ZTE): To wait for the conclusion on handling of propagation delay hopping in RRM session to determine the deployment for scenario-B.

**Discussion：**

QC: Do we need to select the bi-directional vs uni-directional?

E///: For bi-directional, we have OTA test issue with panel switch.

Huawei: Bi-directional scenario has advantages over than uni-directional scenario. For test issue, we don’t think there is test issue since the panel switch in TDM model.

Samsung: Is that possible to define requirements for both, or do some selection?

Both bi-directional and uni-directional deployment are feasible for scenario B.

Introducing performance requirements for both, and test applicable rules can be considered in demod discussion.

Nokia: Operators’ feedback is appreciated; we are aslo open to include both with applicable rules.

QC: There is no obvious need to do down-selection among these two for scenario B. Performance can be considered the candidate criteria for down-selection. For OTA test issue, we can further discuss even it’s TDM, some OTA modification on test set-up still required since single AOA applied for demod test.

E///: we are open to support both with requirements, two AOAs required with panel switch. We can further think a way to simplify the test set-up for baseband performance.

ZTE: Bi-directional need to be covered considering the coverage issue and delay jump issue.

Huawei: We should cover bi-directional deployment in requirements since Doppler shift need to be verified from performance requirements.

**Agreement:**

Introducing performance requirements for both uni-directional and bi-directional deployment in scenario B which pending on further discussion on following aspect:

-The test applicable rules can be further discussed and introduced if needed

- FFS whether single test case cover both uni-directional and bi-directional deployment

- BS declaration for applicable test cases can be further discussed

-Test feasibility for bi-directional deployment under performance test cases

-Performance comparison among uni-directional and bi-directional deployment

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** |
| R4-2115725 | WF on Remaining issues on FR2 HST deployment scenario and channel modeling | Samsung | Approved |
| R4-2115809 | TP to TR 38.854 – beam dwelling time for FR2 HST | Nokia | Approved |

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**R4-2115725 WF on Remaining issues on FR2 HST deployment scenario and channel modeling**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**GTW on Aug 24th**

**Issue 2-0-1: The factor needed to be considered for channel model**

* Option 1: Ds\_offset, Doppler and delay.
* Option 2: Ds\_offset, Doppler.

**Discussion:**

QC: We prefer to keep it FFS. Not sure what’s the assumption under demod test cases for beam detection handling.

Nokia: Intrdoucing delay (jump delay) for UL belongs to RRM scope which still under discussion. We already have dedicated UL TA adjustment requirements in BS side.

Huawei: For uni-directional test, major issue is delay jump issue and bi-directional is Doppler jump issue. We may split DL and UL cases. For UL, we already dedicated UL TA adjustment requirements. For DL, we don’t dedicated cases to define requirements from demodulation aspect.

Samsung: We already agreed DPS scheme for FR2 HST. Similar as FR1 HST, only no delay modelling in demod test cases. The delay (delay jump) belongs to RRM scope which out of demod scope. And during the beam switch period/TCI state switch period, we skipped to schedule PDSCH for RAN4 demod test cases. The same logic shall be applied for FR2 as well.

Intel: We sugguest to keep it as FFS as it’s discussed on RRM session. In FR1 DPS demodulation test case, it’s single TAP test case without pathloss consideration.

Ericsson: We need to decouple DL and UL. We don’t think the need for PUSCH requirements. In current FR1 DPS test cases, no delay modelling and this belongs to RRM scope.

ZTE: If the impact on delay jump already considered by other session, it should be excluded. We prefer to include channel model if no other test cases covered this delay jump.

Nokia: We prefer to decouple for DL and UL. Keep FFS for UL timing requirements. No need the delay for PUSCH.

Huawei: We are OK to decouple DL and UL. For DL, it’s true no any delay modelling under DPS FR1 test case since no delay issue. The discussion still ongoing under RRM session.

QC: Our concern is test ability issue. In demod test, we didn’t model beam detection. Timing detection is feasible in beam recovery.

Samsung: Suggest to consider more for demodulation test cases. Demodulation not consider beam detection, Timing adjustment which belongs to RRM scope. It’s impractical to have a joint test case across RRM and Demod. We already have test case agreed under RRM session. The normal delay variation already handled by RRM requirements; the delay jump issue still discussed under RRM session. Similar logic as FR1 DPS test cases, no PDSCH scheduling during the switch period.

Intel: the difference between FR1 and FR2, under bi-directional no delay issue. For uni-directional we have this issue. We suggest to keep it FFS.

Huawei: For DPS 1b, UE need to tack 2 states in the same time.

Agreement:

For UL PUSCH demod test cases, no delay modelling needed.

For UL TA adjustment demod test cases, further discuss delay modelling

For DL PDSCH demod test cases, FFS whether delay jumpneed to be considered in channel modelling pending on the further decision on RRM session

**Issue 2-1-1: Ds\_offset value for uni-directional**

Candidate options for Ds\_offset:

* Option-1: Ds\_offset = 0 for the Doppler shift worst case for UE performance evaluation.
* Option-2: Follow deployment scenario study outcome for a typical value chosen:
  + Scenario-A: Ds\_offset = 50m
  + Scenario-B: Ds\_offset = [100, or 200] m

Agreement:

Samsung: Scenario A: Ds\_offset = 50m

Nokia: We think offset =0 as worst case. For scenario B, different value can be considered. For unified channel model, the model from Huawei seems need more time check.

Huawei: We can further discuss the option with unified channel model. We are fine to select different values.

Ericsson: From demod aspect, we didn’t see difference among scenario A and B and bi-directional and uni-directional.

We conclude the Ds\_offset for un-directional and channel model for bi-directional. And further discuss the test cases introduced under demod AIs.

Intel: We should focus on Ds\_offset here. We think scenario A Ds\_offset = 0m. Scenario B as 100m.

Qualcomm: We are fine to discuss the unified channel model. We think Ds\_offset =0m not close to deployment considering RF impact.

ZTE: We prefer 50m for Scenario A.

Huawei: For scenario –A, we are fine to make conclusion.

Agreement:

Scenario-A: Ds\_offset = 10m

Scenario-B: Ds\_offset =100m

Note: The values are derived from worst cases based on the analysis of deployment scenario and used for demodulation requirement definition purpose.

**Issue 2-2-1 Channel modeling for FR2 HST bi-directional deployment**

* Option 2(a): To match Bi-directional deployment Scheme-1: UE connect to 2nd-nearest RRH.
* Option 2(b):

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* Option 2(c):

Agreement:

Companies are encouraged to draw conclusion in this meeting for RAN4 demodulation aspect.

All feasible transmission schemes with assioated channel modelling can be included into TR.

The baseline assumption was to consider option 2a for demodulation if introducing test cases pending on further checking by Nov 2021 RAN4 meeting.

-Note: From frequency jump performance verification aspect, option 2a is more simple option.

**Decision: Approved.**

**R4-2112263 On NR FR2 HST Deployment Scenario**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

##### 9.9.2.1 Deployment Scenario-A

**R4-2113170 Further discussion on FR2 HST deployment Scenario-A**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113193 Discussion on NR FR2 HST Scenario-A**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113352 HST Scenario A considerations**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Open issues for scenario A

**Decision: Noted.**

**R4-2113793 Discussion on NR FR2 HST deployment Scenario-A**

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

**Decision: Noted.**

**R4-2114587 On HST FR2 Deployment Scenario A**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

##### 9.9.2.2 Deployment Scenario-B

**R4-2113171 Further discussion on FR2 HST deployment Scenario-B**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113194 Discussion on NR FR2 HST Scenario-B**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113353 HST scenario B considerations**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Open issues for scenario B

**Decision: Noted.**

**R4-2113794 Discussion on NR FR2 HST deployment Scenario-B**

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

**Decision: Noted.**

**R4-2114588 On HST FR2 Deployment Scenario B**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2115809 TP to TR 38.854 – beam dwelling time for FR2 HST**

*Type: pCR For: Approval  
 38.854 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Approved.**

##### 9.9.2.3 Channel modeling

**R4-2113132 Channel models for HST FR2 demodulation requirements**

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

**Decision: Noted.**

**R4-2113172 On FR2 HST channel model**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113195 Discussion on NR FR2 HST channel model**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113349 Channel model for HST FR2 demodulation requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Proposals for remaining open issues for channel model

**Decision: Noted.**

**R4-2113795 Discussion on channel modeling for NR FR2 HST**

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

**Decision: Noted.**

**R4-2114547 On HST FR2 Channel Modeling**

*Type: discussion For: Discussion  
 Source: Nokia Germany*

**Abstract:**

In this contribution, we further disclosed our view on channel modeling for HST deployment scenarios in FR2.

**Decision: Noted.**

##### 9.9.2.4 Others

**R4-2114185 Discussion on FR2 HST deployment aspects**

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

**Decision: Noted.**

#### 9.9.5 Demodulation requirements

##### 9.9.5.1 General

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**Email discussion for [100-e][326] NR\_HST\_FR2\_Demod, AI 9.9.5– Yunchuan Yang**

**R4-2115617 Email discussion summary for [100-e][326] NR\_HST\_FR2\_Demod**  *Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115798 (from R4-2115617).**

**R4-2115798 Email discussion summary for [100-e][326] NR\_HST\_FR2\_Demod**  *Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115726 | WF on FR2 HST demodulation | Samsung | Approved |

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**R4-2115726 WF on FR2 HST demodulation**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2112042 View on demodulation requirement for Rel-17 FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113196 General discussion on demodulation requirements**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

##### 9.9.5.2 UE demodulation requirements

**R4-2112043 View on PDSCH requirement for Rel-17 FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2112252 Discussion on FR2 HST UE Demod Performance Test**

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

**Decision: Noted.**

**R4-2112500 Discussion on UE demodulation for FR2 HST**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113133 View on DL demodulation requirements for HST FR2**

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

**Decision: Noted.**

**R4-2113197 Discussion on UE demodulation requirements**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113457 UE demodulation requirements for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the UE demodulation requirements for HST FR2.

**Decision: Noted.**

**R4-2113804 Discussion on UE demodulation requirements for FR2 HST**

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

**Decision: Noted.**

##### 9.9.5.3 BS demodulation requirements

**R4-2113134 View on UL demodulation requirements for HST FR2**

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

**Decision: Noted.**

###### 9.9.5.3.1 PUSCH requirements

**R4-2112044 View on PUSCH requirement for Rel-17 FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113351 PUSCH demodulation requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Proposals for remaining open issues regarding PUSCH

**Decision: Noted.**

**R4-2113797 Discussion on PUSCH demodulation requirements for FR2 HST**

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

**Decision: Noted.**

**R4-2114558 On HST FR2 PUSCH requirements**

*Type: discussion For: Discussion  
 Source: Nokia Germany*

**Decision: Noted.**

###### 9.9.5.3.2 PUSCH with UL timing adjustment requirements

**R4-2112045 View on UL timing adjustment requirement for Rel-17 FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113354 PUSCH timing adjustment requirement**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Proposed timing adjustment parameters

**Decision: Noted.**

**R4-2113798 Discussion on PUSCH with UL timing adjustment requirements for FR2 HST**

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

**Decision: Noted.**

**R4-2114560 On HST FR2 PUSCH with UL Timing Adjustment Requirements**

*Type: discussion For: Discussion  
 Source: Nokia Germany*

**Decision: Noted.**

###### 9.9.5.3.3 PRACH requirements

**R4-2112046 View on PRACH requirement for Rel-17 FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113350 PRACH demodulation requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Proposals for remaining open issues regarding PRACH

**Decision: Noted.**

**R4-2113799 Discussion on PRACH demodulation requirements for FR2 HST**

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

**Decision: Noted.**

**R4-2114557 On HST FR2 PRACH Requirements**

*Type: discussion For: Discussion  
 Source: Nokia Germany*

**Decision: Noted.**

### 9.12 Further enhancement on NR demodulation performance

#### 9.12.1 General

**R4-2112223 Updated work plan for Further enhancement on NR demodulation performance WI**

*Type: Work Plan For: Approval  
 Source: China Telecom*

**Decision: Approved.**

**R4-2112224 Draft TR 38.833 v0.1.0: Further enhancement on NR demodulation performance**

*Type: draft TR For: Approval  
 38.833 v0.1.0 CR- rev Cat: (Rel-17)  
  
 Source: China Telecom*

**Abstract:**

For email approval after the meeting, i.e., to implement the TPs approved during the meeting.

**Decision:** For Email approval

**R4-2112225 TP to TR 38.833: Skeleton for the section on LTE CRS interference handling**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: China Telecom*

**Decision: Approved.**

#### 9.12.2 UE demodulation and CSI requirements

##### 9.12.2.1 MMSE-IRC receiver for inter-cell interference

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**Email discussion for [100-e][328] NR\_perf\_enh2\_Demod\_Part2, AI 9.12.2.1, 9.12.2.2– Belov, Dmitry**

**R4-2115620 Email discussion summary for [100-e][328] NR\_perf\_enh2\_Demod\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115799 (from R4-2115620).**

**R4-2115799 Email discussion summary for [100-e][328] NR\_perf\_enh2\_Demod\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** |
| R4-2115730 | WF on general and PDSCH demodulation requirements for inter-cell interference MMSE-IRC | Intel Corporation | Approved |
| R4-2115731 | Summary of PDSCH simulation results for scenario with inter-cell interference | Intel Corporation | Noted |
| R4-2115732 | WF on CSI requirements for inter-cell interference MMSE-IRC | Ericsson | Approved |
| R4-2115733 | WF on MMSE-IRC receiver for intra-cell inter-user interference | Huawei, HiSilicon | Approved |
| R4-2115734 | Summary of PDSCH simulation results for scenario with intra-cell inter-user interference | Huawei, HiSilicon | Noted |
| R4-2115727 | TP to TR 38.833: Link level simulation results for Inter-user interference suppression for MU-MIMO | Intel Corporation | Endorsed |
| R4-2115728 | TP: Introduction of simulation assumptions for inter-cell inter-user MMSE-IRC receiver | Huawei, HiSilicon | Endorsed |
| R4-2115729 | TP to TR 38.833: Scenario for inter-user interference suppression for MU-MIMO | MediaTek inc. | Endorsed |

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**R4-2115730 WF on general and PDSCH demodulation requirements for inter-cell interference MMSE-IRC**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**GTW On Aug24**

**Channel bandwidth**

* Summary of 1st round discussion:
  + Option 1 (China Telecom, CMCC): additionally, cover 40 MHz for FDD 15kHz SCS, and 100MHz for TDD 30kHz SCS.
  + Option 2 (Apple, Intel, Ericsson, Huawei, Qualcomm, MediaTek, ZTE): Only 10MHz for FDD 15kHz and 40MHz for TDD 30kHz
  + China Telecom has concern about different MMSE-IRC implementations (different interference-plus-noise covariance granularity) for difference CBWs which may affect the performance
* Discussion:

QC: Our assumption UE need to follow PRB bundling size or lower than bundling size. This not relevant to Channel BW size.

China Telecom: When scheduling large CHBW size with large PRB allocation, then UE can employ large IRC estimation granularity which will introduce performance loss.

CMCC: We share similar view as China Telecom.

Intel: We don’t think UE can adjust implementation pending on channel bandwidth. We can bring more analysis in future RAN4 meeting.

Huawei: Based on previous discussion, we already agreed using PRB bundling size as 2. No meaningful to introduce addtiona test effort. We agreed using generic test set-up for CHBW with typical value for test coverage issue.

Apple: Share same understanding as QC and Huawei. We didn’t see any UE behavior difference among different CHBW size.

Ericsson: We share same view as QC and Huawei.

ZTE: We have same understanding as QC and Huawei. What’s the performance loss 2dB come from?

China Telecom: We can further check by simulation results.

CMCC: Also PRB bundling size same and UE behavior same under same channel bandwidths, we are more favour of 40MHz and 100MHz for TDD as it’s more aligned with our NW deployment.

Agreement:

RAN4 introduce test case under 10MHz for FDD 15kHz and 40MHz for TDD 30kHz only with assumption that interference-plus-noise covariance estimation granularity does not exceed the PRB bundling size regardless the channel bandwidth from RAN4 requirements introduction perspective.

**Decision: Approved.**

**R4-2115731 Summary of PDSCH simulation results for scenario with inter-cell interference**

*Type: other For: Information  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**R4-2115732 WF on CSI requirements for inter-cell interference MMSE-IRC**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115733 WF on MMSE-IRC receiver for intra-cell inter-user interference**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**GTW Aug24**

**Channel bandwidth**

* Option 1
  + - For FDD 15kHz SCS: Cover 10MHz and 40MHz CBW
    - For TDD 30kHz SCS: Cover 40MHz and 100MHz CBW
* Option 2
  + - For FDD 15kHz SCS: Cover 10MHz
    - For TDD 30kHz SCS: Cover 40MHz

Agreement:

* RAN4 introduce test case under 10MHz for FDD 15kHz and 40MHz for TDD 30kHz only with assumption that interference-plus-noise covariance estimation granularity does not exceed the PRB bundling size regardless the channel bandwidth from RAN4 requirements introduction perspective.

**Tx antenna configuration**

* Summary of 1st round:
* Option 1 (Apple, Intel, Ericsson, Huawei, Qualcomm, CMCC, MediaTek, ZTE, DOCOMO): Consider 2 Tx and 4 Tx only
* Option 2 (China Telecom):
* UE performance under 8Tx/16Tx should be additionally evaluated at least in this phase I stage.
* Encourage companies to have more investigation and discussion, on whether we can come up with alternative test metrics for UE supporting MMSE-IRC receiver under 8Tx/16Tx MU-MIMO scenarios, e.g., using random target precoder selection under SNR that achieves larger TP, or testing the reported PMI or CQI under MU-MIMO scenarios, etc.
* Discussion:

China Telecom: For MU-MIMO, 8Tx/16Tx more closed the NW deployment.

Intel: Main purpose was to verify UE processing under intra-cell scenario which no matter Tx anttenan port configuration. We think under 2Tx/4Tx still can serve test purpose well.

ZTE: For 16/64Tx, how many co-scheduled UE assumed?

Apple: In our understanding, 2Tx/4Tx already meet test purpose. With 8Tx/16Tx, test complexcity increased. We didn’t see any additional benefits with 16Tx.

Huawei: Test test was to verify UE proper processing with IRC receiver for intra-cell interference handling. We already agreed 1+1 pairing UE for requirements definition.

QC: We have same view as Apple and Intel.

E///: Similar view as Apple and Huawei.

MTK: Share same view as Huawei.

China Telecom: 8Tx/16 Tx more typical in deployment meanwhile from RAN4 requirements aspect, 2Tx/4Tx test configuration already served test purpose with the benefits of saving test complexity.

Agreement:

Consider 2 Tx and 4Tx only for defining RAN4 test cases

* Include the background information for the decision of choosing 2Tx/4Tx for this test case into TR.
* With above test configuration, there is no limitation for the number Tx ports configuration deployed by NW under MU-MIMO scenario.

**Decision: Approved.**

**R4-2115734 Summary of PDSCH simulation results for scenario with intra-cell inter-user interference**

*Type: other For: Information  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Noted.**

###### 9.12.2.1.1 PDSCH requirements

**R4-2112104 Discussion on PDSCH requirements in intercell interference scenarios**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2112148 On PDSCH requirements for UE MMSE-IRC receiver for inter-cell interference suppression**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2112207 Discussion on R17 demodulation enhancement for inter-cell interference suppressing**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112208 Simulation results for inter-cell interference suppressing**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112956 Views on MMSE-IRC receiver for inter-cell interference test**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2113118 Discussion on PDSCH demodulation MMSE-IRC requirements for scenario with inter-cell interference**

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

**Decision: Noted.**

**R4-2113638 Remaining issues on MMSE-IRC receiver for inter-cell interference**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses PDSCH requirements for inter-cell IRC

**Decision: Noted.**

**R4-2113640 Simulation results on PDSCH performance for inter-cell interference**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution submits our simulation results for PDSCH demodulation for inter-cell IRC

**Decision: Noted.**

**R4-2113780 Discussion on PDSCH requirements for inter-cell MMSE-IRC receiver**

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

**Decision: Noted.**

**R4-2113781 Simulation results for PDSCH requirements for inter-cell MMSE-IRC receiver**

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

**Decision: Noted.**

**R4-2114039 Discussion on the MMSE-IRC receiver requirements for inter-cell inter-user interference**

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

**Decision: Noted.**

**R4-2114566 Views on Inter-cell Interference PDSCH Tests**

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

**Decision: Noted.**

###### 9.12.2.1.2 CSI requirements

**R4-2112105 Discussion on CSI reporting requirements in intercell interference scenarios**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2112149 On CSI requirements for UE MMSE-IRC receiver for inter-cell interference suppression**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2112209 Discussion on CQI reporting related issues for inter-cell interference MMSE-IRC**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113119 Discussion on CSI MMSE-IRC requirements for scenario with inter-cell interference**

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

**Decision: Noted.**

**R4-2113639 Remaining issues on CSI reporting requirements for inter-cell interference**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses CSI reporting requirements for inter-cell IRC

**Decision: Noted.**

**R4-2113783 Discussion on CQI tests for inter-cell MMSE-IRC receiver**

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

**Decision: Noted.**

##### 9.12.2.2 MMSE-IRC receiver for intra-cell inter-user interference

**R4-2112106 Discussion on PDSCH requirements in MU-MIMO scenarios**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2112150 Views on MMSE-IRC receiver for intra-cell inter-user interference**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2112210 Discussion on R17 demodulation enhancement for intra-cell inter-user interference suppressing**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113120 Discussion on MMSE-IRC requirements for scenario with intra-cell inter-user interference**

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

**Decision: Noted.**

**R4-2113128 TP to TR 38.833: Link level simulation results for Inter-user interference suppression for MU-MIMO**

*Type: pCR For: Approval  
 38.833 v0.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2115727 (from R4-2113128).**

**R4-2115727 TP to TR 38.833: Link level simulation results for Inter-user interference suppression for MU-MIMO**

*Type: pCR For: Approval  
 38.833 v0.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Endorsed.**

**R4-2113641 Remaining issues on MMSE-IRC receiver for intra-cell inter-user**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses PDSCH requirements for MU-MIMO

**Decision: Noted.**

**R4-2113778 Discussion on intra cell inter-user MMSE-IRC receiver**

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

**Decision: Noted.**

**R4-2113779 Simulation results for intra cell inter-user MMSE-IRC receiver**

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

**Decision: Noted.**

**R4-2113782 TP: Introduction of simulation assumptions for inter-cell inter-user MMSE-IRC receiver**

*Type: pCR For: Approval  
 38.833 v0.0.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Revised to R4-2115728 (from R4-2113782).**

**R4-2115728 TP: Introduction of simulation assumptions for inter-cell inter-user MMSE-IRC receiver**

*Type: pCR For: Approval  
 38.833 v0.0.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Revised to R4-2115819 (from R4-2115728).**

**R4-2115819 TP: Introduction of simulation assumptions for inter-cell inter-user MMSE-IRC receiver**

*Type: pCR For: Approval  
 38.833 v0.0.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2114040 Discussion on the MMSE-IRC receiver requirements for intra-cell inter-user interference**

*Type: discussion For: (not specified)  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2114414 TP to TR 38.833: Scenario for inter-user interference suppression for MU-MIMO**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2115729 (from R4-2114414).**

**R4-2115729 TP to TR 38.833: Scenario for inter-user interference suppression for MU-MIMO**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Endorsed.**

**R4-2114559 Views on Intra-cell Inter-user Interference Scenarios**

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

**Decision: Noted.**

##### 9.12.2.3 Evaluation on CRS interference in scenarios with overlapping spectrum for LTE and NR

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**Email discussion for [100-e][327] NR\_perf\_enh2\_Demod\_Part1, AI 9.12.1, 9.12.3– Shan Yang**

**R4-2115618 Email discussion summary for [100-e][327] NR\_perf\_enh2\_Demod\_Part1**

*Type: other For: Information  
 Source: Moderator (China Telecom)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115800 (from R4-2115618).**

**R4-2115800 Email discussion summary for [100-e][327] NR\_perf\_enh2\_Demod\_Part1**

*Type: other For: Information  
 Source: Moderator (China Telecom)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW On August 17th**

**Issue 2-3-1: Summary of link-level simulation results for NR PDSCH**

**Discussion:**

Huawei: Whether IRC enable for neighbour cell interference handling? No sure whether we can conclude the reference receiver in this meeting.

QC: The power ratio among CRS and LTE PDSCH which may impact the performance.

Apple: We are target to conclude the schemes.

Session Chair:

We target to conclude the candidate schemes for CRS interference handling based on the collected results with initial evaluation simulation assumption and other aspects i.e. processing time impact, impact on LTE UEs, and impact on NW assistant signalling; and make conclusions to report to RAN-P based on all the analysis we have including the observations from evaluation performance comparison.

It’s also encouraged companies to take effort on the clarification and alignment for the results and the assumptions during this meeting.

The exact test configuration and simulation alignment can be further addressed in requirements definition phase if any.

MTK: We can further check the details of results. The performance maybe depending on the INR levels.

AT&T: We are not sure on the impact on LTE UEs with RM schemes, we should conclude based on the full analysis with all the aspects.

China Telecom: We are ok to check other scenarios. But it’s hard to draw conclusion based new scenarios since we don’t have time.

For LTE UE impact, we saw the analysis from companies we can discuss in this meeting.

QC: We need to consider all the impact to draw the conclusion including process timing impact, NW signalling, etc.

Intel: We can further discuss the test configurations in requirements definition phase, we should focus on the evaluation conclusion in this meeting.

For NW assistant signalling, this can be further discussed in requirements definition phase, this not impact on the initial conclusion on evaluation phase.

Huawei: we agree to focus drawing the conclusion on evaluation phase. Others can be further discussed in the requirements definition phase include other scenarios as proposed by companies.

Ericsson: For link-level simulations, we observed benefits for CRS-IM schemes including LLR weighting and CRS-IC. Companies results may span on the exact performance and gains, but the general observation is aligned.

We can further discuss and down selection among CRS-IC and LLR weighting later.

AT&T: Regarding on the comments from Huawei and Ericsson, postponing the decision on impact on the NW.

We need to discuss the condition CRS-IC turn on/off since this will impact on the performance and also have impact on NW scheduling.

Apple: We are not sure whether we can make decisions on schemes based on link-level evaluation. CRS-IC performance can be pending on NW assistant signalling exist or not .

QC: We have similar concern as Apple. In LTE, we do the NW assistant signalling; this would impact on UE implementation.

Intel: The condition of CRS-IC turn on/off is up to UE implementation, in RAN4 we just define the requirements based on certain conditions. On NW assistant signalling, we can try to conclude the conclusion in this meeting, but that’s not the bottle neck of evaluation conclusions.

Huawei: The sys-level results based on certain simulation assumption, it’s hard to draw the conclusion from that results. We can conclude initial conclusion based on the results collected till now.

MTK: We have concern on the NW signalling, the details on NW signalling should be clarified and aligned.

Ericsson: How companies conduct the analysis with and without NW signalling?

AT&T: Operators will care the field test in real deployment. We are fine to further discuss such issue in requirements phase.

Nokia: For NW assistant signalling, we should consider no assistant signalling in initial performance comparison.

China Telecom: We can check the ration of UE turns on/off of CRS-IC and do the comparison with CRS-IC. For the condition of CRS-IC on/off, that can be discussed in requirements phase.

For NW signalling, not sure we can conclude in this meeting; we can report the status to RAN-P.

Huawei: The NW signalling can be discussed separately for CRS-IC and LLR weighting.

Initial observations from link-level evaluation results based on agreed simulation assumption:

* CRS-IC with the assumption of NW signaling can achieve better performance compared to RM scheme 1
* CRS-IC without NW assistant signaling achieve similar or lower performance compared to CRS-IC schemes with the assumption of NW signaling
* LLR weighting with the assumption of NW signaling can achieve better or similar performance compared to RM scheme 1
* LLR weighting without NW assistant signaling achieve similar or lower performance compared to LLR weighting with the assumption of NW signaling
* Note: RM scheme 1 is under the assumption that RM always applied for the strongest interference cell

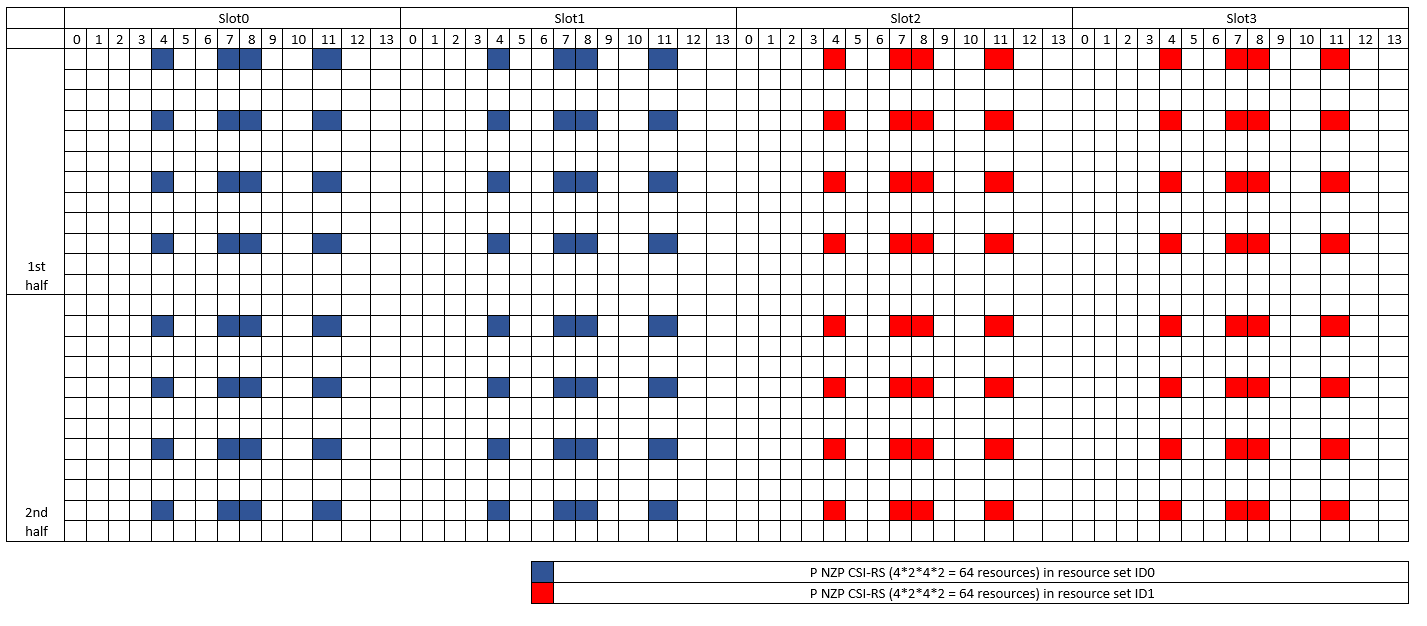
Further discuss the performance comparison among CRS-IC and LLR weighting schemes

Further discuss the model with and without NW signalling

GTW on August 19th

**Issue 2-3-2: Impact on LTE cell due to interference cell RM**

* Initial summary for round 1
  + Proposal 1: Not consider interference cell CRS-RM for the purpose of reducing the interference from neighboring cell LTE CRS. (CTC, Intel, Ericsson, CMCC, HW)
  + Proposal 2: The impact on LTE UEs needs further investigation before concluding on a solution for CRS interference handling (AT&T, Nokia, Apple)
  + Proposal 3: Impact on LTE cell can be avoided if RM is implemented by configuring NZP CSI-RS at interfering cell’s CRS locations. (QC)
    - CTC: It looks not workable to implement interference CRS-RM by configuring NZP CSI-RS at interfering cell’s CRS locations from the following aspects:
      * From the RS pattern (occupied REs) per PRB perspective, it is not feasible to cover all the CRS REs by configuring NZP CSI-RS.
      * From the time-domain property perspective, the slot(s) of NR PDSCH transmission is dynamically scheduled by DCI, how to ensure the NZP-CSI-RS are configured in the same slot(s) as NR PDSCH?
      * From the frequency-domain property perspective, the PRB allocation of NR PDSCH transmisson is dynamically scheduled by DCI, but the CSI-RS bandwidth and frequency-domain starting position are provided as part of the CSI-RS configuration information.
    - QC response:
      * Focus on PDSCH part only becasue PDCCH is robust enough for CRS interference. So, we need to rate match around 16 CRS REs every RB every slot. All CSI-RS resources are configured for whole BWP.
      * Use 2 CSI-RS resource sets containing 1 port NZP CSI-RS resources with periodicity of 4 slots: 1 resource set for slot 0 and 1 and 2nd resource set for slot 2 and slot 3. Then, the patttern repeats with 4 slot periodicity.
      * In each resource set, use 1 port NZP CSI-RS resource for each tone and symbol for two slots (32 NZP CSI-RS) for 1st half of the BWP and 32 NZP CSI-RS resources for 2nd half of BWP. We need to divide it in two halves because of DC offset between LTE and NR.
      * It will look as in below figure:



* Recommended WF
  + Summary of observations:
    - Based on the INR levels used for RAN4 link-level simulation, for UE at 5% geometry, the delta of SINR observed at CRS RE and data RE is 5.86 dB and 11.75 dB for one dominant interference cell CRS-RM and two interference cell CRS-RM respectively.

Apple: Our observations the SINR difference under MCS 4 less than 1dB, MCS 13 around 3dB.

AT&T: We already agreed we need to do such evaluation, now only few companies bring analysis then we need to respect this input analysis.

* + - Based on the system level simulation for ISD of 1000m from one company, the average delta of SINR observed at CRS RE and data RE is ~2.5 dB to ~4.5 dB for one dominant interference cell CRS-RM and two interference cell CRS-RM respectively.

QC/Huawei: One company observation, we need to check.

* + - LTE CQI/RI/PMI is computed based on CRS for TM 1-8 and certain configuration of TM9 (when the parameter *pmi-RI-Report* is not configured by higher layers for TM9).
    - CRS is used for LTE PDSCH demodulation processing for TMs 1-6.
    - LTE RSSI is measured only from OFDM symbols containing CRS port 0 of measurement subframes unless indicated otherwise by higher layers, and it can be measured from all OFDM symbols of the DL part of measurement/indicated subframes if indicated by higher layers. LTE RSRQ is calculated based on RSRP and RSSI.
  + FFS on the proposal

**Discussion:**

QC: This NZP-CSI-RS proposed solution was to address the concern on LTE cell impact due to RM schemes, and can be supported byRel-15/16 UEs without any changes.

China Telecom: According to WID, we target to evaluate the performance among CRS-IM and Rel-15/Rel-16 RM features. We suggest to make some conclusion on this comparison impact.

For the new proposed solution from QC, this is first time we discuss and need more time check the potential impact and the feasibility.

QC: We hope companies can consider this new proposal which can be included into RAN.

Huawei: For this new proposal, the overhead issue still cann’t be avoided. More analysis still required and the impact on NW scheduling.

QC: This is similar as RM, no need to be always on for NZP CSI-RS transmission. Just replacing the existing RM technologies with NZP CSI-RS resources.

AT&T: Is this a NW implementation solution?

Apple: We are open to further discuss the new proposal. Which may be no specification impact.

Intel: We need more time to check the new proposal. This impact NW scheduling, which also need to be considered.

Huawei: This new proposal still unclear for us. The will impact NW implementation and scheduling.

Nokia: For this new proposal, Rel-15 UE has constraints on supporting NZP CSI-RS resources; this will limit the scheduling and need to further check.

Further discuss the new proposal from QC

RAN4 initial observations for LTE cell impact with Rel-15/16 RM:

* Due to RM applied in interference cells, the CRS REs and data REs under LTE cells will observe different interference level with SINR offset.
  + - From one company result and analysis (can be further clarified in this meeting):
    - Based on the INR levels used for RAN4 link-level simulation, for UE at 5% geometry, the delta of SINR observed at CRS RE and data RE is 5.86 dB and 11.75 dB for one dominant interference cell CRS-RM and two interference cell CRS-RM respectively.
    - Based on the system level simulation for ISD of 1000m from one company in R4-2115629 , the average delta of SINR observed at CRS RE and data RE is ~2.5 dB to ~4.5 dB for one dominant interference cell CRS-RM and two interference cell CRS-RM respectively.
* The interference mismatch among CRS REs and data REs may bring impact on LTE cells considering the following aspects:
  + - LTE CQI/RI/PMI is computed based on CRS for TM 1-8 and certain configuration of TM9 (when the parameter *pmi-RI-Report* is not configured by higher layers for TM9).
    - CRS is used for LTE PDSCH demodulation processing for TMs 1-6.
    - LTE RSSI is measured only from OFDM symbols containing CRS port 0 of measurement subframes unless indicated otherwise by higher layers, and it can be measured from all OFDM symbols of the DL part of measurement/indicated subframes if indicated by higher layers. LTE RSRQ is calculated based on RSRP and RSSI.

**Issue 2-4-2: UE processing time impact of CRS-IM**

* Initial summary for round 1
  + Option 1: UE PDSCH processing timeline should not be impacted by CRS-IM (CTC, Intel, E///, CMCC)
    - Intel: Using of CRS-IM receiver does not have impact on PDSCH processing time.
      * PDSCH processing time requirements were defined under assumption of 4-layer processing with 256QAM and 3300 active subcarriers (~ 50 MHz with 15 kHz).
      * Typical scenarios for CRS-IM receiver are Rank 1 with QPSK or 16QAM modulation.
    - CMCC: For 15kHz FDD, available spectrum is relatively small
  + Option 2: UE PDSCH processing timeline is not impacted by LLR weighting, and (may) be impacted by CRS-IC (QC, [MTK], HW, Apple)
    - QC: UE processing time could increase up to 1ms for CRS-IC scheme, if we keep the UE power and processing cycles the same since UE will have to run CRS channel estimation on top of NR DMRS channel estimation.

**Discussion:**

Agreement: UE PDSCH processing timeline is not impacted by LLR weighting.

Apple: It’s FFS for the impact on UE implementation complexity with and without NW assistant signalling.

**Issue 2-1-4: Performance measurement for scenario 2**

* *Agreement in RAN4 #99e (R4-2108662)*:
  + *Target PDSCH performance measurement point*
    - *Companies to provide simulation curves as well as the CRS-IM gain in terms of both SNR improvement and relative throughput improvement.*
    - *Use SNR in the simulation.*
* TBS difference for with and without RM in scenario 2
  + for TBS calculation per PRB
    - With no RM (for the reference and IM schemes): **12** (symbol) x 12 (subcarrier) - 12 (DMRS) = 132
    - With RM and without alternative DMRS (for the RM schemes): **9** (symbol) x 12 (subcarrier) - 12 (DMRS) - **18** (Overhead) = 78
    - With RM and with alternative DMRS (for the RM schemes): **12** (symbol) x 12 (subcarrier) - 12 (DMRS) - **18** (Overhead) = 114
      * Note: the agreement from RAN4 #99e is to use L = 11 for with alternative DMRS, but in fact L = 12 can be used for scenario 2 with alternative DMRS? (***=> to be confirmed***)
  + Difference in symbol length is because the support of alternative DMRS is up to UE capability.
  + Difference in Overhead for TBS determination is due to the overhead by RM.
* Initial summary for round 1
  + For SNR improvement
    - Option 1: Use SNR @ 70% max TP for each scheme (Apple, QC)
      * QC: none of the options are ideal at current stage.
    - Option 2: Use SNR @ 70% max TP with CRS-RM, i.e., L = 9 or 11 (CTC, HW)
    - Option 3: Use SNR @ 70% max TP with the reference scheme. (CMCC)
    - Option 4: Use the same PDSCH allocation for both with and without RM. (Apple, E///)
  + For relative throughput improvement
    - Option 1: Compare the throughput of different schemes at the SNR which achieves 70% of the max TP for one dominant interference cell CRS-RM, i.e., scheme #1. (CTC)
    - Option 2: Use SNR at 70% of maximum throughput for scenario without CRS-RM and without CRS-IM processing (i.e. only MMSE) (Intel)

**Discussion:**

*Tentative agreement (Pending further check on QC by Friday this week):*

* + Proposed compromise on how to capture the results in the TP (note: not impact the observations agreed in Aug 17 GTW):
    - For the comparison of CRS-IM over the reference scheme: use option 3, i.e., SNR improvement @ 70% max TP with the reference scheme
    - For CRS-RM:
      * Do not capture the SNR or throughput performance into the TR in this meeting.
      * Meanwhile, generally capture the TBS difference for with and without RM, and for with and without alternative DMRS (as summarized above)

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2112223 | Updated work plan for Further enhancement on NR demodulation performance WI | China Telecom | Approved |
| R4-2112224 | Draft TR 38.833 v0.1.0: Further enhancement on NR demodulation performance | China Telecom | For email approval |
| R4-2112225 | TP to TR 38.833: Skeleton for the section on LTE CRS interference handling | China Telecom | Approved |
| R4-2112223 | Updated work plan for Further enhancement on NR demodulation performance WI | China Telecom | Approved |
| R4-2115740 | WF on CRS interference handling in scenarios with overlapping spectrum for LTE and NR | China Telecom | **Approved** |
| R4-2115739 | TP to TR 38.833 Scenario for LTE CRS interference handling for NR UE | MediaTek | **Approved** |
| R4-2115742 | TP to TR 38.833: Interference Modeling for LTE CRS-IM | Qualcomm | **Approved** |
| R4-2115737 | TP to TR 38.833: Receiver structure for CRS-IM performance | Ericsson | **Approved** |
| R4-2115738 | TP: Introduction of simulation assumptions for CRS-IM receiver | Huawei, HiSilicon | **Approved** |
| R4-2115736 | TP to TR 38.833: Link level simulation results for LTE CRS interference handling for NR UE | Intel Corporation | **Approved** |
| R4-2115735 | TP to TR 38.833: Summary of link level evaluation and conclusion for CRS-IM | China Telecom | **Approved** |
| R4-2115741 | LS on RAN4 evaluation for LTE CRS interference handling for NR UE | China Telecom | **Approved** |
| R4-2112151 | Simulation result collection for CRS interference handling | China Telecom | Noted |

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**R4-2115740 WF on CRS interference handling in scenarios with overlapping spectrum for LTE and NR**

*Type: other For: Approval  
 Source: China Telecom*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115741 LS on RAN4 evaluation for LTE CRS interference handling for NR UE**

*Type: LS out For: Approval  
 To: RAN*

*Source: China Telecom*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115742 TP to TR 38.833: Interference Modeling for LTE CRS-IM**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: Qualcomm*

**Decision: Approved.**

**R4-2112107 Discussion on CRS interference mitigation in NR**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2112108 Simulation results for CRS interference mitigation in NR**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2112151 Simulation result collection for CRS interference handling**

*Type: other For: Information  
 Source: China Telecom*

**Decision: Noted.**

**R4-2112152 Simulation results for CRS interference handling**

*Type: discussion For: Information  
 Source: China Telecom*

**Decision: Noted.**

**R4-2112211 Discussion on LTE CRS-IM**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112226 Discussion and draft LS on CRS-IM for NR UE in LTE/NR co-existence scenarios**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2112227 TP to TR 38.833: Summary of link level evaluation and conclusion for CRS-IM**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: China Telecom*

**Decision: Revised to R4-2115735 (from R4-2112227).**

**R4-2115735 TP to TR 38.833: Summary of link level evaluation and conclusion for CRS-IM**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: China Telecom*

**Decision: Approved.**

**R4-2112300 Evaluation on CRS interference in scenarios with overlapping spectrum for LTE and NR**

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

**Abstract:**

In this contribution we have provided our views on the proposed simulation cases for CRS-RM and next step for considering network assistance signalling for CRS-IM

**Decision: Noted.**

**R4-2112316 Systems level evaluations on CRS interference in scenarios with overlapping spectrum for LTE and NR**

*Type: discussion For: Decision  
 Source: AT&T*

**Decision: Revised to R4-2115629 (from R4-2112316).**

**R4-2115629 Systems level evaluations on CRS interference in scenarios with overlapping spectrum for LTE and NR**

*Type: discussion For: Decision  
 Source: AT&T*

**Decision: Noted.**

**R4-2112332 Views on CRS Interference Mitigation in NR**

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

**Decision: Noted.**

**R4-2112333 Simulation Results for CRS Interference Mitigation**

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

**Decision: Noted.**

**R4-2113121 Discussion on CRS interference handling in scenarios with overlapping spectrum for LTE and NR**

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

**Decision: Noted.**

**R4-2113129 TP to TR 38.833: Link level simulation results for LTE CRS interference handling for NR UE**

*Type: pCR For: Approval  
 38.833 v0.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2115736 (from R4-2113129).**

**R4-2115736 TP to TR 38.833: Link level simulation results for LTE CRS interference handling for NR UE**

*Type: pCR For: Approval  
 38.833 v0.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Approved.**

**R4-2113621 Discussion on MMSE-IRC receiver for CRS interference**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discuss the open issues for MMSE-IRC receiver for CRS interference

**Decision: Noted.**

**R4-2113622 Simulation results on PDSCH performance for CRS interference**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Submit the simualtion results for CRS interference

**Decision: Noted.**

**R4-2113623 TP to TR 38.833: Receiver structure for CRS-IM performance**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

TP for the receiver structure for CRS-IM interference per work split

**Decision: Revised to R4-2115737 (from R4-2113623).**

**R4-2115737 TP to TR 38.833: Receiver structure for CRS-IM performance**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

TP for the receiver structure for CRS-IM interference per work split

**Decision: Approved.**

**R4-2113775 Discussion on open issues for CRS-IM receiver**

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

**Decision: Noted.**

**R4-2113776 Simulation results for CRS-IM receiver**

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

**Decision: Noted.**

**R4-2113777 TP: Introduction of simulation assumptions for CRS-IM receiver**

*Type: pCR For: Approval  
 38.833 v0.0.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Revised to R4-2115738 (from R4-2113777).**

**R4-2115738 TP: Introduction of simulation assumptions for CRS-IM receiver**

*Type: pCR For: Approval  
 38.833 v0.0.0 CR- rev Cat: (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Decision: Approved.**

**R4-2114041 Discussion on PDSCH requirements for CRS-IM**

*Type: discussion For: (not specified)  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2114415 TP to TR 38.833 Scenario for LTE CRS interference handling for NR UE**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2115739 (from R4-2114415).**

**R4-2115739 TP to TR 38.833 Scenario for LTE CRS interference handling for NR UE**

*Type: pCR For: Approval  
 38.833 v0.0.1 CR- rev Cat: (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Approved.**

#### 9.12.3 BS demodulation requirements

##### 9.12.3.1 PUSCH demodulation requirements for FR1 256QAM

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**Email discussion for [100-e][329] NR\_perf\_enh2\_Demod\_Part3\_NWM, AI 9.12.3– Tricia Li**

**R4-2115747 Email discussion summary for [100-e][329] NR\_perf\_enh2\_Demod\_Part3\_NWM**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115801 (from R4-2115747).**

**R4-2115801 Email discussion summary for [100-e][329] NR\_perf\_enh2\_Demod\_Part3\_NWM**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115748 | WF on FR1 PUSCH demodulation requirements for FR1 256QAM | Huawei | Approved |

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**R4-2115748 WF on FR1 PUSCH demodulation requirements for Fr1 256QAM**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**GTW discussion on August 26**

* Tx EVM: No explicit Tx EVM modelling
  + Option 1: Consider 3.5% Tx EVM impact in the impairment results submitted by companies, but it is up to companies
  + Option 2: Not consider 3.5% Tx EVM impact

E///: Question 1, applied for all cases 2/4/8Rx? Rel-16/16 result summary template can be resued?

Nokia: Yes.

Huawei: Yes.

Agreement: option1

* SCS and Bandwidth combination
  + Option 1: (Ericsson, Samsung, Huawei, Intel, CATT, Nokia, ZTE)
    - 15kHz SCS: 5MHz and 10MHz
    - 30kHz SCS: 10MHz and 40MHz
  + Option 2: (CMCC, CTC, DCM slightly prefer)
    - 15kHz SCS: 5MHz, 10MHz and 20MHz
    - 30kHz SCS: 10MHz, 20MHz, 40MHz and 100MHz.

NTT DOCOMO: We can comprise to option 1.

China Telecom: Option 2 already applied for other modulation orders. Supporting CHBW for BS is declaration basis.

We already observed 1-2dB performance difference between 40MHz and 100MHz. We already comprised to MCS selection.

CMCC: We share similar view as China Telecom. We already comprised for many issues i.e. number of Rx and MCS.

Intel: We can take option 1 and include 100MHz additionally since companies observe the performance difference.

Huawei: We worry the work load with many cases. We already agree test applicable rules for different CHBW sets.

Nokia: We are willing to comprise to include 100MHz instead of 40MHz.

Ericsson: Share same view as Huawei. But we can comprise to include 100MHz.

Samsung: Share same view as Huawei.

Agreements:

* + - 15kHz SCS: 5MHz and 10MHz
    - 30kHz SCS: 10MHz, 40MHz and 100MHz

**Decision: Approved.**

**R4-2111974 Discussion on PUSCH demodulation requirements for FR1 256QAM**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2111975 Simulation results for PUSCH 256QAM performance requirement**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112035 View on PUSCH demodulation requirement with FR1 256QAM**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2112147 Initial simulation results and discussion on PUSCH FR1 256QAM demodulation requirements**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2112212 Discussion on BS demodulation requirements for FR1 256QAM**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112213 Simulation results for PUSCH 256QAM performance**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2112326 Link simulation results for PUSCH 256QAM demodulation requirements**

*Type: discussion For: Discussion  
 Source: ZTE Wistron Telecom AB*

**Decision: Noted.**

**R4-2112408 Discussion on NR FR1 PUSCH 256QAM demodulation**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

remain issue discussion on NR FR1 PUSCH 256QAM demodulation

**Decision: Noted.**

**R4-2112409 Simulation results for NR FR1 PUSCH 256QAM demodulation**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

simulation results

**Decision: Noted.**

**R4-2112763 Views on the combination of SCS and CBW for FR1 PUSCH 256QAM**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2113122 Discussion on PUSCH requirements for FR1 256QAM**

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

**Decision: Noted.**

**R4-2113630 On PUSCH demodulation requirements for FR1 256QAM**

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

**Abstract:**

In this contribution we have provided our views on 256QAM deployment scenarios and requirement test configurations in FR1. In particular, we have discussed the MCS choice and Tx EVM modelling

**Decision: Noted.**

**R4-2113631 Simulation results for PUSCH demodulation requirements for FR1 256QAM**

*Type: discussion For: Information  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our simulation results for PUSCH demodulation requirements for FR1 256QAM.

**Decision: Noted.**

**R4-2113784 Discussion on PUSCH demodulation requirements for FR1 256QAM**

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

**Decision: Noted.**

**R4-2113785 Simulation results for PUSCH demodulation requirements for FR1 256QAM**

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

**Decision: Noted.**

**R4-2113786 Summary of simulation results for PUSCH requirements for FR1 256QAM**

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

**Decision: Noted.**

### 9.13 Solutions for NR to support non-terrestrial networks (NTN)

#### 9.13.1 General and work plan

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**Email discussion for [100-e][312] NTN\_Solutions\_Part1, AI 9.13.1– Dorin Panaitopol**

**R4-2115602 Email discussion summary for [100-e][312] NTN\_Solutions\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115784 (from R4-2115602).**

**R4-2115784 Email discussion summary for [100-e][312] NTN\_Solutions\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW August 20th**

**Topic #6: FR2 Generalities**

**RAN4 session Chair Guidance: According to RAN-P guidance (Proposal 1 and proposal 2 in RP-211596), RAN4 work on FR2 postponed until March 2022. No discussion on RAN4 FR2 from now on till March 2022. Discussion on Topic #6 shall be stopped after 1st round. All t-docs under topic #6 will be “Noted”.**

**Issue 2-1-1:** Satellite NTN gNB Type

* Proposals
  + Option 1: 1-H (already decided during RAN4#99-e)
  + Option 2: 1-H (already decided during RAN4#99-e) and 1-O
    - Note: **NTN BS would only specify BS types 1-H and 1-O, not BS type 1-C.**
  + Option 3: 1-H (already decided during RAN4#99-e) and 1-C
    - Note: **It is proposed to define type 1-C and type 1-H requirements for NTN BS in Rel-17 and use the figure 2-1 and 2-2 as the reference architecture.**
  + Option 4: 1-H (already decided during RAN4#99-e) and 1-O and 1-C
    - Note: **for S band, all the 1-C, 1-H, 1-O types are suggested for NTN network.**

**Discussion:**

Huawei: We supposed 1-C is possible for NTN BS. With one beam and large footprint, 1-C still possible.

Agreement:

BS Type 1-H and 1- O will be supported for NTN BS in Rel-17. The baseline assumption BS type 1-C is not supported in Rel-17 NTN pending on further checking till Nov 2021 Nov Meeting.

Further check the progress on BS type 1-O in Nov 2021 RAN4 meeting.

**Issue 2-2-1:** Satellite NTN gNB Class - general

* Proposals
  + Option 1: Introduce 3 NTN BS classes,
    - NTN BS class A representing a typical operating altitude of 35786/50000 km
    - NTN BS class B representing a typical operating altitude in the range of 7000-25000 km
    - NTN BS class C representing a typical operating altitude in the range of 300-1500 km

**Issue 2-2-2:** Criteria for defining NTN gNB Class

* Proposals
  + Option 1: Define NTN BS class based (at least) on the considered **satellite’s orbit.**
    - **Note:** Further discuss if, for each of those NTN BS classes, additional sub-classes should be considered.
  + Option 2: Define NTN gNB classes characterised by requirements derived from different satellite types with certain satellite to ground **altitude or altitude range.**
    - **Note:** NTN gNB could be classified by different altitudes or altitude ranges to differentiate RF requirements.

**GTW discussion:**

Introducing NTN BS classes pending on the further checking whether there is difference among different classes from RAN4 RF requirements aspects. It’s not precluded to introduce a generic single BS class in Rel-17 timeframe. At least introduce NTN BS class with wide coverage.

The candidate criterias as following:

* Option 1: Define NTN BS class based (at least) on the considered satellite’s orbit.
  + Note: Further discuss if, for each of those NTN BS classes, additional sub-classes should be considered.
* Option 2: Define NTN gNB classes characterized by requirements derived from different satellite types with certain satellite to ground altitude or altitude range.
  + Note: NTN gNB could be classified by different altitudes or altitude ranges to differentiate RF requirements.
* Combined option 1 and option2 not excluded

**Issue 1-1-1: MSS S-Band Range** Clarification **with respect to NTN RAN4 work**

* Proposals
  + Option 1: RAN4 work to focus on the MSS specific range [1980-2010 MHz (UL) and 2170-2200 MHz (DL)] for the NTN FR1 exemplary band. The MSS S-band definition for NTN-NR [1980-2010 MHz (UL) and 2170-2200 MHz (DL)] as part of the Rel-17 NR-NTN WI does not apply for North America (US, Canada and Mexico).

**Proposal 1-1-1-1:** RAN4 work to focus on the MSS specific range [1980-2010 MHz (UL) and 2170-2200 MHz (DL)] for the NTN FR1 exemplary band. The MSS S-band definition for NTN-NR [1980-2010 MHz (UL) and 2170-2200 MHz (DL)] as part of the Rel-17 NR-NTN WI does not apply for North America (US, Canada and Mexico).

**Or**

**Proposal 1-1-1-2:** RAN4 work to focus on the MSS specific range [1980-2010 MHz (UL) and 2170-2200 MHz (DL)] for the NTN FR1 exemplary band. The MSS S-band definition for NTN-NR [1980-2010 MHz (UL) and 2170-2200 MHz (DL)] as part of the Rel-17 NR-NTN WI does not apply for Region 2~~North America (US, Canada and Mexico)~~.

**Or**

**Proposal 1-1-1-3:** RAN4 work to focus on the MSS specific range [1980-2010 MHz (UL) and 2170-2200 MHz (DL)] for the NTN FR1 exemplary band. The MSS S-band definition for NTN-NR [1980-2010 MHz (UL) and 2170-2200 MHz (DL)] as part of the Rel-17 NR-NTN WI does not apply for Region 2 (except Brazil, Costa Rica, and potentially other Central/South America countries)~~North America (US, Canada and Mexico)~~.

**Discussion:**

Apple: We don’t need to capture in the specification.

Ericssion: Proposal -1 is not correct.

Agreement:

NO need to capture such information into TS. Such information can be included into TR as regulatory information.

**Issue 1-1-2: MSS L-Band Range** Clarification **with respect to NTN RAN4 work**

* Proposals
  + Option 1: The first band NTN based on L-band will have the following frequency range definition: **1626.5-1660.5 MHz in UL and 1525-1559 MHz in DL.**
  + Option 2: L-band 1610–1618.725MHz for UL (in combination with S-band 2483.5–2500MHz for DL)

**Proposal 1-1-2-1:** The first band NTN based on L-band will have the following frequency range definition: **1525-1559 MHz in DL, 1626.5-1660.5 MHz in UL (FDD).**

**And/Or**

**Proposal 1-1-2-2:** RAN4 to define the **full L-band (1515-1559 MHz DL, 1626.5-1660.5 and 1668-1675 MHz UL)** while acknowledging the impracticality of the extended L-band segments in certain countries.

**And/Or**

**Proposal 1-1-2-3:** RAN4 to continue the discussion of the irregular channel bandwidths in the context of NTN in Rel-17.

**Moderator Note:** other companies are invited to contribute with L-band candidate ranges for NTN operation in FR1.

**Proposal 1-1-2-4:** Companies continue to contribute with L-band candidate ranges for NTN operation in FR1. **Note:** companies to decide L-band range and different deployment options.

**GTW discussion:**

Ericsson: We think -1 proposal more practical; -2 proposal more complexity which required more work.

Hughes/EchoStart: We suggest to wait the operators’ feedback.

MTK: We think RAN4 work load should be cared.

Agreement: If no consensus on L band definition with frequency ranges can be reached by Nov 2021 RAN4 meeting, then L band work can be postponed after March 2022.

**Issue 1-2-1:** NTN Band Coding and Signalling Design

* Proposals
  + Option 1: The same set of band coding and signaling design should be used for NTN and NR.
  + Option 2: The same set of band coding and signaling design should be used for NTN and NR. The NTN band is numbered in reverse order from the maximum NR band number in each FR.
  + Option 3: The NTN satellite bands should be prefixed with “s”. NTN satellite band in FR1 will have one or two digits number. The first NTN FR1 band should be named “s1”.

**Proposal 1-2-1-1:** The NTN satellite bands should be prefixed with “s”. NTN satellite band in FR1 will have one or two digits number. The first NTN FR1 band should be named “s1”.

**Or**

**Proposal 1-2-1-2:** The same set of band coding and signaling design should be used for NTN **satellite band** and NR.

**GTW Discussion:**

Apple/ZTE/QC/CATT: Proposal -1 required changes on RAN2 signalling design. We prefer option 2.

CATT: We can consider to differentiate TN and satellite bands.

Apple: With prefixed not workable in RAN2 signalling design. Do we need to inform as satellite band information?

Ericsson: We agree option 1 has RAN2 impact; we think in RAN4 specification, it’s better to have some distinguish.

Nokia: We can add some note into specification to clearly mention the usage of bands similar as NR-U bands.

Agreement:

Introduce NTN band numbering respecting existing band coding and signalling design without changes on RAN2.

**Issue 1-2-2:** NTN Band Numbering

* Proposals
  + Option 1: **s1** for S-band and **s2** for L-band
  + Option 2: **n100** for S-band and **n101** for L-band
  + Option 3: **10x** for S-band
    - **Note:** this Option 3 can be included (or can be considered) as part of Option 2
  + Option 4: **n256** for S-band
  + Option 5: The NTN band should be numbered as a new band even though it is fully overlapped with a TN band.

**GTW discussion:**

Echostar: Starting with n100 for NTN bands. (option 2)

ZTE: n100 probably already used. That’s the reason we suggest option 3. If we follow the previous logic, first come first service.

Ericsson: We think option 4 starting end of range, and with decreased order, with naming s256 only for RAN4 specification.

T-Mobile: We support option 4 idea.

QC: Option 4. If we using “s” may bring confusion to RAN2, we can use a note instead of different prefix.

Nokia: Option 4 with clear distinguish for the usage of NTN bands.

EchoStar: OK for option 4. The number should be in the range of FR1.

Huawei: We are fine with Nokia. Similar note as NR-U and NB-IoT.

Agreement:

Starting from the largest band number in FR1 range for NTN bands which fully within FR1 frequency ranges, the number can be taken in a decreased order with first come, first service.

FFS with prefix as “n’ or “s”. A note can be included to clarify the usage of NTN bands.

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115640 | Way Forward on NTN\_solutions\_Part1 | **THALES** | Approved |

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**R4-2115640 Way Forward on NTN\_solutions\_Part1**

*Type: other For: Approval  
Source: THALES*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**GTW discussion on August 27th**

**Proposal 3-2-1-1: SU discussion**

Additional agreement:

Still following previous agreements Proposal 2-1-2-1 from R4-2108099: The common definition for channel bandwidth, transmission bandwidth configuration, minimum guard band, and RB alignment in 38.104 and 38.101-1 can be reused for NTN system.

RAN4 can further check the SU once ACLR, SEM, ACS reqirements defined.

**R4-2114469 MSS S-Band range (1980-2010 and 2170-2200 MHz) for NTN-FR1 and its adjacent bands**

*Type: discussion For: Agreement  
 Source: Hughes/EchoStar, Inmarsat, Sateliot, Thales*

**Decision: Noted.**

##### 9.13.1.1 System parameters

**R4-2111932 Further discussion on NTN System parameters**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2112390 NR NTN and Irregular Channel Bandwidths**

*Type: discussion For: Decision  
 Source: GLOBALSTAR Inc.*

**Abstract:**

Discussion of irregular channel bandwidths for NR NTN (also submitted to agenda item 10.2.1).

**Decision: Noted.**

**R4-2113183 system parameter for NTN network**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113689 On NTN System parameters**

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

**Decision: Noted.**

**R4-2113745 NTN - System parameters**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses NTN system parameters

**Decision: Noted.**

**R4-2113928 Discussion on system parameters for NTN**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

##### 9.13.1.2 NTN gNB Class/Type

**R4-2112009 Discussion on NTN gNB type/class**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2112145 Considerations on BS type and BS class**

*Type: discussion For: Discussion  
 Source: SoftBank Corp., Deutsche Telekom*

**Decision: Noted.**

**R4-2113184 NTN gNB Class and Types**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2113744 NTN - BS Class and Type**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses NTN BS classes and types

**Decision: Noted.**

**R4-2113929 Discussion on NTN gNB class and type**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

##### 9.13.1.3 Regulatory information

**R4-2113741 NTN - Regulatory information**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Based on Radio Regulations , this contribution is discussing NTN spectrum aspects

**Decision: Noted.**

**R4-2114410 Ka band consideration for FR2 NTN**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

In this contribution we provide our views on the Ka band handling in NTN WI.

**Decision: Noted.**

##### 9.13.1.4 Others

**R4-2113430 General discussion on how to arrange the specifications for satellite communication system**

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

**Decision: Noted.**

**R4-2113450 Discussion on NTN specification**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2113451 LS on NTN network architecture**

*Type: LS out For: Approval  
 to RAN3  
 Source: CATT*

**Decision: Noted.**

**R4-2113740 NTN - General**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses some NTN general aspects

**Decision: Noted.**

**R4-2114412 On the NTN bands numbering**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

In this contribution we provide our views on the NTN bands numbering.

**Decision: Noted.**

**R4-2114471 On the New NTN Specifications Titles and their Scope**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The goal of this contribution is to further clarify the titles and the scope of the new specifications for NTN related work.

**Decision: Noted.**

**R4-2112517 Skeleton of TR 38.863 for NTN related RF and co-existence aspects**

*Type: draft TR For: Approval  
 38.863 v0.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Samsung*

**Abstract:**

This is a draft skeleton of TR 38.863 for discussion and approval.

Session Chair Note: Move to this AI from AI 9.13.2.

**Decision: Noted.**

#### 9.13.2 Coexistence aspects

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**Email discussion for [100-e][313] NTN\_Solutions\_Part2, AI 9.13.2– Yiran Jin**

**R4-2115603 Email discussion summary for [100-e][313] NTN\_Solutions\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115785 (from R4-2115603).**

**R4-2115785 Email discussion summary for [100-e][313] NTN\_Solutions\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW Aug 20**

**Issue 5-12: Calibration and alignment (R4-2115628)**

* Proposals
  + Option 1: N/A

Agreement:

The updated summary of calibration results and assumptions will be captured in the new TR 38.863

The calibration results indicate the consistency of most companies’ simulations. Therefore, calibration work has mostly been done for NTN coexistence. Companies can continue to contribute on calibration aspect over emails till Sep 30th.

For HAPS calibration, companies will continue the effort for calibration. It’s encouraged interested companies can provide results for HAPS, RAN4 will check the status till Nov 2021 RAN4 meeting.

RAN4 start to discuss the simulation assumption and co-existence results for phase 1 as agreed in previous work plan, RAN4 will check the status in Nov 2021 RAN4 meeting with the target to conclude phase 1 co-existence study by Nov 2021.

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2115749 | WF on [313] NTN\_Solutions\_Part2 | Samsung | Approved |  |
| R4-2115750 | Simulation assumptions for NTN co-existence | Samsung, CATT | Approved |  |
| R4-2115751 | Simulation assumptions for HAPS co-existence | Nokia | Apporved |  |

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**R4-2115749 WF on NTN co-existence study**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**GTW on Aug 25**

**1) Issue 3-4: Central beam elevation angle**

THALES: with 20°，the beam will out of the surface which is not realistic.

Ericsson: We think with lower angle we can achieve more interference.

THALES: We prefer to use the value for 38.821.

E///: Why not applicable for LEO as well.

THALES: Moving beam vs Fixed beam?

Agreement:

Baseline assumption for simulation: adding 45° for GEO and LEO; interested companies can bring analysis and results for other values.

**2) Issue 3-6: NTN UE deployment**

QC: We are OK with option 2. We prefer option was to simplify simulation.

Huawei: Usually RAN4 use full RBs allocation. With 2RBs how to apply ACIR model for this assumption?

ZTE: We are fine with option 2. In simulation table, we can’t assume full buffer since we have 2 RBs. For ACIR we have 3 steps, for each region we can allocate the UEs equally.

EchoStar: We want to know the reason before the proposed values.

THALES: We are fine with options. For uplink, we have issue on uplink SINR. That’s the reason for narrow RB allocation.

Samsung: 3 from QC, and option 2 from ZTE.

Huawei: For 2RBs, mostly we may allocate in the ACIR region 2. 2RB applied for both LEO and GEO?

ZTE: Originally we proposed 10RBs with 10-15 UEs.

THALES: 12 UE with 2RBs with 24 RBs totally. How we allocate UEs in whole Channel bandwidth 20MHz.

Huawei: What’s the scenario?

Ericsson: We should allocate equally splited UEs inside the channel bandwidth in ACIR 3 regions.

QC: We have same view as Ericsson and ZTE.

THALES: For LEO, we can allocate more RBs for single UE in reality.

Echostar: We still have concern on number of UEs here. We prefer low number scheduled UEs.

THALES: Do you think we can consider FRF =3 for GEO.

E///: We consider this later on.

Samsung: Same view.

Agreement:

9 UEs and 2RBs per UE for GEO and LEO

- UEs are equally splitted inside the channel bandwidth into ACIR 3 regions

**3) Issue 3-7: NTN UL TPC**

Agreement: Option 1

**4) 3-14: Propagation model between NTN and UE**

E///: Two main issues pointed by us, we like to get feedback from other companies.

We can go with option 2, meanwhile including some background information into TR.

THALES: We are aware of E///’s analysis, we also bring analysis. If no huge difference identified, then we can follow option 2 respect the value from TR 38.811. The value from TR 38.811 take some debate and decided as a comprised value.

E///: We don’t change the TR 38.811, we aim to include the information into RAN4 TR 38.863.

Agreement: Option 2

- Further discuss and include background information into RAN4 TR 38.863.

**Decision: Approved.**

**R4-2115750 Simulation assumption for NTN co-existence study**

*Type: other For: Approval  
 Source: Samsung, Thales*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115751 Simulation assumption for HAPS co-existence study**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2112016 NR-NTN calibration summary and observations**

*Type: agenda For: Discussion  
 Source: Samsung*

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

**R4-2112716 NR-NTN calibration summary and observations**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Revised to R4-2115628 (from R4-2112716).**

**R4-2115628 NR-NTN calibration summary and observations**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113394 Simulation assumptions and results for NTN co-existence calibration**

*Type: other For: Information  
 Source: Fraunhofer HHI, Fraunhofer IIS*

**Decision: Noted.**

##### 9.13.2.1 Coexistence scenarios and Simulation assumptions

**R4-2112012 Further consideration on simulation assumption**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2112014 Proposed methodologies and assumptions for NTN co-ex study**

*Type: agenda For: Approval  
 Source: Samsung*

**Decision: Noted.**

**R4-2112248 Simulation assumptions for NTN co-existence**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2112588 Proposed methodologies and assumptions for NTN co-ex study**

*Type: discussion For: Approval  
 Source: Samsung*

**Decision: Noted.**

**R4-2113311 Simulation assumptions for HAPS co-existence**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2113427 Further discussion on NTN simulation assumptions**

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

**Decision: Noted.**

**R4-2113690 NTN simulation assumptions for coexistence study**

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

**Decision: Noted.**

**R4-2113742 NTN - Simulation assumptions**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution further discusses simulations assumptions, focusing on deployment models

**Decision: Noted.**

**R4-2113930 Further discussion on simulation assumptions for NTN**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2114232 MSS S-Band range (1980-2010 and 2170-2200 MHz) for NTN-FR1 and its adjacent bands**

*Type: discussion For: Agreement  
 Source: Hughes/EchoStar, Inmarsat, Sateliot, Thales*

**Decision: Noted.**

**R4-2114424 On the S-band NTN Scenarios and Parameters for Calibration and Coexistence Simulations**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The goal of this contribution is to further clarify/define some simulation parameters to be taken into account for coexistence scenarios considered by RAN4 studies.

**Decision: Noted.**

**R4-2114425 On the NTN Propagation Model**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The goal of this contribution is to further clarify some simulation parameters related to 38.811 NTN propagation model, to be taken into account for coexistence scenarios considered by RAN4 studies.

**Decision: Noted.**

##### 9.13.2.2 Simulation results

**R4-2112013 Simulation results for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2112015 Initial NR-NTN co-ex study ACIR results**

*Type: agenda For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2112247 Coexistence simulation restuls for TN-NTN**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2112715 Initial NR-NTN co-ex study ACIR results**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2113296 Coexistence study assumptions on NR to support non-terrestrial networks**

*Type: discussion For: Information  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2113310 Simulation restuls for HAPS**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2113428 Initial NTN simulation Results**

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

**Decision: Noted.**

**R4-2113691 NTN adjacent channel coexistence simulation results**

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

**Decision: Noted.**

**R4-2113743 NTN - Simulation results for alignment**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution provides out initial simulation results based on the agreed assumptions for alignment

**Decision: Noted.**

**R4-2113931 Initial simulation results for NTN coexistence study**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2114486 NTN co-existence calibration with THALES updated values**

*Type: discussion For: Information  
 Source: THALES*

**Abstract:**

NTN co-existence calibration with THALES updated values.

**Decision: Noted.**

#### 9.13.3 BS RF requirements

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**Email discussion for [100-e][314] NTN\_Solutions\_Part3, AI 9.13.3, 9.13.4– Yuexia Song**

**R4-2115604 Email discussion summary for [100-e][314] NTN\_Solutions\_Part3**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115786 (from R4-2115604).**

**R4-2115786 Email discussion summary for [100-e][314] NTN\_Solutions\_Part3**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision |
| R4-2115641 | WF on NTN BS requirements | CATT | Approved |
| R4-2115642 | WF on NTN UE requirements | Huawei | Approved |

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**R4-2115641 WF on NTN BS requirenments**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115642 WF on NTN UE requirements**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

##### 9.13.3.1 TX requirements

**R4-2112010 Tx requirement for NTN gNB**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2113746 NTN - Satellite Node - Tx requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses Satellite node - Tx requirements

**Decision: Noted.**

**R4-2113932 Discussion on Tx requirements of satellite gNB**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

##### 9.13.3.2 RX requirements

**R4-2112011 Rx requirement for NTN gNB**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2113747 NTN - Satellite Node - Rx requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses Satellite node - Rx requirements

**Decision: Noted.**

**R4-2113933 Discussion on Rx requirements of satellite gNB**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

#### 9.13.4 UE RF requirements

**R4-2113297 Discussion on UE RF requirements for NR to support non-terrestrial networks**

*Type: other For: Approval  
 Source: Xiaomi*

**Decision: Noted.**

##### 9.13.4.1 TX requirements

**R4-2111933 Discussion on UE Tx RF requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2113429 General discussion on NTN UE RF requirements.**

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

**Decision: Noted.**

##### 9.13.4.2 RX requirements

**R4-2111934 Discussion on UE Rx RF requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

### 9.16 Extending current NR operation to 71GHz

#### 9.16.5 BS RF requirements

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**Email discussion for [100-e][315] NR\_exto71GHz\_BSRF, AI 9.16.5– Toni lahteensuo**

**R4-2115605 Email discussion summary for [100-e][315] NR\_exto71GHz\_BSRF**  *Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115787 (from R4-2115605).**

**R4-2115787 Email discussion summary for [100-e][315] NR\_exto71GHz\_BSRF**  *Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** |
| R4-2115643 | WF on BS TX RF requirements | Nokia, Nokia Shanghai Bell | Approved |
| R4-2115644 | WF on BS RX RF requirements | Ericsson | Approved |

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**R4-2115643 WF on BS Tx RF requirement**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115644 WF on BS Rx RF requirement**

*Type: other For: Approval  
 Source:Ericsson*

**Abstract:**

**Discussion:**

**Decision: Approved.**

##### 9.16.5.1 TX requirements

**R4-2111749 Discussion on limitation of the measurement interval for the determination of the averaged EVM for FR2-2 and possible test time improvements.**

*Type: discussion For: Discussion  
 Source: ROHDE & SCHWARZ*

**Abstract:**

Demodulating all 320 / 640 slots by default resulting in a very long analysis time (> 1 minute for 640 slots, 960kHz SCS, 2GHz channel bandwidth).

EVM measurement interval of 10ms over 320 / 640 slots is considered unnecessary to determine a reliable E

**Decision: Noted.**

**R4-2111972 Discussion on BS TX RF requirements for 52 6-71GHz**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112278 Proposals on BS transmitter requirements for extending current NR operation to 71 GHz**

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

**Abstract:**

This contribution provides further proposals on BS transmitter requirements for extending current NR operation to 71 GHz according to the approved WF and the findings in the corresponding study item as recorded in TR 38.808.

**Decision: Noted.**

**R4-2113316 On BS RF transmitter requirements for the frequency range 52 to 71 GHz**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this contribution we present an overview of BS transmitter requirements and some proposals necessary to progress the work related to defining RF core requirements for the NR extension up to 71 GHz. To further stimulate the discussion draft specificatio

**Decision: Noted.**

**R4-2113857 Discussion on the OBUE mask boundary for 52.6 - 71 GHz**

*Type: other For: Approval  
 Source: NEC*

**Decision: Noted.**

**R4-2113922 Discussion on BS Tx requirements for 60GHz**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

##### 9.16.5.2 RX requirements

**R4-2111973 Discussion on BS RX RF requirements for 52 6-71GHz**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2112279 Proposals on BS receiver requirements for extending current NR operation to 71 GHz**

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

**Abstract:**

This contribution provides further proposals on BS receiver requirements for extending current NR operation to 71 GHz according to the approved WF and the findings in the corresponding study item as recorded in TR 38.808.

**Decision: Noted.**

**R4-2113317 On BS RF receiver requirements for the frequency range 52 to 71 GHz**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this contribution we present an overview of BS receiver requirements and some proposals to progress the work. To stimulate the discussion draft specification text applicable for TS 38.104, clause 10 [6] is provided as an attachment at the end of contri

**Decision: Noted.**

**R4-2113923 Discussion on BS Rx requirements for 60GHz**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

### 9.17 Enhancements to Integrated Access and Backhaul (IAB) for NR

#### 9.17.1 General

**R4-2112866 RAN4 workplan for Rel-17 IAB enhancement**

*Type: other For: Endorsement  
 Source: Samsung, Qualcomm*

**Decision: Approved.**

#### 9.17.2 RF requirements

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**Email discussion for [100-e][316] NR\_eIAB, AI 9.17.1,9.17.2– Yankun Li**

**R4-2115606 Email discussion summary for [100-e][316] NR\_eIAB**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115788 (from R4-2115606).**

**R4-2115788 Email discussion summary for [100-e][316] NR\_eIAB**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2112866 | RAN4 workplan for Rel-17 IAB enhancement | Samsung, Qualcomm | Approved |  |
| R4-2115645 | WF on RF impact for Rel-17 eIAB | Samsung | Approved |  |

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**R4-2115645 WF on RF impact for Rel-17 eIAB**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**Decision: Approved.**

##### 9.17.2.1 Impact for Simultaneous operation of IAB child and parent links

**R4-2112867 Simultaneous operation on IAB-node’s child and parent links**

*Type: other For: Approval  
 Source: Samsung*

**Decision: Noted.**

**R4-2113198 Simultaneous operation of IAB child and parent links**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113682 RF requirements for simultaneous IAB-MT and IAB-DU operation**

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

**Decision: Noted.**

**R4-2114329 RF impact analysis for simultaneous DU and MT operation**

*Type: discussion For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on RF impact on simultaneous operation of DU and MT.

**Decision: Noted.**

##### 9.17.2.2 Impact for Timing enhancement

**R4-2112868 Timing enhancement on Rel-17 IAB**

*Type: other For: Approval  
 Source: Samsung*

**Decision: Noted.**

**R4-2113199 Timing enhancement for eIAB**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2113681 Requirements related to different IAB timing cases**

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

**Decision: Noted.**

**R4-2114330 IAB MT /DU case 6 timing**

*Type: discussion For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on generic RAN4 work relating to the objectives focusing the timing aspect.

**Decision: Noted.**

##### 9.17.2.3 Others

## 10 Rel-17 Study Items for NR

### 10.1 Study on enhanced test methods for FR2 in NR

#### 10.1.1 General

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**Email discussion for [100-e][334] FR2\_enhTestMethods\_Part1, AI 10.1 (Except 10.1.5)– Anatoliy (Toliy) Ioffe**

**R4-2115625 Email discussion summary for [100-e][334] FR2\_enhTestMethods\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115802 (from R4-2115625).**

**R4-2115802 Email discussion summary for [100-e][334] FR2\_enhTestMethods\_Part1**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW Aug 23th**

**Concluding the study of <52 GHz objectives**

**Agreement:**

* Prioritize completion of preliminary MU assessment for methods/elements which have no open issues as of end of this meeting
* If preliminary MU assessment is not concluded for a particular method/approach, then this method/approach is not considered feasible from the perspective of this study
* MU assessment can be continued till Nov 2021 RAN4#101 meeting for objective 1 considered as maintenance

**Issue 1-1-1: Black-box approach for CFFDNF**

**Agreement:**

* A local search in DNF, relative to a reference test case, such as peak EIRP at FF and DNF, is necessary to mitigate the effect of the change in antenna pattern as a function of power level/attenuation
* MU analyses of this approach shall assume that the local search is performed and are expected at the next meeting
* This relative approach removes 3 out of the 5 MU contributions identified for CFFDNF: DUT antenna location estimation, Probe antenna pattern and Near-field interaction between probe antenna and DUT antenna. Additional MU contributors are FFS.
* Applicability of correlation factor at reference frequency and relative correlation factor needs to be investigated more

**Issue 1-1-2: CFFDNF MU**

**Agreement:**

Consider the min. range length for EIRP/EIS measurements based on the CFFDNF methodology for PC1 devices to be 45cm with an MU for the mean error of 0.5dB (systematic error) [R4-2114384] and specify min range lengths including MU for both CFFDNF and CFFNF for completeness

Target to capture the outcome including MU assessment in to TR by proposed TP in this meeting.

**Issue 1-1-3: Remaining issues with CFFNF (first round outcome)**

**Agreement:**

* Revise the following simulation results in the TR:
  + Revise the range length of CFFDNF to r+2 cm in Clause 5.1.4.9 of the TR
  + Use coarse and fine grid search optimizations for CFFNF with black-box approach to reduce total measurement time
  + Include PC1 TRP results for CFFDNF
  + Clarification is required on how the MU due to Influence of Noise on CFFNF approach is to be handled

Target to capture the outcome including MU assessment in to TR by proposed TP in this meeting.

**Issue 2-1-1: EVM calculation method for 2L UL**

**Agreement:**

* Adopt Method 1 as the reference EVM calculation method for FR2 UL MIMO measurements
* Some companies raised concerns that test equipment vendors need time to upgrade the test system, and it is the common understanding that RAN5 can make use of "transition periods" when they undertake the effort to apply the outcome of this study to the conformance test specification
* For MU assessment, initial comparison analysis compared to SISO case can be included into TR.

**Issue 3-1-2: RSRP(B) based RX beam peak search (interpretation of reported results)**

**Agreement:**

* Option 1: only RSRPB is used for beam peak search interpretation based on the following considerations:
  + Without a clear interpretation of how RSRP reporting is implemented for all UEs, only the RSRPB-based test procedure is feasible
  + if RSRPB is confined to being a test function, then only its relative accuracy is important, and it is reasonable to ignore the absolute reported value based on RSRPB for the purpose of the beam peak search
* For RSRPB data processing: Linear sum of 4 reported RSRPBs

**Issue 3-2-1: Spectrum emission mask test time reduction**

**Agreement:**

Due to limited time, RAN4 can't conclude this new proposal by this meeting. It’s not precluded to further discuss this new proposal in future release with appropriate WIs/SIs.

**Issue 3-2-2: Non-uniform TRP measurement grid for PC1**

**Agreement:**

Further discuss and try to conclude all the open issues; if consensus reached with conclusion for all the open issues, then this proposal can be captured into TR by this meeting.

**Conclusion after 2nd round**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tdoc number | Title | Source | Decision | Comments |
| R4-2115764 | TP to TR38.884 on the EVM calculation method | Rohde & Schwarz, Qualcomm, Anritsu | Approved |  |
| R4-2115765 | LS on enhanced test methods for FR2 testing time reduction | vivo | Approved | TO RAN5 |
| R4-2115766 | TP to TR38.884 on enhanced test methods for FR2 testing time reduction | Huawei | Approved |  |
| R4-2112986 | TP to TR38.884 on TPMI index for EIRP measurement | vivo | Approved |  |
| R4-2115762 | TP on high DL power and low UL power test cases | Keysight Technologies, Rohde&Schwarz | Approved |  |
| R4-2115820 | Draft TR38.884 Study on enhanced test methods for FR2 NR UEs v1.1.0 | *Apple, vivo, Intel* | Email approval |  |
| R4-2115763 | On Non-Uniform TRP grids for PC1 | Keysight Technologies | Noted |  |

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**R4-2115820 Draft TR38.884 Study on enhanced test methods for FR2 NR UEs v1.1.0**

*Type: draft TR For: Approval  
 38.884 v1.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple, vivo, Intel*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115764 TP to TR38.884 on the EVM calculation method**

*Type: other For: Approval  
 Source:* Rohde & Schwarz, Qualcomm, Anritsu

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115765 LS on enhanced test methods for FR2 testing time reduction**

*Type: LS out For: Approval*

*To: RAN5  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2115766 TP to TR38.884 on enhanced test methods for FR2 testing time reduction**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2112989 TR structure to accommodate OTA test methods for 52.6-71GHz**

*Type: pCR For: Approval  
 38.884 v1.0.0 CR- rev Cat: (Rel-17)  
  
 Source: vivo*

**Decision: Revised to R4-2115822 (from R4-2112989).**

**R4-2115822 TR structure to accommodate OTA test methods for 52.6-71GHz**

*Type: pCR For: Approval  
 38.884 v1.0.0 CR- rev Cat: (Rel-17)  
  
 Source: vivo*

**Decision: Approved.**

**R4-2114249 Work plan updates for Objective 7 of FS\_FR2\_enhTestMethods**

*Type: other For: Approval  
 Source: Intel Corporation, Apple Inc.*

**Decision: Approved.**

**R4-2114565 Concluding the study objectives related to f < 52 GHz**

*Type: discussion For: Decision  
 Source: Apple*

**Decision: Noted.**

#### 10.1.2 Test methodology for high DL power and low UL power test cases

**R4-2113318 Black-box approach for CFFDNF and Enhancement of permitted methods**

*Type: discussion For: Approval  
 38.884 v CR- rev Cat: (Rel-17)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Noted.**

**R4-2114384 On CFFNF and CFFDNF test methodologies for high DL power and low UL power test cases**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2114385 TP on high DL power and low UL power test cases**

*Type: pCR For: Approval  
 38.884 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz*

**Decision: Revised to R4-2115762 (from R4-2114385).**

**R4-2115762 TP on high DL power and low UL power test cases**

*Type: pCR For: Approval  
 38.884 v0.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Keysight Technologies UK Ltd, Rohde & Schwarz*

**Decision: Approved.**

#### 10.1.3 Polarization basis mismatch

**R4-2111902 Comparison of TSQ measurement methods for TE with dual pol Rx**

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

**Abstract:**

Existing verification methods for Tx signal quality are derived from conducted domain testing and do not provide for coherent combining with dual pol Rx. In this contribution we propose the demodulation strategy for the enhanced TE architecture that woul

**Decision: Noted.**

**R4-2112221 Evaluation of FR2 UL transmit signal quality measurement methods**

*Type: discussion For: Approval  
 Source: Rohde & Schwarz*

**Decision: Noted.**

**R4-2112255 Evaluation of the DMRS-based channel inversion method for FR2 UL MIMO EVM calculations**

*Type: discussion For: Approval  
 Source: Anritsu Limited*

**Decision: Noted.**

**R4-2112986 TP to TR38.884 v0.4.0 on TPMI index for EIRP measurement**

*Type: pCR For: Approval  
 38.884 v1.0.0 CR- rev Cat: (Rel-17)  
  
 Source: vivo*

**Decision: Approved.**

#### 10.1.4 Test time reduction

**R4-2112577 Discussion on FR2 test time reduction**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2112987 Further discussions on RSRP(B) based Rx beam peak search**

*Type: discussion For: Approval  
 38.884 v CR- rev Cat: (Rel-17)  
  
 Source: vivo*

**Decision: Noted.**

**R4-2114499 On Non-Uniform TRP grids for PC1**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Revised to R4-2115763 (from R4-2114499).**

**R4-2115763 On Non-Uniform TRP grids for PC1**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2114541 Spectrum emission mask test time reduction**

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

**Decision: Noted.**

#### 10.1.5 OTA test methods for UE RF, RRM and demodulation for 52.6~71GHz

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**Email discussion for [100-e][335] FR2\_enhTestMethods\_Part2**

**, AI 10.1.5, 10.1.1 (R4-2112989, R4-2114249) -Aida Vera Lopez**

**R4-2115626 Email discussion summary for [100-e][335] FR2\_enhTestMethods\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115804 (from R4-2115626).**

**R4-2115804 Email discussion summary for [100-e][335] FR2\_enhTestMethods\_Part2**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**Conclusion after 2nd round**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** |
| R4-2115822 | TR structure to accommodate OTA test methods for 52.6-71GHz | vivo | Return to |
| R4-2114249 | Work plan updates for Objective 7 of FS\_FR2\_enhTestMethods | Intel Corporation, Apple Inc. | Approved |
| R4-2115767 | WF on OTA test methods for 52.6~71GHz (Objective 7) | Intel Corporation | Approved |

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**R4-2115767 WF on OTA test methods for 52.6~71GHz (Objective 7)**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Approved.**

**R4-2112988 Discussion on OTA test methods for B52.6GHz**

*Type: discussion For: Approval  
 Source: vivo*

**Decision: Noted.**

**R4-2113532 On 60GHz OTA testing for vehicular UE**

*Type: discussion For: Approval  
 Source: LG Electronics Finland*

**Abstract:**

Document discusses and proposes a way forward on studying the test methods for vehicular device type.

**Decision: Noted.**

**R4-2114250 OTA test methods for FR2-2**

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

**Decision: Noted.**

**R4-2114386 On 52.6-71GHz Testability**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

#### 10.1.6 Others

### 10.7 Study on 5G NR UE Application Layer Data Throughput Performance

#### 10.7.1 General and work plan

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**Email discussion for [100-e][330] NR\_ATP, AI 10.7– Gaurav Nigam**

**R4-2115621 Email discussion summary for [100-e][330] NR\_ATP**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2115803 (from R4-2115621).**

**R4-2115803 Email discussion summary for [100-e][330] NR\_ATP**

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

**Abstract:**

**Discussion:**

**Decision: Noted.**

**GTW on August 17th**

**Issue 2-1-2: Simulation results alignment criteria**

* Proposals
  + Option 1: Absolute throughput span within X% of average throughput across companies at a given SNR.
    - Decide X based on simulation results. Possible values of X = [5]% or [10]%.
  + Option 2: SNR G±Gspan can be reached for the T% of maximum throughput [Apple, QC]
    - Maximum throughput is derived with TBS corresponding to CQI index 15 with rank 2 for 2Rx/4Rx UE.
    - Decide Gspan based on simulation results. Candidate option is Gspan = [2.5] dB.

**Discussion:**

Huawei: For the throughput, we see chance to be aligned at some points.

Question 1: DO we need to consider 10%-20% percentile as alignment criteria?

Question 2: Whether other test metrics i.e. RI, CQI, BLER need to be considered?

QC: Current we are considering absolute throughput as alignment metric. Other test metrics can be provided to help for the alignment purpose.

The target of peak date throughput as 256QAM, Rank2; that’s pending on SNR we simulated.

Intel: For test metric, we consider absolute throughput as major test metric; others just provided some assistance.

For 10-20% percentile, that’s pending on simulated cases i.e. 2Rx, 4Rx. We can conclude the reference point at requirements introduction in WI phase. Current we focused on the feasibility in SI phase.

Ericsson: Same view as QC and Intel, we can focus on the absolute throughput for feasibility and alignment criteria.

Apple: Share same view as other companies, focus on throughput for alignment criteria.

Regarding alignment criteria regarding SNR span vs throughput span, I think it’s still open.

MTK: We can focus on throughput first.

China Telecom: We are general observations from moderators; for reference point of the percentile of absolute throughput, we can further evaluate and decide in WI phase.

QC: Can we agree option 2 for alignment criteria since based on collected results, option 2 can serve alignment purpose better than option 1.

Huawei: For number of SNR points, for FR1 2x2 FDD cases it’s hard to find two points to be aligned. We think more effort needed to align the results.

QC: For the Span, we can further discuss in WI phase. We target to conclude the feasibility in this meeting, for alignment effort can be further work in WI phase.

Intel: We are ok to draw conclusion for the feasibility based on collected results. Except 2x2 FDD cases, other 3 cases quite aligned.

China Telecom: Now we have +/- for Span, so shall we have 1.25dB other than 2.5dB?

Ericsson: Same view as QC, we can conclude the feasibility in this meeting; for requirements definition can be further discussed in WI stage.

Huawei: This is first time to get chances for results alignment, hope we can still spend some effort on the alignment during this meeting.

QC: We are ok to take some effort with the target to conclude the feasibility. We can further work on the term of “Gspan”.

Agreement:

Using to option 2: SNR G±Gspan can be reached for the T% of maximum throughput for simulation results alignment criteria.

* Maximum throughput is defined with TBS corresponding to CQI index 15 with rank 2 for 2Rx/4Rx UE.
* Further work on the definition of “Gspan”; the exact test points and requirements can be discussed and concluded in WI phase if any.

Companies are encouraged to continue the effort for the results alignment with the target to draw the conclusion of feasibility by this meeting.

Based on the collected results till now and above agreed alignment criteria, RAN4 observed FR1 2x4 FDD, FR1 2x2 and 2x4 TDD are quite aligned.

**Conclusion after 2nd round**

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2114569 | LS on RAN4 updates to TR 37.901-5 | Qualcomm | Approved |  |
| R4-2115745 | Draft CR on General and Summary Sections in RAN4 study on Application Layer Throughput Requirements | Qualcomm | Endorsed |  |
| R4-2115743 | Draft CR to TR 37.901-5: Simulation results section | Intel | Endorsed |  |
| R4-2115744 | Draft CR on ATP performance simulation alignment criteria | Ericsson | Endorsed |  |
| R4-2115746 | Draft CR: Introduction the simulation assumptions for ATP to TR.37.901-5 | Huawei, HiSilicon | Endorsed |  |
| R4-2113123 | Summary of simulation results for NR UE Application Layer Data Throughput Performance | Intel | Noted |  |

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**R4-2113123 Summary of simulation results for NR UE Application Layer Data Throughput Performance**

*Type: other For: Information  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2113130 Draft CR to TR 37.901-5: Simulation results section**

*Type: draftCR For: Endorsement  
 37.901-5 v16.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2115743 (from R4-2113130).**

**R4-2115743 Draft CR to TR 37.901-5: Simulation results section**

*Type: draftCR For: Endorsement  
 37.901-5 v16.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Endorsed.**

**R4-2113644 Draft TP on ATP performance simulation alignment criteria**

*Type: draftCR For: Endorsement  
 37.901-5 v16.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This draft TR submits the section of simulation alignment criteria for ATP

**Decision: Revised to R4-2115744 (from R4-2113644).**

**R4-2115744 Draft CR on ATP performance simulation alignment criteria**

*Type: draftCR For: Endorsement  
 37.901-5 v16.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This draft TR submits the section of simulation alignment criteria for ATP

**Decision: Endorsed.**

**R4-2114477 Draft CR on General and Summary Sections in RAN4 study on Application Layer Throughput Requirements**

*Type: draftCR For: Endorsement  
 37.901-5 v16.4.0 CR- rev Cat: (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Decision: Revised to R4-2115745 (from R4-2114477).**

**RR4-2115745 Draft CR on General and Summary Sections in RAN4 study on Application Layer Throughput Requirements**

*Type: draftCR For: Endorsement  
 37.901-5 v16.4.0 CR- rev Cat: (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Decision: Endorsed.**

**R4-2114569 LS on RAN4 updates to TR 37.901-5**

*Type: LS out For: Agreement  
 to RAN5  
 Source: Qualcomm Incorporated*

**Decision: Approved.**

#### 10.7.2 Test methodology

**R4-2112110 Simulation results for physical layer Throughput**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2113124 Discussion on NR UE Application Layer Data Throughput Performance**

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

**Decision: Noted.**

**R4-2113642 Remaining issues on Test methodology for application layer data throughput performance**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses ATP methodology

**Decision: Noted.**

**R4-2113643 Simulation results for application layer data throughput performance**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution submits our simulation results for ATP

**Decision: Noted.**

**R4-2114474 Simulation Results for Application Layer Throughput Tests**

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

**Decision: Noted.**

#### 10.7.3 Test parameters

**R4-2113787 Discussion on open issues on Application layer data throughput performance**

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

**Decision: Noted.**

**R4-2113788 Simulation results for application layer data throughput performance**

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

**Decision: Noted.**

**R4-2113789 draftCR:Simulation assumptions for application layer data throughput performance**

*Type: draftCR For: Endorsement  
 37.901-5 v16.4.0 CR- rev Cat: (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Revised to R4-2115746 (from R4-2113789).**

**R4-2115746 draftCR:Simulation assumptions for application layer data throughput performance**

*Type: draftCR For: Endorsement  
 37.901-5 v16.4.0 CR- rev Cat: (Rel-16)  
  
 Source: Huawei,HiSilicon*

**Decision: Endorsed.**

**R4-2114042 Simulation results for the study on application layer throughput requirements**

*Type: discussion For: (not specified)  
 Source: MediaTek inc.*

**Decision: Noted.**

## 11 Rel-17 Work Items for LTE

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## 12 Liaison and output to other groups

### 12.2 Others

**Refer to Email discussion summary of [100-e][318] LS\_Response\_BSRF(RP-210747,R4-2111719), AI 6.4,12 (R4-2112288,R4-2114225, R4-2114226, R4-2113039)– Johan Sköld**

**Topic #2: LS response to ETSI TFES on blocking requirement**

**R4-2112288 Draft LS to ETSI TFES on the New blocking requirement for Band 1 BSs for protection from RMR in 1900-1910**

*Type: LS out For: Approval  
 to ETSI MSG TFES, cc ETSI RT  
 Source: Ericsson*

**Abstract:**

The LS response gives feedback to the four issues brought up by ETS MSG TFES.

**Decision: Noted.**

**R4-2114225 Discussion on DRAFT LS to 3GPP RAN4 on new blocking requirement for Band 1 BSs for protection from RMR in 1900-1910**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discussion around the questions raised in the LS on protection of 1900-1910

**Decision: Noted.**

**R4-2114226 Draft LS out - New blocking requirement for Band 1 BSs for protection from RMR in 1900-1910**

*Type: LS out For: Approval  
 to ETSI MSG TFES, cc ETSI RT  
 Source: Huawei*

**Abstract:**

Draft LS response to the questions raised in the LS on protection of 1900-1910

**Decision: Revised to R4-2115646 (from R4-2114226).**

**R4-2115646 LS out - New blocking requirement for Band 1 BSs for protection from RMR in 1900-1910**

*Type: LS out For: Approval  
 to ETSI MSG TFES, cc ETSI RT  
 Source: Huawei, Keysight*

**Abstract:**

Draft LS response to the questions raised in the LS on protection of 1900-1910

**Decision: Approved.**

**AAS Antenna Model**

**R4-2113039 AAS antenna model**

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

**Decision: Noted.**

## BACKUP

**R4-21AAAAA Email discussion summary for**

*Type: other For: Approval  
 Source: Xx*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**New t-docs**

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**Existing t-docs**

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