**3GPP TSG-RAN WG4 Meeting #108 R4-23xxxxx**

**Toulouse, France, 21 – 25 August 2023**

**Source: RAN4 vice chair (Samsung)**

**Title:** **BS RF Demod Test session report for RAN4#108**

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

**Document for: Approval**

## 2 Meeting arrangement and events

### 2.3 Summary of sessions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Topic title** | **Topic areas** | **AI** | **Moderator &Summary AI** |
| 300 | [108][300] BSRF\_Demod\_Test\_Session | N.A. | N.A. | Haijie Qiu |
| 301 | [108][301] BSRF\_Maintenance | Rel-16 BS RF maintenance Rel-17 BS RF maintenance | 4.2 5.2.1 6 (R4-2311663) | Johan Sköld AI 5.4 |
| 302 | [108][302] NR\_ext\_to\_71GHz\_BSRF\_Maintenance | Rel-17 FR2-2 BS RF conformance maintenance | 5.2.6.1, 5.2.6.2 | Michal Szydelko AI 5.4 |
| 303 | [108][303] NR\_ATG\_BSRF | Rel-18 NR\_ATG BS RF core requirements | 8.13.3 | Wubin Zhou AI 8.13.6 |
| 304 | [108][304] NR\_FR1\_lessthan\_5MHz\_BW\_BSRF | Rel-18 Less than 5MHz BW: RF | 8.14.3 | Man Hung  AI 8.14.5 |
| 305 | [108][305] NR\_LTE\_EMC\_enh | EMC maintenance  Rel-18 NR EMC | 4.3 8.17 | Aurelian Bria AI 8.17.4 |
| 306 | [108][306] FS\_NR\_duplex\_evo\_Part1 | Rel-18 NR Duplex evolution SI: General, RF feasibility and impact from BS perspective, regulatory | 8.19.1, 8.19.2.2.1, 8.19.2.2.2, 8.19.2.3, 8.19.3 | He Wang AI 8.19.4 |
| 307 | [108][307] FS\_NR\_duplex\_evo\_Part2 | Rel-18 NR Duplex evaluation SI: RF feasibility and impact from UE perspective, | 8.19.2.2.3, 8.19.2.2.4, 8.19.2.4 | Phil Coan  AI 8.19.4 |
| 308 | [108][308] FS\_NR\_duplex\_evo\_Part3 | Rel-18 NR Duplex evolution SI: Adjacent channel co-existence evaluation | 8.19.2.1 | Chunxia Guo AI 8.19.4 |
| 309 | [108][309] NR\_NTN\_enh\_Part1 | Rel-18 NTN system parameters, regulatory | 8.26.1 | Dorin Panaitopol AI 8.26.6 |
| 310 | [108][310] NR\_NTN\_enh\_Part2 | Rel-18 NTN SAN RF | 8.26.3 | Dominique Everaere AI 8.26.6 |
| 311 | [108][311] NR\_NTN\_enh\_Part3 | Rel-18 NTN co-existence evaluation | 8.26.2 | Yiran Jin AI 8.26.6 |
| 312 | [108][312] NR\_netcon\_repeater\_RF | Rel-18 Network control repeater: General, RF and EMC | 8.28.1, 8.28.2, 8.28.3 | Fei Xue 8.28.7 |
| 313 | [108][313] NR\_netcon\_repeater\_RFConformance | Rel-18 Network control repeater: RF conformance | 8.28.4 | Huiping Shan 8.28.7 |
| 314 | [108][314] NR\_mobile\_IAB\_RF | NR\_mobile\_IAB: General, co-existence, RF core | 8.33.1, 8.33.2, 8.33.3 | Mustafa Emara AI 8.33.5 |
| 315 | [108][315] LTE\_terr\_bcast\_bands\_BSRF | New bands for 5G terrestrial broadcast: BS RF | 9.3.4 | Iwajlo Angelow AI 9.3.5 |
| 316 | [108][316] IoT\_NTN\_SANRF | Rel-18 IoT NTN SAN RF maintenance, RF conformance | 6.8.1 | Michal Szydelko AI 6.9 |
| 317 | [108][317] Demod\_Maintenance | Rel-16 Demod maintenance  Rel-17 FR2-2 Demod Rell-17 Demod maintenance | 4.5 5.2.6.5 5.2.4 | Axel Mueller AI 5.4 |
| 318 | [108][318] IoT\_NTN Demod\_Maintenance | Rel-18 IoT\_NTN Demod | 6.8.5 | Licheng Lin AI 6.9 |
| 319 | [108][319] RF\_FR1\_enh2\_Demod\_Part1 | Rel-18 NR\_ENDC\_ RF\_FR1\_enh2 demodulation part1: 8Rx | 8.4.3.1 | Tricia Li AI 8.4.4 |
| 320 | [108][320] RF\_FR1\_enh2\_Demod\_Part2 | Rel-18 NR\_ENDC\_ RF\_FR1\_enh2 demodulation part2: 4Tx | 8.4.3.2 | Jiakai Si AI 8.4.4 |
| 321 | [108][321] NR\_RF\_FR2\_req\_Ph3\_Demod | Rel-18: FR2 RF enhancement demodulation | 8.6.4 | Alexander Hamilton AI 8.6.5 |
| 322 | [108][322] NR\_FR2\_multiRX\_DL\_Demod | Rel-18 Requirement for NR FR2 multi-Rx chain DL reception: Demodulation part | 8.7.4 | Jahidur Rahman AI 8.7.5 |
| 323 | [108][323] NonCol\_intraB\_ENDC\_NR\_CA\_Demod | Rel-18 Support of intra-band non-collocated EN-DC/NR-CA deployment: Demodulation part | 8.11.4 | Kazuyoshi Uesaka  AI 8.11.5 |
| 324 | [108][324] NR\_HST\_FR2\_enh\_Demod | Rel-18 FR2 HST: Demod part | 8.12.5 | Yunchuan Yang AI 8.12.6 |
| 325 | [108][325] NR\_ATG\_Demod | Rel-18 NR ATG demodulation | 8.13.5 | Shiyuan Wang AI 8.13.6 |
| 326 | [108][326] NR\_demod\_enh3\_Part1 | Rel-18 NR\_demod\_enh3: Advanced receiver for MU-MIMO | 8.18.1 | Shan Yang AI 8.18.3 |
| 327 | [108][327] NR\_demod\_enh3\_Part2 | Rel-18 NR\_demod\_enh3: ATP | 8.18.2 | Manasa Raghavan AI 8.18.3 |
| 328 | [108][328] NR\_netcon\_repeater\_Demod | Rel-18 Network control repeater: Demod | 8.28.6 | Yao Kun 8.28.7 |
| 329 | [108][329] FS\_NR\_FR2\_OTA\_enh | Rel-17 test methed maintenance Rel-18 FR2 OTA test method enhancement | ~~4.6~~ 5.2.5 (R4-2311231)8.2 | Bin Han AI 8.2.6 |
| 330 | [108][330] NR\_FR1\_TRP\_TRS\_enh | Rel-17 TRP TRS maintenance Rel-18 TRP/TRS enhancement | ~~5.2.5~~ 8.15 | Ruixin Wang AI 8.15.4 |
| 331 | [108][331] NR\_MIMO\_OTA\_enh | Rel-17 MIMO OTA maintenance Rel-18 MIMO OTA enhancement | 5.2.5 (except R4-2311231) 8.16 | Xuan Yi AI 8.16.6 |
| 332 | [108][332] LS\_NTN\_R5-233672 | LS response to RAN5 on NTN conformance R5-233672 | 10.2.3 (R4-2311688 , R4-2311767 , R4-2313262,R4-2313372, R4-2313489 , R4-2313635 R4-2313636, R4-2313637, R4-2313638, R4-2313639 R4-2313640) | Dorin Panaitopol AI 10.4 |

## 3A Topic Summary (pre-meeting)

### 3A.3 BSRF\_Demod session topic summaries

|  |  |
| --- | --- |
| **T-doc** | **Title** |
| R4-2314237 | Topic summary for [108][301] BSRF\_Maintenance |
| R4-2314238 | Topic summary for [108][302] NR\_ext\_to\_71GHz\_BSRF\_Maintenance |
| R4-2314239 | Topic summary for [108][303] NR\_ATG\_BSRF |
| R4-2314240 | Topic summary for [108][304] NR\_FR1\_lessthan\_5MHz\_BW\_BSRF |
| R4-2314241 | Topic summary for [108][305] NR\_LTE\_EMC\_enh |
| R4-2314242 | Topic summary for [108][306] FS\_NR\_duplex\_evo\_Part1 |
| R4-2314243 | Topic summary for [108][307] FS\_NR\_duplex\_evo\_Part2 |
| R4-2314244 | Topic summary for [108][308] FS\_NR\_duplex\_evo\_Part3 |
| R4-2314245 | Topic summary for [108][309] NR\_NTN\_enh\_Part1 |
| R4-2314246 | Topic summary for [108][310] NR\_NTN\_enh\_Part2 |
| R4-2314247 | Topic summary for [108][311] NR\_NTN\_enh\_Part3 |
| R4-2314248 | Topic summary for [108][312] NR\_netcon\_repeater\_RF |
| R4-2314249 | Topic summary for [108][313] NR\_netcon\_repeater\_RFConformance |
| R4-2314250 | Topic summary for [108][314] NR\_mobile\_IAB\_RF |
| R4-2314251 | Topic summary for [108][315] LTE\_terr\_bcast\_bands\_BSRF |
| R4-2314252 | Topic summary for [108][316] IoT\_NTN\_SANRF |
| R4-2314253 | Topic summary for [108][317] Demod\_Maintenance |
| R4-2314254 | Topic summary for [108][318] IoT\_NTN Demod\_Maintenance |
| R4-2314255 | Topic summary for [108][319] RF\_FR1\_enh2\_Demod\_Part1 |
| R4-2314256 | Topic summary for [108][320] RF\_FR1\_enh2\_Demod\_Part2 |
| R4-2314257 | Topic summary for [108][321] NR\_RF\_FR2\_req\_Ph3\_Demod |
| R4-2314258 | Topic summary for [108][322] NR\_FR2\_multiRX\_DL\_Demod |
| R4-2314259 | Topic summary for [108][323] NonCol\_intraB\_ENDC\_NR\_CA\_Demod |
| R4-2314260 | Topic summary for [108][324] NR\_HST\_FR2\_enh\_Demod |
| R4-2314261 | Topic summary for [108][325] NR\_ATG\_Demod |
| R4-2314262 | Topic summary for [108][326] NR\_demod\_enh3\_Part1 |
| R4-2314263 | Topic summary for [108][327] NR\_demod\_enh3\_Part2 |
| R4-2314264 | Topic summary for [108][328] NR\_netcon\_repeater\_Demod |
| R4-2314265 | Topic summary for [108][329] FS\_NR\_FR2\_OTA\_enh |
| R4-2314266 | Topic summary for [108][330] NR\_FR1\_TRP\_TRS\_enh |
| R4-2314267 | Topic summary for [108][331] NR\_MIMO\_OTA\_enh |
| R4-2314268 | Topic summary for [108][332] LS\_NTN\_R5-233672 |

## 4 Up to Rel-16 maintenance for LTE and NR

The following contributions have been moved and will be treatedi n the respective topic threads.

For Rel-15/16 maintenance, please submit formal CRs. When you reserve the tdoc number, please use the correct WI code rather than simply using TEI and fill the column of “Related WIs” in your reservation spreadsheet. If you submit a CR with TEI as WI code, please inform session chair.

When submitting contributions to AI 4, please add [WI\_code] in the beginning of titles for both discussion files and CRs to facilitate handling of moderators and session chairs.

### 4.2 BS RF requirements and BS conformance testing

[RInImp9-Rfmulti, TEI12] CR to TS 37.104: FFS removal

**R4-2313600 [RInImp9-Rfmulti, TEI12] CR to TS 37.104: FFS removal, Rel-12**

*Type: CR For: Agreement  
 37.104 v12.14.0 CR-0992 rev Cat: F (Rel-12)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

FFS needs to be removed as it is not allowed in a frozen release.

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

**R4-2313601 [RInImp9-Rfmulti, TEI12] CR to TS 37.104: FFS removal, Rel-13**

*Type: CR For: Agreement  
 37.104 v13.9.0 CR-0993 rev Cat: A (Rel-13)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

FFS needs to be removed as it is not allowed in a frozen release.

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

**R4-2313602 [RInImp9-Rfmulti, TEI12] CR to TS 37.104: FFS removal, Rel-14**

*Type: CR For: Agreement  
 37.104 v14.8.0 CR-0994 rev Cat: A (Rel-14)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

FFS needs to be removed as it is not allowed in a frozen release.

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

**R4-2313603 [RInImp9-Rfmulti, TEI15] CR to TS 37.104: FFS removal, Rel-15**

*Type: CR For: Agreement  
 37.104 v15.18.0 CR-0995 rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

FFS needs to be removed as it is not allowed in a frozen release.

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

**R4-2313604 [RInImp9-Rfmulti, TEI15] CR to TS 37.104: FFS removal, Rel-16**

*Type: CR For: Agreement  
 37.104 v16.17.0 CR-0996 rev Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

FFS needs to be removed as it is not allowed in a frozen release.

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

**R4-2313605 [RInImp9-Rfmulti, TEI15] CR to TS 37.104: FFS removal, Rel-17**

*Type: CR For: Agreement  
 37.104 v17.9.0 CR-0997 rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

FFS needs to be removed as it is not allowed in a frozen release.

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

**R4-2313809 [RInImp9-Rfmulti, TEI18] CR to TS 37.104: FFS removal, Rel-18**

*Type: CR For: Agreement  
 37.104 v18.2.0 CR-0999 rev Cat: F (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

FFS needs to be removed as it is not allowed in a frozen release.

As those requirements were not addressed since Rel-12, it is proposed to remove related statements.

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

**R4-2313606 [RInImp9-Rfmulti, TEI15] CR to TS 37.104: FFS removal, Rel-18**

*Type: CR For: Agreement  
 37.104 v18.2.0 CR-0998 rev Cat: F (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

FFS needs to be removed as it is not allowed in a frozen release.

As those requirements were not addressed since Rel-12, it is proposed to remove related statements.

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

[MSR\_NC-Perf] Correction to TS 37.141 for MSR BS

**R4-2311538 [MSR\_NC-Perf] CR to TS 37.141 NR with Multipath fading of GSM for MSR BS**

*Type: CR For: Agreement  
 37.141 v16.18.0 CR-1047 rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311539 [MSR\_NC-Perf] CR to TS 37.141 NR with Multipath fading of GSM for MSR BS**

*Type: CR For: Agreement  
 37.141 v17.10.0 CR-1048 rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311540 [MSR\_NC-Perf] CR to TS 37.141 NR with Multipath fading of GSM for MSR BS**

*Type: CR For: Agreement  
 37.141 v18.2.0 CR-1049 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311541 [MSR\_NC-Perf] CR to TS 37.141 with correction to interference signal bandwidth for MSR BS**

*Type: CR For: Agreement  
 37.141 v15.20.0 CR-1050 rev Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311542 [MSR\_NC-Perf] CR to TS 37.141 with correction to interference signal bandwidth for MSR BS**

*Type: CR For: Agreement  
 37.141 v16.18.0 CR-1051 rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311543 [MSR\_NC-Perf] CR to TS 37.141 with correction to interference signal bandwidth for MSR BS**

*Type: CR For: Agreement  
 37.141 v17.10.0 CR-1052 rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311544 [MSR\_NC-Perf] CR to TS 37.141 with correction to interference signal bandwidth for MSR BS**

*Type: CR For: Agreement  
 37.141 v18.2.0 CR-1053 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311548 [MSR\_NC-Perf] CR to TS 37.141 with the rated output power definition of the test signal for MSR BS**

*Type: CR For: Agreement  
 37.141 v16.18.0 CR-1054 rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311549 [MSR\_NC-Perf] CR to TS 37.141 with the rated output power definition of the test signal for MSR BS**

*Type: CR For: Agreement  
 37.141 v17.10.0 CR-1055 rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311550 [MSR\_NC-Perf] CR to TS 37.141 with the rated output power definition of the test signal for MSR BS**

*Type: CR For: Agreement  
 37.141 v18.2.0 CR-1056 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

[AAS\_BS\_LTE\_UTRA-Perf] Correction to TS 37.145-1/-2 for AAS BS

**R4-2311545 [AAS\_BS\_LTE\_UTRA-Perf] CR to TS 37.145-1 with corrections to TCs for AAS BS conformance testing**

*Type: CR For: Agreement  
 37.145-1 v16.13.0 CR-0317 rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311546 [AAS\_BS\_LTE\_UTRA-Perf] CR to TS 37.145-1 with corrections to TCs for AAS BS conformance testing**

*Type: CR For: Agreement  
 37.145-1 v17.8.0 CR-0318 rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311547 [AAS\_BS\_LTE\_UTRA-Perf] CR to TS 37.145-1 with corrections to TCs for AAS BS conformance testing**

*Type: CR For: Agreement  
 37.145-1 v18.2.0 CR-0319 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311551 [AAS\_BS\_LTE\_UTRA-Perf] CR to TS 37.145-1 with test signal configuration changes for AAS BS**

*Type: CR For: Agreement  
 37.145-1 v16.13.0 CR-0320 rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311552 [AAS\_BS\_LTE\_UTRA-Perf] CR to TS 37.145-1 with test signal configuration changes for AAS BS**

*Type: CR For: Agreement  
 37.145-1 v17.8.0 CR-0321 rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311553 [AAS\_BS\_LTE\_UTRA-Perf] CR to TS 37.145-1 with test signal configuration changes for AAS BS**

*Type: CR For: Agreement  
 37.145-1 v18.2.0 CR-0322 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311723 [AASenh\_BS\_LTE\_UTRA-Perf] CR to TR 37.145-2: Corrections on table references for E-UTRA in-channel selectivity test requirement**

*Type: CR For: Agreement  
 37.145-2 v15.15.0 CR-0354 rev Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Correct the table references.

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

**R4-2311724 [AASenh\_BS\_LTE\_UTRA-Perf] CR to TR 37.145-2: Corrections on table references for E-UTRA in-channel selectivity test requirement**

*Type: CR For: Agreement  
 37.145-2 v16.14.0 CR-0355 rev Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Correct the table references.

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

**R4-2311725 [AASenh\_BS\_LTE\_UTRA-Perf] CR to TR 37.145-2: Corrections on table references for E-UTRA in-channel selectivity test requirement**

*Type: CR For: Agreement  
 37.145-2 v17.8.0 CR-0356 rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Correct the table references.

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

**R4-2311726 [AASenh\_BS\_LTE\_UTRA-Perf] CR to TR 37.145-2: Corrections on tables for E-UTRA in-channel selectivity test requirement**

*Type: CR For: Agreement  
 37.145-2 v18.2.0 CR-0357 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Correct the table references.

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

[NR\_newRAT-Core] Correction to TS 38.104/38.141-1/-2, TS 37.104/141/145-1/145-2 on ACLR and CACLR requirements

**R4-2312098 CR to 38.104: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 38.104 v16.16.0 CR-0506 rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge” (FR1). NOTE: This is an additi

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

**R4-2312099 CR to 38.104: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 38.104 v17.10.0 CR-0507 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge” (FR1). NOTE: This is an additi

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

**R4-2312100 CR to 38.104: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 38.104 v18.2.0 CR-0508 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge” (FR1). NOTE: This is an additi

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

**R4-2312101 CR to 38.141-1: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 38.141-1 v16.16.0 CR-0368 rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge” (FR1). NOTE: This is an additi

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

**R4-2312102 CR to 38.141-1: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 38.141-1 v17.10.0 CR-0369 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge” (FR1). NOTE: This is an additi

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

**R4-2312103 CR to 38.141-1: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 38.141-1 v18.2.0 CR-0370 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge” (FR1). NOTE: This is an additi

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

**R4-2312104 CR to 37.104: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.104 v15.18.0 CR-0988 rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312105 CR to 37.104: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.104 v16.17.0 CR-0989 rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312106 CR to 37.104: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.104 v17.9.0 CR-0990 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312107 CR to 37.104: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.104 v18.2.0 CR-0991 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312108 CR to 37.141: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.141 v15.20.0 CR-1058 rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312109 CR to 37.141: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.141 v16.18.0 CR-1059 rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312110 CR to 37.141: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.141 v17.10.0 CR-1060 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312111 CR to 37.141: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.141 v18.2.0 CR-1061 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312112 CR to 37.145-1: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.145-1 v15.14.0 CR-0324 rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312113 CR to 37.145-1: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.145-1 v16.13.0 CR-0325 rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312114 CR to 37.145-1: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.145-1 v17.8.0 CR-0326 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312115 CR to 37.145-1: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.145-1 v18.2.0 CR-0327 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312116 CR to 37.145-2: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.145-2 v15.15.0 CR-0359 rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312117 CR to 37.145-2: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.145-2 v16.14.0 CR-0360 rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312118 CR to 37.145-2: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.145-2 v17.8.0 CR-0361 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

**R4-2312119 CR to 37.145-2: Correction to ACLR and CACLR requirement**

*Type: CR For: Agreement  
 37.145-2 v18.2.0 CR-0362 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted below or above the sub-block edge or Base Station RF Bandwidth edge”

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

[NR\_newRAT-Perf] Correction to TS 38.141-2/-1 on REFSENS

**R4-2311582 CR for TS 38.141-2, Correction on reference of EISminSENS, EISREFSENS and EISREFSENS\_50M**

*Type: CR For: Agreement  
 38.141-2 v15.18.0 CR-0520 rev Cat: F (Rel-15)  
  
 Source: CATT*

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

**R4-2311583 CR for TS 38.141-2, Correction on reference of EISminSENS, EISREFSENS and EISREFSENS\_50M**

*Type: CR For: Agreement  
 38.141-2 v16.16.0 CR-0521 rev Cat: A (Rel-16)  
  
 Source: CATT*

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

**R4-2311584 CR for TS 38.141-2, Correction on reference of EISminSENS, EISREFSENS and EISREFSENS\_50M**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0522 rev Cat: F (Rel-17)  
  
 Source: CATT*

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

**R4-2311585 CR for TS 38.141-2, Correction on reference of EISminSENS, EISREFSENS and EISREFSENS\_50M**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0523 rev Cat: A (Rel-18)  
  
 Source: CATT*

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

**R4-2311586 CR for TS 38.141-1, Correction on reference of PREFSENS**

*Type: CR For: Agreement  
 38.141-1 v15.15.0 CR-0357 rev Cat: F (Rel-15)  
  
 Source: CATT*

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

**R4-2311587 CR for TS 38.141-1, Correction on reference of PREFSENS**

*Type: CR For: Agreement  
 38.141-1 v16.16.0 CR-0358 rev Cat: A (Rel-16)  
  
 Source: CATT*

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

**R4-2311588 CR for TS 38.141-1, Correction on reference of PREFSENS**

*Type: CR For: Agreement  
 38.141-1 v17.10.0 CR-0359 rev Cat: F (Rel-17)  
  
 Source: CATT*

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

**R4-2311589 CR for TS 38.141-1, Correction on reference of PREFSENS**

*Type: CR For: Agreement  
 38.141-1 v18.2.0 CR-0360 rev Cat: A (Rel-18)  
  
 Source: CATT*

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

[NR\_newRAT-Perf] Correction to TS 38.104 on FR2-2 CHBW table

**R4-2311903 Update to table format for enabling automated data scraping**

*Type: CR For: Agreement  
 38.104 v17.10.0 CR-0502 rev Cat: F (Rel-17)  
  
 Source: ROHDE & SCHWARZ*

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

**R4-2311916 Update to table format for enabling automated data scraping**

*Type: CR For: Agreement  
 38.104 v18.2.0 CR-0503 rev Cat: A (Rel-18)  
  
 Source: ROHDE & SCHWARZ*

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

[NR\_IAB-Core/Perf] Correction to TS 38.174/38.176-2 on IAB scaling factor

**R4-2311590 CR for TS 38.174, Correction on scaling factor for IAB-MT type 1-O**

*Type: CR For: Agreement  
 38.174 v16.8.0 CR-0057 rev Cat: F (Rel-16)  
  
 Source: CATT*

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

**R4-2311591 CR for TS 38.174, Correction on scaling factor for IAB-MT type 1-O**

*Type: CR For: Agreement  
 38.174 v17.4.0 CR-0058 rev Cat: A (Rel-17)  
  
 Source: CATT*

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

**R4-2311592 CR for TS 38.174, Correction on scaling factor for IAB-MT type 1-O**

*Type: CR For: Agreement  
 38.174 v18.1.0 CR-0059 rev Cat: A (Rel-18)  
  
 Source: CATT*

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

**R4-2311593 CR for TS 38.176-2, Correction on scaling factor for IAB-MT type 1-O**

*Type: CR For: Agreement  
 38.176-2 v16.6.0 CR-0028 rev Cat: F (Rel-16)  
  
 Source: CATT*

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

**R4-2311594 CR for TS 38.176-2, Correction on scaling factor for IAB-MT type 1-O**

*Type: CR For: Agreement  
 38.176-2 v17.5.0 CR-0029 rev Cat: A (Rel-17)  
  
 Source: CATT*

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

**R4-2311595 CR for TS 38.176-2, Correction on scaling factor for IAB-MT type 1-O**

*Type: CR For: Agreement  
 38.176-2 v18.1.0 CR-0030 rev Cat: A (Rel-18)  
  
 Source: CATT*

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

[NR\_newRAT-Perf] Correctios to TS 37.145-2/38.141-2

**R4-2313735 Proposal for clean-up and improvements on BS specifications**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution describes issues in current BS specficiations which were identified together with ETSI and European Commission during the process of editing the harmonised standard.

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

**R4-2313736 TS 37.145-2: Corrections**

*Type: CR For: Agreement  
 37.145-2 v15.15.0 CR-0363 rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Various corrections in the specification

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

**R4-2313737 TS 37.145-2: Corrections**

*Type: CR For: Agreement  
 37.145-2 v16.14.0 CR-0364 rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Various corrections in the specification

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

**R4-2313738 TS 37.145-2: Corrections**

*Type: CR For: Agreement  
 37.145-2 v17.8.0 CR-0365 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Various corrections in the specification

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

**R4-2313739 TS 37.145-2: Corrections**

*Type: CR For: Agreement  
 37.145-2 v18.2.0 CR-0366 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Various corrections in the specification

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

**R4-2313740 TS 38.141-2: Corrections**

*Type: CR For: Agreement  
 38.141-2 v15.18.0 CR-0543 rev Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Various corrections in the specification

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

**R4-2313741 TS 38.141-2: Corrections**

*Type: CR For: Agreement  
 38.141-2 v16.16.0 CR-0544 rev Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Various corrections in the specification

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

**R4-2313742 TS 38.141-2: Corrections**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0545 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Various corrections in the specification

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

**R4-2313743 TS 38.141-2: Corrections**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0546 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Various corrections in the specification

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

[NR\_IAB-Core] Correction to TS 38.174 on FR2 range

**R4-2313477 CR to correct FR2 range in IAB specifiaiton**

*Type: CR For: Agreement  
 38.174 v17.4.0 CR-0066 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

CR to update the FR2 to align with 38.104

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

**R4-2313478 CR to correct FR2 range in IAB specifiaiton**

*Type: CR For: Agreement  
 38.174 v18.1.0 CR-0067 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

CR to update the FR2 to align with 38.104

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

[NR\_newRAT-Core] Correction to TR 38.817-02

**R4-2311659 [NR\_newRAT-Core] CR to TR 38.817-02: Clarification on calculation of CW frequency offset for conducted narrowband receiver intermodulation requirement in FR1**

*Type: CR For: Agreement  
 38.817-02 v15.10.0 CR-0070 rev Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

1) Replace the symbol with SCSwanted, which is clearly defined, in the equation on calculation of CW frequency offset for conducted narrowband receiver intermodulation requirement.

2) Correct TS to TR in the title.

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

[OTA\_BS\_testing-Perf] Correction to TR 37.941

**R4-2312375 CR to TR 37.941: Improvement of RC description in subclause 7.8, 8.8, 11.2.5, 11.3.5 and 11.4.5**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0043 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This CR implements corrections related to the technical description for the Reverberation Chamber (RC) test method. In current version of TR 37.941 we have discovered some errors related to how antenna efficiency is included. Since RC is a essential testm

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

[OTA\_BS\_testing-Perf] CR to TR 37.941

**R4-2313596 [OTA\_BS\_testing-Perf] CR to TR 37.941: correction of the applicability of General Chamber (co-location, out-of-band requirements), Rel-15**

*Type: CR For: Agreement  
 37.941 v15.3.0 CR-0045 rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

It was observed, that the applicability of the General Chamber in TR 37.941 was not used in consistent manner.

In Rel-15, the General Chamber terminology was introduced in order to refer to multiple OTA chamber types utilizing attenuated chambers (e.g. I

Session chair note: R4-231596~2313599 move to this AI from AI 4.6.

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

**R4-2313597 [OTA\_BS\_testing-Perf] CR to TR 37.941: correction of the applicability of General Chamber (co-location, out-of-band requirements), Rel-16**

*Type: CR For: Agreement  
 37.941 v16.5.0 CR-0046 rev Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

It was observed, that the applicability of the General Chamber in TR 37.941 was not used in consistent manner.

In Rel-15, the General Chamber terminology was introduced in order to refer to multiple OTA chamber types utilizing attenuated chambers (e.g. I

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

**R4-2313598 [OTA\_BS\_testing-Perf] CR to TR 37.941: correction of the applicability of General Chamber (co-location, out-of-band requirements), Rel-17**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0047 rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

It was observed, that the applicability of the General Chamber in TR 37.941 was not used in consistent manner.

In Rel-15, the General Chamber terminology was introduced in order to refer to multiple OTA chamber types utilizing attenuated chambers (e.g. I

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

**R4-2313599 [OTA\_BS\_testing-Perf] CR to TR 37.941: correction of the applicability of General Chamber (co-location, out-of-band requirements), Rel-18**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0048 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

It was observed, that the applicability of the General Chamber in TR 37.941 was not used in consistent manner.

In Rel-15, the General Chamber terminology was introduced in order to refer to multiple OTA chamber types utilizing attenuated chambers (e.g. I

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

### 4.3 UE/BS EMC requirements

[NR\_newRAT-Core] CR on TS 38.175

**R4-2312070 [NR\_newRAT-Core] CR on TS 38.175 IAB reference maintenance R17**

*Type: CR For: Agreement  
 38.175 v17.3.0 CR-0030 rev Cat: F (Rel-17)  
  
 Source: ZTE*

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

**R4-2312071 [NR\_newRAT-Core] CR on TS 38.175 IAB reference maintenance R16**

*Type: CR For: Agreement  
 38.175 v16.5.0 CR-0031 rev Cat: F (Rel-16)  
  
 Source: ZTE*

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

[NR\_newRAT-Core] CR on TS 38.113

**R4-2312097 [NR\_newRAT-Core] CR on TS 38.113 NR BS reference maintenance R15**

*Type: CR For: Agreement  
 38.113 v15.18.0 CR-0060 rev Cat: F (Rel-15)  
  
 Source: ZTE*

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

**R4-2312121 [NR\_newRAT-Core] CR on TS 38.113 NR BS reference maintenance R16**

*Type: CR For: Agreement  
 38.113 v16.8.0 CR-0061 rev Cat: A (Rel-16)  
  
 Source: ZTE Corporation*

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

**R4-2312186 [NR\_newRAT-Core] CR on TS 38.113 NR BS reference maintenance R17**

*Type: CR For: Agreement  
 38.113 v17.4.0 CR-0062 rev Cat: A (Rel-17)  
  
 Source: ZTE Corporation*

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

[NR\_newRAT-Core] CR on TS 38.114

**R4-2312203 [NR\_newRAT-Core] CR on TS 38.114 NR repeater general maintenance R17**

*Type: CR For: Agreement  
 38.114 v17.2.0 CR-0006 rev Cat: F (Rel-17)  
  
 Source: ZTE*

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

### 4.5 Demodulation and CSI requirements

[NR\_newRAT-Perf] CR to TS 38.101-4 on FRC correction

**R4-2313678 [NR\_newRAT-Perf] CR on correction of FRC definition (TS38.101-4, Rel-15)**

*Type: CR For: Agreement  
 38.101-4 v15.18.0 CR-0415 rev Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313679 [NR\_newRAT-Perf] CR on correction of FRC definition (TS38.101-4, Rel-16)**

*Type: CR For: Agreement  
 38.101-4 v16.13.0 CR-0416 rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313680 [NR\_newRAT-Perf] CR on correction of FRC definition (TS38.101-4, Rel-17)**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0417 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313681 [NR\_newRAT-Perf] CR on correction of FRC definition (TS38.101-4, Rel-18)**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0418 rev Cat: F (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

[NR\_L1enh\_URLLC-Perf] TS38.101-4 correction to CQI with 1 Tx

**R4-2311202 [NR\_newRAT-Perf] Report quantity parameter setting for CQI reporting with 1Tx**

*Type: other For: Approval  
 38.101-4 v CR- rev Cat: ()  
  
 Source: Anritsu Corporation, Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion on the definition of the test parameter reportQuantity for CQI test with 1Tx.

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

**R4-2311300 [NR\_L1enh\_URLLC-Perf] CR to TS38.101-4 Corrections to CQI Reporting tests with 1TX (Rel-16)**

*Type: CR For: Agreement  
 38.101-4 v16.13.0 CR-0389 rev Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

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

**R4-2313571 CR to TS38.101-4: Corrections to CQI Reporting tests with 1TX (Rel-16)**

*Type: CR For: Agreement  
 38.101-4 v16.13.0 CR-0412 rev Cat: F (Rel-16)  
  
 Source: MediaTek*

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

**R4-2311301 [NR\_L1enh\_URLLC-Perf] CR to TS38.101-4 Corrections to CQI Reporting tests with 1TX (Rel-17)**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0390 rev Cat: A (Rel-17)  
  
 Source: MediaTek inc.*

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

**R4-2311302 [NR\_L1enh\_URLLC-Perf] CR to TS38.101-4 Corrections to CQI Reporting tests with 1TX (Rel-18)**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0391 rev Cat: A (Rel-18)  
  
 Source: MediaTek inc.*

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

[NR\_HST] CR to TS 38.101-4

**R4-2311784 [NR\_HST] HST-SFN and HST-DPS model clarification**

*Type: CR For: Agreement  
 38.101-4 v16.13.0 CR-0393 rev Cat: F (Rel-16)  
  
 Source: Qualcomm Inc.*

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

**R4-2311785 [NR\_HST]HST demod test correction R17 mirror**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0394 rev Cat: A (Rel-17)  
  
 Source: Qualcomm, Inc.*

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

**R4-2311786 [NR\_HST]HST demod test correction R18 mirror**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0395 rev Cat: A (Rel-18)  
  
 Source: Qualcomm, Inc.*

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

[NR\_newRAT-Perf , NR\_redcap-Perf] CR to TS 38.101-4 on test applicability

**R4-2312346 [NR\_newRAT-Perf] CR on 38.101-4 general applicablity of demodulation performance requirements (Rel-16)**

*Type: CR For: Agreement  
 38.101-4 v16.13.0 CR-0398 rev Cat: F (Rel-16)  
  
 Source: Samsung*

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

**R4-2312347 [NR\_redcap-Perf] CR on 38.101-4 general applicablity of demodulation performance requirements (Rel-17)**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0399 rev Cat: F (Rel-17)  
  
 Source: Samsung*

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

**R4-2312348 [NR\_redcap-Perf] CR on 38.101-4 general applicablity of demodulation performance requirements (Rel-18)**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0400 rev Cat: A (Rel-18)  
  
 Source: Samsung*

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

[NR\_unlic-Perf] CR to TS 38.101-4

**R4-2312500 [NR\_unlic-Perf] Add clarification to simulation parameters for SSB Q Factor (Rel.16 - Cat. F)**

*Type: CR For: Agreement  
 38.101-4 v16.13.0 CR-0402 rev Cat: F (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Introduce note to clarify SSB Q factor - Cat.F

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

**R4-2312501 [NR\_unlic-Perf] Add clarification to simulation parameters for SSB Q Factor (Rel.17 - Cat. A)**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0403 rev Cat: A (Rel-17)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Introduce note to clarify SSB Q factor - Cat.A

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

**R4-2312502 [NR\_unlic-Perf] Add clarification to simulation parameters for SSB Q Factor (Rel.18 - Cat. A)**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0404 rev Cat: A (Rel-18)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Introduce note to clarify SSB Q factor - Cat.A

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

[NR\_L1enh\_URLLC-Perf] CR to TS 38.141-1/-2

**R4-2312057 [NR\_L1enh\_URLLC-Perf] CR for adding optional statement for URLLC demodulation requirements**

*Type: CR For: Agreement  
 38.141-1 v16.16.0 CR-0365 rev Cat: F (Rel-16)  
  
 Source: Ericsson, Nokia, Nokia Shanghai Bell*

**Abstract:**

Add manufacture declarations and applicability rule for URLLC requirements

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

**R4-2312058 CR for TS38.141-1 add declaration and applicability rule for URLLC requirements**

*Type: CR For: Agreement  
 38.141-1 v17.10.0 CR-0366 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Add manufacture declarations and applicability rule for URLLC requirements

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

**R4-2312059 CR for TS38.141-1 add declaration and applicability rule for URLLC requirements**

*Type: CR For: Agreement  
 38.141-1 v18.2.0 CR-0367 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Add manufacture declarations and applicability rule for URLLC requirements

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

**R4-2312060 [NR\_L1enh\_URLLC-Perf] CR for adding optional statement for URLLC demodulation requirements**

*Type: CR For: Agreement  
 38.141-2 v16.16.0 CR-0528 rev Cat: F (Rel-16)  
  
 Source: Ericsson, Nokia, Nokia Shanghai Bell*

**Abstract:**

Add manufacture declarations and applicability rule for URLLC requirements

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

**R4-2312061 CR for TS38.141-2 add declaration and applicability rule for URLLC requirements**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0529 rev Cat: A (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Add manufacture declarations and applicability rule for URLLC requirements

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

**R4-2312062 CR for TS38.141-2 add declaration and applicability rule for URLLC requirements**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0530 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Add manufacture declarations and applicability rule for URLLC requirements

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

**R4-2312444 [NR\_L1enh\_URLLC-Perf] CR to 38.141-1: Correction on BLER test requirement R16**

*Type: CR For: Agreement  
 38.141-1 v16.16.0 CR-0371 rev Cat: F (Rel-16)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2313556 [NR\_L1enh\_URLLC-Perf] CR to 38.141-1: Correction on BLER test requirement R17**

*Type: CR For: Agreement  
 38.141-1 v17.10.0 CR-0374 rev Cat: A (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2313557 [NR\_L1enh\_URLLC-Perf] CR to 38.141-1: Correction on BLER test requirement R18**

*Type: CR For: Agreement  
 38.141-1 v18.2.0 CR-0375 rev Cat: A (Rel-18)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2312445 [NR\_L1enh\_URLLC-Perf] CR to 38.141-1: Correction on BLER test requirement R17**

*Type: CR For: Agreement  
 38.141-1 v17.10.0 CR-0372 rev Cat: A (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2312446 [NR\_L1enh\_URLLC-Perf] CR to 38.141-1: Correction on BLER test requirement R18**

*Type: CR For: Agreement  
 38.141-1 v18.2.0 CR-0373 rev Cat: A (Rel-18)  
  
 Source: Keysight Technologies UK Ltd*

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

[NR\_IAB-Perf] CR for TS 38.174

**R4-2312799 [NR\_IAB-Perf] CR for TS 38.174 FRC Correction in PDCCH Table (NR\_IAB, Rel-16, CAT F)**

*Type: CR For: Agreement  
 38.174 v16.8.0 CR-0063 rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The FRCs in PDCCH Table do not align with the Aggregation Level.

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

**R4-2312800 [NR\_IAB-Perf] CR for TS 38.174 FRC Correction in PDCCH Table (NR\_IAB, Rel-17, CAT A)**

*Type: CR For: Agreement  
 38.174 v17.4.0 CR-0064 rev Cat: A (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The FRCs in PDCCH Table do not align with the Aggregation Level.

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

**R4-2312801 [NR\_IAB-Perf] CR for TS 38.174 FRC Correction in PDCCH Table (NR\_IAB, Rel-18, CAT A)**

*Type: CR For: Agreement  
 38.174 v18.1.0 CR-0065 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The FRCs in PDCCH Table do not align with the Aggregation Level.

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

**R4-2313668 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS36.174, Rel-16)**

*Type: CR For: Agreement  
 38.174 v16.8.0 CR-0070 rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313669 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS38.174, Rel-17)**

*Type: CR For: Agreement  
 38.174 v17.4.0 CR-0071 rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313670 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS38.174, Rel-18)**

*Type: CR For: Agreement  
 38.174 v18.1.0 CR-0072 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313671 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS36.176-1, Rel-16)**

*Type: CR For: Agreement  
 38.176-1 v16.6.0 CR-0028 rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313672 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS38.176-1, Rel-17)**

*Type: CR For: Agreement  
 38.176-1 v17.5.0 CR-0029 rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313673 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS38.176-1, Rel-18)**

*Type: CR For: Agreement  
 38.176-1 v18.1.0 CR-0030 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313674 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS36.176-2, Rel-16)**

*Type: CR For: Agreement  
 38.176-2 v16.6.0 CR-0031 rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313675 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS38.176-2, Rel-17)**

*Type: CR For: Agreement  
 38.176-2 v17.5.0 CR-0032 rev Cat: A (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313676 [NR\_IAB-Perf] CR on NR IAB performance requirements (TS38.176-2, Rel-18)**

*Type: CR For: Agreement  
 38.176-2 v18.1.0 CR-0033 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

### 4.6 OTA and TRP/TRS test aspects

### 4.7 Moderator summary and conclusion

## 5 Rel-17 maintenance for LTE and NR

The following contributions have been moved and will be treatedi n the respective topic threads.

*For Rel-17 maintenance, please submit formal CRs. When you reserve the tdoc number, please use the correct WI code rather than simply using TEI and fill the column of “Related WIs” in your reservation spreadsheet. If you submit a CR with TEI as WI code, please inform session chair.*

*The contributions corresponding to incoming LS for Rel-18, Rel-17 are expected to be submitted in AI 10.1 and AI 10.2.*

*When submitting contributions to AI 5, please add [WI\_code] in the beginning of titles for both discussion files and CRs to facilitate handling of moderators and session chairs.*

### 5.2 Rel-17 non-spectrum related WI maintenance

#### 5.2.1 BS RF requirements

[NR\_NTN\_solutions-Core] CR to TS 38.108/181 correction on antenna connector

**R4-2311596 CR for TS 38.108, Correction on antenna connector**

*Type: CR For: Agreement  
 38.108 v17.4.0 CR-0038 rev Cat: F (Rel-17)  
  
 Source: CATT*

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

**R4-2311597 CR for TS 38.181, Correction on antenna connector**

*Type: CR For: Agreement  
 38.181 v17.1.0 CR-0004 rev Cat: F (Rel-17)  
  
 Source: CATT*

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

[NR\_NTN\_solutions-Core] CR to TS 38.108/181 correction OOBE

**R4-2311598 CR for TS 38.108, Correction on out-of-band emissions**

*Type: CR For: Agreement  
 38.108 v17.4.0 CR-0039 rev Cat: F (Rel-17)  
  
 Source: CATT, THALES*

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

**R4-2311599 CR for TS 38.181, Correction on out-of-band emissions**

*Type: CR For: Agreement  
 38.181 v17.1.0 CR-0005 rev Cat: F (Rel-17)  
  
 Source: CATT*

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

**R4-2311700 CR to 38.181: Out-of-band emissions requirements**

*Type: CR For: Agreement  
 38.181 v17.1.0 CR-0006 rev Cat: F (Rel-17)  
  
 Source: NEC*

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

**R4-2311701 CR to 38.108: Application of unwanted emissions requirements**

*Type: CR For: Agreement  
 38.108 v17.4.0 CR-0040 rev Cat: F (Rel-17)  
  
 Source: NEC*

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

**R4-2311702 CR to 38.181: Applicaiton of unwanted emissions requirements**

*Type: CR For: Agreement  
 38.181 v17.1.0 CR-0007 rev Cat: F (Rel-17)  
  
 Source: NEC*

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

[NR\_NTN\_solutions-Perf] CR to TS 38.181 correction of interfering signal

**R4-2311703 CR to 38.181: Characteristic of interfering signal**

*Type: CR For: Agreement  
 38.181 v17.1.0 CR-0008 rev Cat: F (Rel-17)  
  
 Source: NEC*

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

[NR\_repeaters] CR to 38.106 on transient period

**R4-2311711 CR to 38.106: Editorial correction in transmitter transient period for NR repeaters**

*Type: CR For: Agreement  
 38.106 v18.1.0 CR-0037 rev Cat: F (Rel-18)  
  
 Source: NEC*

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

[NR\_repeaters] CR to 38.106/115-1/115-2 on Input intermodulation

**R4-2312329 [NR\_repeaters] CR to 38.106: Input intermodulation**

*Type: CR For: Agreement  
 38.106 v17.5.0 CR-0038 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

**R4-2312330 [NR\_repeaters] CR to 38.106: Input intermodulation**

*Type: CR For: Agreement  
 38.106 v18.1.0 CR-0039 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2312331 [NR\_repeaters] CR to 38.115-1: Input intermodulation**

*Type: CR For: Agreement  
 38.115-1 v17.2.0 CR-0016 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

**R4-2312332 [NR\_repeaters] CR to 38.115-1: Input intermodulation**

*Type: CR For: Agreement  
 38.115-1 v18.1.0 CR-0017 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2312333 [NR\_repeaters] CR to 38.115-2: Input intermodulation**

*Type: CR For: Agreement  
 38.115-2 v17.2.0 CR-0008 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

[NR\_FR1\_35MHz\_45MHz\_BW-Core] CR to TS 38.141-2

**R4-2312447 [NR\_FR1\_35MHz\_45MHz\_BW-Core] CR to 38.141-2: Correction on EVM window length table R17**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0535 rev Cat: F (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2312448 [NR\_FR1\_35MHz\_45MHz\_BW-Core] CR to 38.141-2: Correction on EVM window length table R18**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0536 rev Cat: A (Rel-18)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2313558 [NR\_FR1\_35MHz\_45MHz\_BW-Core] CR to 38.141-2: Correction on EVM window length table R18**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0539 rev Cat: A (Rel-18)  
  
 Source: Keysight Technologies UK Ltd*

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

[NR\_IAB\_enh-Core] CR to TS 38.174

**R4-2311566 [NR\_IAB\_enh-Core] CR to TS 38.174: Addition of missing bands for IAB co-existence and co-location requirements**

*Type: CR For: Agreement  
 38.174 v17.4.0 CR-0055 rev Cat: F (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

Session chair note: R4-2311566~569 move to this AI from AI 5.2.

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

**R4-2311567 [NR\_IAB\_enh-Core] CR to TS 38.174: Addition of missing bands for IAB co-existence and co-location requirements**

*Type: CR For: Agreement  
 38.174 v18.1.0 CR-0056 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

[NR\_6GHz-Core] CR to TS 38.104

**R4-2311568 [NR\_6GHz-Core] CR to TS 38.104 on receiver requirements for 100MHz channel bandwidth**

*Type: CR For: Agreement  
 38.104 v17.10.0 CR-0498 rev Cat: F (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2311569 [NR\_6GHz-Core] CR to TS 38.104 on receiver requirements for 100MHz channel bandwidth**

*Type: CR For: Agreement  
 38.104 v18.2.0 CR-0499 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

#### 5.2.4 Demodulation and CSI requirements

[NR\_DL1024QAM\_FR1-Perf] CR to TS 38.101-4

**R4-2311087 CR to 38.101-4: Corrections to channel model parameters for FR1 (Rel-17)**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0385 rev Cat: F (Rel-17)  
  
 Source: MediaTek*

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

**R4-2311088 [NR\_DL1024QAM\_FR1-Perf] CR to 38.101-4: Corrections to channel model parameters for FR1 (Rel-18)**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0386 rev Cat: A (Rel-18)  
  
 Source: MediaTek inc.*

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

[NR\_demod\_enh2-Perf, NR\_redcap-Perf] CR to TS 38.101-4

**R4-2311207 [NR\_demod\_enh2-Perf, NR\_redcap-Perf] CR to PDSCH requirements and RMCs for SCS 30kHz FR1**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0387 rev Cat: F (Rel-17)  
  
 Source: Anritsu Corporation*

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

**R4-2311208 [NR\_demod\_enh2-Perf, NR\_redcap-Perf] CR to PDSCH requirements and RMCs for SCS 30kHz FR1**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0388 rev Cat: A (Rel-18)  
  
 Source: Anritsu Corporation*

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

[NR\_redcap-Perf] CR to TS 38.101-4

**R4-2312503 [NR\_redcap-Perf] Align Measurement channel to test rank in CQI Redcap tests (Rel.17 - Cat F)**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0405 rev Cat: F (Rel-17)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Tests in Table 6.2.2.1.2.4 are defined for Rank=1 but use Measurement Channel with Rank=2 - Cat.F

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

**R4-2312504 [NR\_redcap-Perf] Align Measurement channel to test rank in CQI Redcap tests (Rel.18 - Cat A)**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0406 rev Cat: A (Rel-18)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Tests in Table 6.2.2.1.2.4 are defined for Rank=1 but use Measurement Channel with Rank=2 - Cat.F

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

[NR\_HST\_FR2-Perf] CR to TS 38.101-4

**R4-2312786 [NR\_HST\_FR2-Perf] CR: Correction of FRC for FR2 HST-DPS UE demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0407 rev Cat: F (Rel-17)  
  
 Source: Ericsson, Anritsu*

**Abstract:**

This CR corrects FRC used for FR2 HST-DPS UE demodulation requirements.

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

**R4-2312787 [NR\_HST\_FR2-Perf] CR: Correction of FRC for FR2 HST-DPS UE demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0408 rev Cat: A (Rel-18)  
  
 Source: Ericsson, Anritsu*

**Abstract:**

This CR corrects FRC used for FR2 HST-DPS UE demodulation requirements.

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

**R4-2312215 Correction CR on Rel-17 FR2 HST test setup and FRC**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0396 rev Cat: F (Rel-17)  
  
 Source: Samsung*

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

**R4-2312216 Correction CR on Rel-17 FR2 HST test setup and FRC**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0397 rev Cat: A (Rel-18)  
  
 Source: Samsung*

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

**R4-2312217 FRC and simulation assumption correction for Rel-17 FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

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

[NR\_HST\_FR1\_enh-Perf] CR to TS 38.101-4

**R4-2313666 [NR\_HST\_FR1\_enh-Perf] CR on HST-SFN CA UE capability (TS38.101-4, Rel-17)**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0413 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313667 [NR\_HST\_FR1\_enh-Perf] CR on HST-SFN CA UE capability (TS38.101-4, Rel-18)**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0414 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

[NR\_NTN\_solutions-Perf] CR to TS 38.101-5

**R4-2311298 [NR\_NTN\_solutions-Perf] CR to TS38.101-5: Corrections to NR-NTN requirements (Rel-17)**

*Type: CR For: Agreement  
 38.101-5 v17.4.0 CR-0027 rev Cat: F (Rel-17)  
  
 Source: MediaTek inc.*

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

**R4-2311299 [NR\_NTN\_solutions-Perf] CR to TS38.101-5: Corrections to NR-NTN requirements (Rel-18)**

*Type: CR For: Agreement  
 38.101-5 v18.2.0 CR-0028 rev Cat: A (Rel-18)  
  
 Source: MediaTek inc.*

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

**R4-2312056 [NR\_NTN\_solutions-Perf] CR for channel model description in SAN PRACH demodulation requirement**

*Type: CR For: Agreement  
 38.108 v17.4.0 CR-0042 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR correct the channel model naming in SAN PRACH configuration

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

**R4-2313572 CR to TS38.101-5: Corrections to NR-NTN requirements (Rel-17)**

*Type: CR For: Agreement  
 38.101-5 v17.4.0 CR-0032 rev Cat: F (Rel-17)  
  
 Source: MediaTek*

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

[NR\_cov\_enh-Perf] Correction to TS 38.141-1/-2

**R4-2312220 Update to Test Case 8.2.13 (FDD case, PUSCH Aggregation Factor 8), Rel17, 38.141-2**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0531 rev Cat: F (Rel-17)  
  
 Source: ROHDE & SCHWARZ*

Session chair note: Move to this AI from AI 4.2.

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

**R4-2312270 Update to Test Case 8.2.13 (FDD case, PUSCH Aggregation Factor 8), Rel18, 38.141-2**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0532 rev Cat: A (Rel-18)  
  
 Source: ROHDE & SCHWARZ*

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

**R4-2311973 Update to Test Case 8.2.13 (FDD case, PUSCH Aggregation Factor 8), Rel17, 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v17.10.0 CR-0361 rev Cat: F (Rel-17)  
  
 Source: ROHDE & SCHWARZ*

Session chair note: Move to this AI from AI 4.2.

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

**R4-2312001 Update to Test Case 8.2.13 (FDD case, PUSCH Aggregation Factor 8), Rel18, 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v18.2.0 CR-0362 rev Cat: A (Rel-18)  
  
 Source: ROHDE & SCHWARZ*

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

[NR\_cov\_enh-Perf] CR to TS 38.104/141-1/141-2 TBoMS

**R4-2312052 [ CR for configuration of FR1 PUSCH TBoMS demodulation requirement**

*Type: CR For: Agreement  
 38.104 v17.10.0 CR-0504 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR correct the number of slot repetition in configuration

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

**R4-2312053 CR for TS38.104 correction for TBoMS configuration**

*Type: CR For: Agreement  
 38.104 v18.2.0 CR-0505 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

The CR correct the number of slot repetition in configuration

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

**R4-2312054 [NR\_cov\_enh-Perf] CR for configuration of FR1 PUSCH TBoMS demodulation requirement**

*Type: CR For: Agreement  
 38.141-1 v17.10.0 CR-0363 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR correct the number of slot repetition in configuration

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

**R4-2312055 CR for TS38.141-1 correction for TBoMS configuration**

*Type: CR For: Agreement  
 38.141-1 v18.2.0 CR-0364 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

The CR correct the number of slot repetition in configuration

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

[NR\_ext\_to\_71GHz-Perf]

**R4-2313582 [NR\_ext\_to\_71GHz-Perf] CR to TS 38.141-2: propagation conditions annex J reference corrections, Rel-17**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0541 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In this CR, correction of incorrect reference to the propagation conditions annex J is fixed.

Session chair note: Move to this AI from AI 5.1.3

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

**R4-2313583 [NR\_ext\_to\_71GHz-Perf] CR to TS 38.141-2: propagation conditions annex J reference corrections, Rel-18**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0542 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In this CR, correction of incorrect reference to the propagation conditions annex J is fixed.

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

[NR\_NTN\_solutions-Perf] CR to TS 38.181

**R4-2313677 [NR\_NTN\_solutions-Perf] CR on NTN SAN performance requirements (TS38.181, Rel-17)**

*Type: CR For: Agreement  
 38.181 v17.1.0 CR-0009 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313837 [NR\_NTN\_solutions-Perf] CR on NTN SAN performance requirements (TS38.181, Rel-17)**

*Type: CR For: Agreement  
 38.181 v17.1.0 CR-0010 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

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

#### 5.2.5 OTA and TRP/TRS test aspects

FS\_FR2\_enhTestMethods

**R4-2311231 Measurement Grids for Optional 6x2 PC3 Antenna Array Configuration**

*Type: discussion For: Decision  
 Source: Apple*

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

[NR\_MIMO\_OTA] CR to TS 38.151

**R4-2312573 [NR\_MIMO\_OTA] CR to TS38.151 on Definitions of terms**

*Type: CR For: Agreement  
 38.151 v17.4.0 CR-0013 rev Cat: F (Rel-17)  
  
 Source: vivo*

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

**R4-2312927 On FR1 requirement metric**

*Type: other For: Approval  
 Source: OPPO*

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

**R4-2312928 CR to TS 38.151 on FR1 and FR2 requirement**

*Type: CR For: Agreement  
 38.151 v17.4.0 CR-0014 rev Cat: F (Rel-17)  
  
 Source: OPPO*

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

**R4-2313227 [NR\_MIMO\_OTA] CR on TS38.151 on FR2 power validation passfail limit**

*Type: CR For: Agreement  
 38.151 v17.4.0 CR-0015 rev Cat: F (Rel-17)  
  
 Source: Huawei,HiSilicon*

**Abstract:**

Specify power validation pass/fail limit for FR2 channel model

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

**R4-2313575 CR to TS 38.151 on Definitions of terms**

*Type: CR For: Agreement  
 38.151 v17.4.0 CR-0017 rev Cat: F (Rel-17)  
  
 Source: vivo*

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

#### 5.2.6 Extending current NR operation to 71GHz

##### 5.2.6.1 MU budget for FR2-2

**R4-2311660 Proposals on measurement uncertainties of BS OTA transmitter requirements for extending current NR operation to 71 GHz**

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

**Abstract:**

This contribution provides proposals on the measurement uncertainties of BS OTA transmitter requirements for extending current NR operation to 71 GHz based on the agreed WF and the related discussion at TSG RAN4#107 to decide the remaining. measurement un

**Decision:** The document was **revised to R4-2313453**.

**R4-2313453 Proposals on measurement uncertainties of BS OTA transmitter requirements for extending current NR operation to 71 GHz**

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

(Replaces R4-2311660)

**Abstract:**

This contribution provides proposals on the measurement uncertainties of BS OTA transmitter requirements for extending current NR operation to 71 GHz based on the agreed WF and the related discussion at TSG RAN4#107 to decide the remaining. measurement un

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

**R4-2313234 FR2-2 BS MU and remaining issues for BS conformance testing**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

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

##### 5.2.6.2 BS RF requirements and conformance testing

[NR\_ext\_to\_71GHz-Perf] CR to TS 38.141-2

**R4-2311709 CR to 38.141-2: Measurement uncertainty for OBW in FR2-2 (Rel-17)**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0526 rev Cat: F (Rel-17)  
  
 Source: NEC*

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

**R4-2311710 CR to 38.141-2: Measurement uncertainty for OBW in FR2-2 (Rel-18)**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0527 rev Cat: A (Rel-18)  
  
 Source: NEC*

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

**R4-2312373 CR to TS 38.141-2: Correction of MU for ACLR, OBUE and Spurious emission for NR operation up to 71 GHz in Subclause 4.1.2.2, 4.1.2.3, 6.7.3.5.2, 6.7.4.5.2 and Annex C.1**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0533 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This CR resolves open issues related to ACLR, OBUE and Spurious emissions for NR operation between 52 to 71 GHz.

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

**R4-2312374 CR to TS 38.141-2: Correction of MU for ACLR, OBUE and Spurious emission for NR operation up to 71 GHz**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0534 rev Cat: A (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

This CR resolves open issues related to ACLR, OBUE and Spurious emissions for NR operation between 52 to 71 GHz.

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

**R4-2311661 CR to TS 38.141-2 on completion of measurement uncertainties for extending current NR operation to 71GHz**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0524 rev Cat: F (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Complete measurement uncertainties for extending current NR operation to 71GHz.

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

**R4-2311662 CR to TS 38.141-2 on completion of measurement uncertainties for extending current NR operation to 71GHz**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0525 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Complete measurement uncertainties for extending current NR operation to 71GHz.

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

**R4-2313236 [NR\_ext\_to\_71GHz-Perf] CR to 38.141-2: 71 GHz Extension BS conformance test MU update R17**

*Type: CR For: Agreement  
 38.141-2 v17.10.0 CR-0537 rev Cat: F (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2313237 [NR\_ext\_to\_71GHz-Perf] CR to 38.141-2: 71 GHz Extension BS conformance test MU update R18**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0538 rev Cat: A (Rel-18)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2313559 [NR\_ext\_to\_71GHz-Perf] CR to 38.141-2: 71 GHz Extension BS conformance test MU update R18**

*Type: CR For: Agreement  
 38.141-2 v18.2.0 CR-0540 rev Cat: A (Rel-18)  
  
 Source: Keysight Technologies UK Ltd*

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

[NR\_ext\_to\_71GHz-Perf] CR to TR 37.941

**R4-2313235 [NR\_ext\_to\_71GHz-Perf] CR to 37.941: 71 GHz Extension BS conformance test MU update**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0044 rev Cat: F (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

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

**R4-2312370 CR to TR 37.941: Addition of technical background related to additional power level calibration in subclause 7.3.1, 8.3 and 8.8**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0040 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This CR adds technical background information relevant for the additional power level calibration required for the FR2-2 MU evaluation. The information in the CR was technically endorsed at RAN4#107 in R4-2309858 and R4-2309859.

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

**R4-2312371 CR to TR 37.941: Addition of FR2-2 MU evaluation for EIRP measured in CATR in subclause 9.2 and 9.3**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0041 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This CR adds MU evaluations for EIRP measured in CATR based on agreements from last meeting in R4-2309855.

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

**R4-2312372 CR to TR 37.941: Addition of FR2-2 MU evaluation for TRP in RC in subclause 11.2, 11.3, 11.4 and 12.2**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0042 rev Cat: F (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This CR adds MU evaluations for EIRP measured in CATR based on agreements from last meeting in R4-2309855.

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

**R4-2313810 CR to TR 37.941: implementation of FR2-2 MU and TT derivations, Rel-17**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0049 rev Cat: F (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on discusssion last meeting and agreements implementated in TS, this CR to TR implements FR2-2 MU and TT derivations.

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

**R4-2313811 CR to TR 37.941: implementation of FR2-2 MU and TT derivations, Rel-18**

*Type: CR For: Agreement  
 37.941 v17.1.0 CR-0050 rev Cat: A (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on discusssion last meeting and agreements implementated in TS, this CR to TR implements FR2-2 MU and TT derivations.

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

**R4-2313814 CR content to TR 37.941: implementation of FR2-2 MU and TT derivations, Rel-17**

*Type: other For: Agreement  
 37.941 v CR- rev Cat: (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

This contribution includes CR content for TR 37.941. It is submitted as a backup due to tdoc upload/parsing isseus of the actual CR in R4-2313810.

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

##### 5.2.6.5 Demodulation and CSI requirements

[NR\_ext\_to\_71GHz-Perf] CR on 38.104

**R4-2313275 [NR\_ext\_to\_71GHz-Perf] CR on 38.104: Clean up the brackets for FR2-2 PUSCH requirements**

*Type: CR For: Agreement  
 38.104 v17.10.0 CR-0513 rev Cat: F (Rel-17)  
  
 Source: Huawei,HiSilicon*

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

**R4-2313276 [NR\_ext\_to\_71GHz-Perf] CR on 38.104 Clean up the brackets for FR2-2 PUSCH requirements (Rel-18)**

*Type: CR For: Agreement  
 38.104 v18.2.0 CR-0514 rev Cat: A (Rel-18)  
  
 Source: Huawei,HiSilicon*

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

**R4-2313407 NR\_ext\_to\_71GHz CR 38.104 demodulation requirements**

*Type: CR For: Agreement  
 38.104 v17.10.0 CR-0515 rev Cat: F (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2313408 NR\_ext\_to\_71GHz CR 38.104 demodulation requirements**

*Type: CR For: Agreement  
 38.104 v18.2.0 CR-0516 rev Cat: A (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

[NR\_ext\_to\_71GHz-Perf] CR on 38.101-4

**R4-2313277 [NR\_ext\_to\_71GHz-Perf] CR on 38.101-4 Update TDD UL-DL configuration for FR2-2 480kHz SCS (Rel-17)**

*Type: CR For: Agreement  
 38.101-4 v17.9.0 CR-0410 rev Cat: F (Rel-17)  
  
 Source: Huawei,HiSilicon*

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

**R4-2313278 [NR\_ext\_to\_71GHz-Perf] CR on 38.101-4 Update TDD UL-DL configuration for FR2-2 480kHz SCS (Rel-18)**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0411 rev Cat: A (Rel-18)  
  
 Source: Huawei,HiSilicon*

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

### 5.4 Moderator summary and conclusions (for Agenda 5)

**Topic for [108][301] BSRF\_maintenance, AI 4.2, 5.2.1, 6 (R4-2311663)**

**R4-2314237 Topic summary for [108][301] BSRF\_maintenance**

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

**Decision: Return to**

**[108][317] Demod\_Maintenance, AI 4.5, 5.2.6.5, 5.2.4**

**R4-2314253 Topic summary for [108][317] Demod\_Maintenance**

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

**Decision: Return to**

**Sub-topic 1-1: Report quantity parameter setting for CQI reporting with 1Tx**

*Sub-topic description:*

In RAN4#107 a CR was agreed [R4-2309881] that removed the reportQuantity configuration from the 1Tx CQI tests.

In RAN4#108 a CR has been submitted [R4-2313571] that undoes this change.

Furthermore, a discussion tdoc was submitted [R4-2311202], that collects statements made by various companies concerning potential issues with CQI reporting configurations for 1Tx, during an offline email exchange between RAN4#107 and RAN4#108.   
The tdoc also includes an LS proposal to ask RAN1 clarifications about the raised potential issues and RAN1 intent for PMI reporting in 1Tx.

The 1Tx CQI requirements were introduced in Rel-16 (via [R4-2103891] for table 3 in NR\_L1\_URLLC\_enh-Perf, and via [R4-2100886] for CA CQI in NR\_perf\_enh).

*Open issues and candidate options before meeting:*

**Issue 1-1: Whether to send an LS to RAN1**

* Proposals
  + Option 1 (Anritsu, Nokia): Send an LS to RAN1 to clarify/align these CQI report quantity issues
  + Option 2: TBA
* Discussion

**Issue 1-2: Agree further specification changes in RAN4#108**

* Proposals
  + Option 1 (Mediatek): Yes. Undo RAN4#107 changes and agree corresponding CR.
  + Option 2: TBA
* Discussion:

**Sub-topic 2-1 NR\_HST\_FR2 FRC and simulation assumption correction**

*Sub-topic description:*

Please see [**R4-2312217**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2312217.zip) for the background provided by one company.

*Open issues and candidate options before meeting:*

**Issue 2-1: CSI-RS configuration**

* Proposals
  + Option 1 (Samsung): Change the first OFDM symbol in the PRB used for CSI-RS from {5, 9} to {1,5}.
  + Option 2: TBA
* Discussion

**Issue 2-2: FRC table**

* Proposals
  + Option 1 (Samsung): Update the FRC for Rel-17 FR2 HST UE demodulation in Table A.3.2.2.5-12, as outlined in [R4-2312217].
  + Option 2: TBA
* Discussion

**Topic for [108][302] NR\_ext\_to\_71GHz\_BSRF\_Maintenance, AI 5.2.6.1, 5.2.6.2**

**R4-2314238 Topic summary for [108][302] NR\_ext\_to\_71GHz\_BSRF\_Maintenance**

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

**Decision: Return to**

**Sub-topic 1-1: C1-7 (RF power measurement equipment (e.g. spectrum analyzer, power meter) - low power (UEM, absolute ACLR))**

* Proposals (not mutually exclusive)
  + Option 1: To merge C1-7 and C1-7\_mixer rows for in-band measurement. (R4-2313453, Nokia)
  + Option 2: To use 2.0 dB for C1-7 for in-band measurement of 52.6 < f < 71GHz. (R4-2313453, Nokia)
  + Option 3: merge C1-7 and C-1-7\_mixer then use 2.0 (1 sigma) as value. Also, add “mixer” in UID description as follows: *C1-7 RF power measurement equipment (e.g. spectrum analyzer, power meter, mixer) – low power (UEM, absolute ACLR)* (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF
  + To merge C1-7 and C1-7\_mixer rows for in-band measurement, with the updated UID description:
    - *C1-7 RF power measurement equipment (e.g. spectrum analyzer, power meter, mixer) – low power (UEM, absolute ACLR)*
  + C1-7 for 52.6 < f < 71GHz: 2.0 dB

**Sub-topic 1-2: LNA MU**

* Proposals
  + Option 1: Not to include additional LNA MU for low level requirements. (R4-2313453, Nokia)
  + Option 2: LNA is necessary for ACLR/OBUE measurement because of link budget with CATR chamber (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: further discuss

**Sub-topic 1-3: Switching uncertainty MU**

* Proposals
  + Option 1: To use 0.25 dB for the Switching uncertainty MU for in-band TRP requirement. (R4-2313453, Nokia)
  + Option 1: Use already agreed value for frequency range of 40G~60G for f ~ 71 GHz, 0.25 (1-sigma) (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: A2-11 (Switching uncertainty) for CATR inband TRP measurement; 52.6 < f < 71GHz: 0.25 dB

**Sub-topic 1-4: Tx OFF requirement**

* Proposals
  + Option 1: Not to include additional LNA MU in the TX OFF requirement. (R4-2313453, Nokia)
  + Option 2: No need LNA for Tx Off power measurement. (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: No LNA for TX OFF MU budget.

**Sub-topic 1-5: EVM requirement**

* Proposals
  + Option 1: To use EVM MU value of 1.0%. (R4-2313453, Nokia)
  + Option 2: EVM MU for FR2-2, 1.1% (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: further discuss

**Sub-topic 1-6: inband TRP requirement**

* Proposals
  + Option 1: For inband TRP, in order to use reduced MU for power measurement equipment, calibration procedure described in this document should be used. (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: Option 1

**Sub-topic 1-7: ACLR requirement**

* Proposals (not mutually exclusive)
  + Option 1: To use 2.0 dB for C1-7 and C1-8 for ACLR requirements (R4-2313453, Nokia)
  + Option 2: For ACLR- relative, in order to use reduced MU for power measurement equipment, calibration procedure described in this document should be used. (R4-2313234, Keysight Technologies UK Ltd)
  + Option 3: For ACLR- relative, OK to use 0.98 as MU for power measurement equipment with calibration procedure described in this document. (R4-2313234, Keysight Technologies UK Ltd)
  + Option 4: Reduced MU (with use of power sensor) as for inband TRP is not feasible for those measurement. (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: double-check if all Options are agreeable.

**Sub-topic 1-8: OBUE requirement**

* Proposals (not mutually exclusive)
  + Option 1: To use 2.0 dB for C1-7 and C1-8 for OBUE requirements (R4-2313453, Nokia)
  + Option 2: For OBUE, which requirement defines with measurement bandwidth, need to use spectrum analyzer MU for power measurement equipment MU. Reduced MU (with use of power sensor) as for inband TRP is not feasible for those measurement. (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: double-check if all Options are agreeable.

**Sub-topic 1-9: Spurious emissions requirement**

* Proposals
  + Option 1: To use 2.0 dB for the missing MU value for the range 60 < f ≤ 71 GHz in the C1-7 row for spurious emission measurements. (R4-2313453, Nokia)
  + Option 2: For spurious emission measurement, value for “60 < f ≤ 71 GHz C1-7” is 2.0 (1 sigma), there is already agreed number. (R4-2313234, Keysight Technologies UK Ltd)
  + Option 3: For spurious emissions, which requirement defines with measurement bandwidth, need to use spectrum analyzer MU for power measurement equipment MU. Reduced MU (with use of power sensor) as for inband TRP is not feasible for those measurement. (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: C1-7 for 60 < f ≤ 71 GHz: 2.0 dB (1 sigma)

**Sub-topic 1-10: OOB requirement**

* Proposals
  + Option 1: To use 2.0 dB for C1-7 for OOB EX requirements. (R4-2313453, Nokia)
  + Option 2: To apply the other MU agreed for OOB for 71-110GHz to 60-71GHz range to complete the CATR MU for OOB EM. (R4-2313453, Nokia)
  + Option 3: CATR should be capable for OOB EM. (R4-2313234, Keysight Technologies UK Ltd)
  + Option 4: For OOB EM total system MU calculation, use SA number which used in RC chamber for consistency which agreed in previous meeting, so that no discussion needed for mixer value. For LNA, we propose to use the same value as we previously discussed. (R4-2313234, Keysight Technologies UK Ltd)
  + Option 5: Total test system MU for 60-71 GHz range for OOB EM is 4.48 with using C1-7 UID value (R4-2313234, Keysight Technologies UK Ltd)
* Recommended WF: Option 1 and 5. Further clarify Options 2, 4, 5 which require Excel spreadsheets verifications (offline).

**Sub-topic 1-11: Final MU values**

* Proposals
  + Option 1: for overall test system MU values, agree with numbers in Table (R4-2313234, Keysight Technologies UK Ltd)

|  |  |  |
| --- | --- | --- |
| **Proposed Test system MU**  **From CATR Tx MU calculation** | **52.6 < f ≤ 71.0 GHz** | **Note** |
| EIRP - Normal conditions | 3.0 | Confirmed already |
| EIRP - Extreme conditions | 3.9 | Confirmed already |
| Power dynamics | 0.4 | Confirmed already |
| EVM (%) | 1.1 | Propose 1.1% rather [1.0]% |
| Tx OFF | 5.6 | Propose to confirm value 5.6 |
| In-band TRP | 3.2 | Confirmed |
| ACLR – absolute | 4.8 | Propose new value 4.8 rather [5.3] |
| ACLR- relative | 5.1 | Propose new value 5.1 rather [5.2] |
| OBUE | 4.8 | Propose new value 4.8 rather [5.3] |
| OOB SE 60 < f ≤ 71 GHz | 4.7 | Confirm to remove [] |
| OOB SE 71 < f ≤ 110 GHz | 5.3 | Confirm 5.3 from last meeting |
| OOB SE 110 < f ≤ 142 GHz | 5.9 | Confirm 5.9 from last meeting |

* + Option 2: for overall test system MU values, agree with numbers in spreadsheet contained in R4-2313453 (Nokia)
* Recommended WF: All options require Excel spreadsheets verifications (offline), and alignment with the TR calculations.

## 6 Rel-18 maintenance for LTE and NR

**R4-2311663 [FS\_NR\_BS\_RF\_evo] CR to TR 38.877 on correction and additional clarification on phase shifters for MB BS**

*Type: CR For: Agreement  
 38.877 v18.0.0 CR-0001 rev Cat: F (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Add discussion for true-time-delay and frequency-flat phase shifter, and add text to clarify the simulation results are based on frequeny-flat phase shifter.

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

### 6.8 NB-IoT/eMTC core & perf. requirements for NTN

#### 6.8.1 SAN RF requirement and conformance testing

**R4-2312641 Discussion on Unwanted emission for IoT NTN**

*Type: other For: Approval  
 Source: China Telecomunication Corp*

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

CR on Unwanted emission   
**R4-2312639 CR on Unwanted emission requirement for IoT NTN**

*Type: CR For: Agreement  
 36.108 v18.2.0 CR-0010 rev Cat: F (Rel-18)  
  
 Source: China Telecomunication Corp*

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

**R4-2312640 CR on Unwanted emission requirement for IoT NTN**

*Type: CR For: Agreement  
 36.181 v18.0.0 CR-0005 rev Cat: F (Rel-18)  
  
 Source: China Telecomunication Corp*

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

**R4-2311704 CR to 36.108: Out-of-band emissions requirements**

*Type: CR For: Agreement  
 36.108 v18.2.0 CR-0007 rev Cat: F (Rel-18)  
  
 Source: NEC*

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

**R4-2311705 CR to 36.181: Out-of-band emissions requirements**

*Type: CR For: Agreement  
 36.181 v18.0.0 CR-0002 rev Cat: F (Rel-18)  
  
 Source: NEC*

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

**R4-2311706 CR to 36.108: Characteristics of the interfering signals**

*Type: CR For: Agreement  
 36.108 v18.2.0 CR-0008 rev Cat: F (Rel-18)  
  
 Source: NEC*

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

**R4-2311707 CR to 36.181: Characteristics of the interfering signals**

*Type: CR For: Agreement  
 36.181 v18.0.0 CR-0003 rev Cat: F (Rel-18)  
  
 Source: NEC*

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

**R4-2311708 CR to 36.181: Test model correction for total power dynamic range requirements**

*Type: CR For: Agreement  
 36.181 v18.0.0 CR-0004 rev Cat: F (Rel-18)  
  
 Source: NEC*

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

#### 6.8.5 Demodulation requirements

##### 6.8.5.1 UE demodulation

**R4-2311296 CR to 36.307: Release independent for IoT-NTN demodulation requirements**

*Type: CR For: Agreement  
 36.307 v17.5.0 CR-4492 rev Cat: F (Rel-17)  
  
 Source: MediaTek*

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

**R4-2311297 CR to 36.307: Release independent for IoT-NTN UE demodulation requirements (Rel-18)**

*Type: CR For: Agreement  
 36.307 v18.1.0 CR-4493 rev Cat: A (Rel-18)  
  
 Source: MediaTek inc.*

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

**R4-2311303 CR to TS36.102: Corrections to IoT-NTN requirements**

*Type: CR For: Agreement  
 36.102 v18.2.0 CR-0015 rev Cat: F (Rel-18)  
  
 Source: MediaTek, Qualcomm*

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

**R4-2311524 NTN NB-IoT/eMTC demodulation performance requirements**

*Type: discussion For: Agreement  
 Source: Qualcomm*

**Abstract:**

Document sharing eMTC demodulation simulation results so that the results can be correctly captured in the spec. requirements.

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

##### 6.8.5.2 SAN demodulation

**R4-2312205 Discussion and simulation results for eMTC and NB-IoT over NTN**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312789 Simulation results of SAN demodulation requirements for IoT-NTN**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution provides the updated simulation results of SAN dedmodulation requirements for IoT-NTN.

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

**R4-2312791 Summary of SAN simulation results for IoT-NTN**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This spread sheet summarizes the simulation results of SAN demodulation requirements for IoT-NTN.

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

**R4-2313662 [LTE\_NBIOT\_eMTC\_NTN\_req-Perf] Discussion on SAN demodulation requirements for LTE NTN IOT**

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

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

**R4-2313663 [LTE\_NBIOT\_eMTC\_NTN\_req-Perf] Simulation results on SAN demodulation requirements for LTE NTN IOT**

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

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

**R4-2312206 Draft CR on SAN demodulation requirements for NB-IoT over NTN**

*Type: draftCR For: Endorsement  
 36.108 v18.2.0 CR- rev Cat: F (Rel-18)  
  
 Source: Samsung*

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

**R4-2312790 draft CR: Introduction of SAN demodulation requirements for IoT-NTN**

*Type: draftCR For: Endorsement  
 36.108 v18.2.0 CR- rev Cat: F (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

This draft CR introduces the SNA demodulation requirements for IoT-NTN.

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

**R4-2311070 [LTE\_NBIoT\_eMTC\_NTN\_req] CR on TS 36.181 for SAN Demodulation on PUSCH**

*Type: CR For: Agreement  
 36.181 v18.0.0 CR-0001 rev Cat: F (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Removal of square brackets and tidy up of TS 36.181 PUSCH Performance Requirements

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

**R4-2313664 [LTE\_NBIOT\_eMTC\_NTN\_req-Perf] CR on IOT NTN demodulation performance requirements (TS36.181, Rel-18)**

*Type: CR For: Agreement  
 36.181 v18.0.0 CR-0006 rev Cat: F (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

### 6.9 Moderator summary and conclusions

**[108][316] IoT\_NTN\_SANRF, AI 6.8.1**

**R4-2314252 Topic summary for [108][316] IoT\_NTN\_SANRF**

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

**Decision: Return to**

**Sub-topic 1-1: OOB requirement**

* Proposals (not mutually exclusive)
  + Proposal 1: It’s suggested to use BWNecessary instead of BWChannel in TS36.108 for Unwanted emission requirement of IoT NTN. FFS on whether corresponding update should be aligned between NR NTN and IoT NTN (R4-2312641, China Telecomunication Corp)
  + Proposal 2: The OBUE requirement should be extended to BWNecessary beyond DL operating band edge (R4-2312641, China Telecomunication Corp)
  + Proposal 3: The PSD terminology in OBUE requirement should be updated to align with ITU recommendation (R4-2312641, China Telecomunication Corp)
  + Proposal 4: RAN4 agreed to adopt out-of-band emissions instead of Operating band unwanted emissions for NR NTN solutions. Same approach shall be taken for NB-IoT/eMTC core & performance requirements for NTN, i.e. Introduce OOB emissions and remove OBUE; Introduce BWSAN and remove ΔfOBUE (R4-2311704/05; NEC)
* Recommended WF: collect feedback during the 1st round.

**[108][318] IoT\_NTN Demod\_Maintenance, AI 6.8.5**

**R4-2314254 Topic summary for [108][318] IoT\_NTN Demod\_Maintenance**

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

**Decision: Return to**

**Topic #1 UE Demodulation**

**Issue 1: SNR requirement for test2 of Cat-M1**

* Proposals
  + Option 1 (Qualcomm): Set the requirement for test2 of Cat-M1 as -4.2dB
* Recommended WF
  + Agree Option 1

**Moderator:** SNR requirement for Test 2 of Cat-M1 is incorrectly captured in simulation collection in RAN#107.

**Topic #2 BS Demodulation**

**Issue 1: Test applicability of 1Rx tests and 2Rx tests in TS 36.181**

* Proposals
  + Option 1 (Samsung, Huawei): Reuse Rel-17 NR NTN applicability rule for specifying the applicability rule of 1Rx test and 2Rx test for IoT over NTN SAN requirement
* Recommended WF
  + TBD

**Issue 2: Measurement uncertainties and test tolerance**

* Proposals
  + Option 1 (Samsung):

|  |  |  |
| --- | --- | --- |
| **Subclause** | **Maximum Test System Uncertainty1** | **Derivation of Test System Uncertainty** |
| 8.1.1 Performance requirements of PUSCH in multipath fading propagation conditions transmission on single antenna port for coverage enhancement | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| 8.2.1 ACK missed detection for PUCCH format 1a transmission on single antenna port for coverage enhancement | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| 8.3.1 PRACH false alarm probability and missed detection | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| 8.4.1 Performance requirements for NPUSCH format 1 | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| 8.5.1 ACK missed detection for NPUSCH format 2 | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| 8.6.1 Performance requirements for NPRACH | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| In addition, the following Test System uncertainties and related constraints apply:   |  |  | | --- | --- | | AWGN Bandwidth | = 1.08MHz;NRB x 180kHz according to BWConfig | | AWGN absolute power uncertainty, averaged over BWConfig | ±1.5 dB | | AWGN flatness and signal flatness, max deviation for any resource block, relative to average over BWConfig | ±2 dB | | AWGN flatness over BWChannel, max deviation for any resource block, relative to average over BWConfig | +2 dB | | AWGN flatness and signal flatness, max difference between adjacent resource blocks | ±0.5 dB | | AWGN peak to average ratio | ≥10 dB @0.001% | | Signal-to noise ratio uncertainty, averaged over uplink transmission Bandwidth | ±0.3 dB | | Fading profile power uncertainty | Test-specific | | Fading profile delay uncertainty, relative to frame timing | ±5 ns (excludes absolute errors related to baseband timing) | | | |
| Note 1: Only the overall stimulus error is considered here. The effect of errors in the throughput measurements due to finite test duration is not considered. | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Test** | **Minimum Requirement in TS 38.108** | **Test Tolerance (TT)** | **Test Requirement in TS 38.181** |
| 8.2.1 Performance requirements of PUSCH in multipath fading propagation conditions transmission on single antenna port for coverage enhancement | SINRs as specified | 0.6dB | Formula: SINR + TT  T-put limit unchanged |
| 8.3.1 ACK missed detection for PUCCH format 1a transmission on single antenna port for coverage enhancement | SNRs as specified | 0.6 dB | Formula: SNR + TT  False ACK limit unchanged  Correct ACK limit unchanged |
| 8.4.1 PRACH false alarm probability and missed detection | SNRs as specified | 0.6dB | Formula: SNR + TT  PRACH False detection limit unchanged  PRACH detection limit unchanged |
| 8.5.1 Performance requirements for NPUSCH format 1 | SINRs as specified | 0.6dB | Formula: SINR + TT  T-put limit unchanged |
| 8.5.2 ACK missed detection for NPUSCH format 2 | SINRs as specified | 0.6dB | Formula: SNR + TT  False ACK limit unchanged  Correct ACK limit unchanged |
| 8.5.3 Performance requirements for NPRACH | SNRs as specified | 0.6dB | Formula: SNR + TT  NPRACH False detection limit unchanged  NPRACH detection limit unchanged |

* Recommended WF
  + TBD

**Issue 3: SNR requirement derivation**

* Proposals
  + Option 1 (Samsung): Additional margin should be considered for requirement. The detail number of additional margins can be discussed based on the latest simulation results summary
  + Option 2 (Huawei): Relax the SNR requirement derivation rule as following:
* - For the cases that the ideal span less than 2dB among companies, follow the existing rule
* - For the cases that the ideal span larger than 2dB and less than 3dB among companies, average results from all companies and add additional 0.5 dB margin.
* - For the cases that the ideal span larger than 3dB and less than 4dB among companies, average results from all companies and add additional 1 dB margin.
* - And so on...
* Recommended WF
  + TBD

## 8 Rel-18 on-going non-spectrum related work items and study items for NR

### 8.2 Study on NR FR2 OTA testing enhancements

#### 8.2.1 General and work plan

**R4-2312890 3GPP TR 38.871 v0.4.0**

*Type: draft TR For: Agreement  
 38.871 v0.3.0 CR- rev Cat: (Rel-18)  
  
 Source: Qualcomm Incorporated*

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

**R4-2312914 TP for assistant coordination system**

*Type: pCR For: Approval  
 38.871 v0.2.0 CR- rev Cat: (Rel-18)  
  
 Source: OPPO*

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

#### 8.2.2 Test methods for RF requirements

**R4-2312889 TP to TR38.871 on UE RF testing methdology**

*Type: pCR For: Approval  
 38.871 v0.3.0 CR- rev Cat: (Rel-18)  
  
 Source: Qualcomm Incorporated*

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

**R4-2312507 On measurement grid and other testing issues for 2AoA spherical coverage**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312579 Discussion on the impact of measurement grid in multi-Rx RF test**

*Type: other For: Approval  
 Source: vivo*

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

**R4-2312886 Views on RF test method for FR2 multi-Rx UE**

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

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

**R4-2312915 Discussion of test procedure**

*Type: other For: Approval  
 Source: OPPO*

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

**R4-2313219 Discussion on Test methods for RF requirements**

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

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

**R4-2313781 On Multi-RX UE RF topics**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

This contribution briefly addresses multi-RX UE topics, specifically the probe locations.

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

#### 8.2.3 Test methods for RRM requirements

**R4-2312888 Views on RRM test method for FR2 multi-Rx UE**

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

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

#### 8.2.4 Test methods for Demodulation requirements

**R4-2312887 Views on demodulation test method for FR2 multi-Rx UE**

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

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

**R4-2313223 Discussion on Test methods for demod requirements**

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

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

**R4-2313782 On Multi-RX UE demod topics**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

This contribution briefly addresses multi-RX UE demod topics, specifically the request for multi-RX SNR reference numbers

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

#### 8.2.5 Test uncertainty assessments

**R4-2312916 For measurement grid analysis**

*Type: other For: Approval  
 Source: OPPO*

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

#### 8.2.6 Moderator summary and conclusions

**[108][329] FS\_NR\_FR2\_OTA\_enh, AI 5.2.5 (R4-2311231), 8.2**

**R4-2314265 Topic summary for [108][329] FS\_NR\_FR2\_OTA\_enh**

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

**Decision: Return to**

### 8.4 Further RF requirements enhancement for NR and EN-DC in FR1

#### 8.4.3 Demodulation and CSI requirements

##### 8.4.3.1 8Rx UE demodulation and CSI

###### 8.4.3.1.1 General

Draft CRs

**R4-2312352 Draft CR on 8Rx PDSCH demodulation requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v18.0.0 CR- rev Cat: B (Rel-18)  
  
 Source: Samsung*

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

**R4-2311078 draftCR for 38.101 - inclusion of 8Rx Applicabilty Rule**

*Type: draftCR For: Endorsement  
 38.101-4 v18.0.0 CR- rev Cat: B (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of 8Rx applicability rules for PDSCH/PDCCH/PBCH for TS 38.101

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

**R4-2311525 8Rx for CPE/FWA/vehicle/industrial devices: Demodulation requirements**

*Type: discussion For: Agreement  
 Source: Qualcomm*

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

**R4-2311526 Views on 8Rx demodulation performance requirements: Simulation results**

*Type: discussion For: Agreement  
 Source: Qualcomm*

**Abstract:**

TDD and FDD PDSCH simulation results for 8Rx demod requirements

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

**R4-2311071 General Discussion on 8Rx**

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

**Abstract:**

Within this contribution we discuss the introduction of FDD requirements and CA for 8Rx and Applicability rules for PDSCH/PDCCH/PBCH and CSI

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

**R4-2311904 Further Discussion on General Aspects of 8Rx Requirements in FR1**

*Type: discussion For: Discussion  
 38.101-4 v CR- rev Cat: (Rel-18)  
  
 Source: Apple*

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

**R4-2312350 discussion on 8Rx general requirements**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2313307 Remaining issues on general aspects for 8 Rx in FR1**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this draft, we go through the remaining issues on general aspects. We examine the applicability rules for PDSCH and CSI tests in FDD duplex mode and provide our views on carrier aggregation (CA) for 8 Rx in FR1.

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

###### 8.4.3.1.2 PDSCH requirements

Draft CRs

**R4-2311509 Draft CR to TS 38.101-4 for supporting of 8Rx in Rel-18**

*Type: draftCR For: Endorsement  
 38.101-4 v18.0.0 CR- rev Cat: B (Rel-18)  
  
 Source: ZTE Corporation*

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

**R4-2311909 draft CR on Inclusion of Correlation Matrices for 8Rx UEs**

*Type: discussion For: Discussion  
 38.101-4 v CR- rev Cat: (Rel-18)  
  
 Source: Apple*

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

**R4-2312616 Draft CR to 38.101-4 Reference measurement channels for 8Rx PDSCH requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v18.0.0 CR- rev Cat: (Rel-18)  
  
 Source: MediaTek inc.*

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

Simulation results summary

**R4-2313310 Simulation results collection for 8 Rx UE demodulation requirements**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This is the second summary on simulation results that have been collected from the companies. Considering both TDD and FDD duplex modes, the results have been provided for PDSCH demodulation at 70% of the peak throughput for Rank 2, Rank 4 and Rank 8.

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

**R4-2311072 Discussion on PDSCH Demodulation Requirements for 8Rx**

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

**Abstract:**

Within this contribution we discuss the MCS choice for PDSCH with Rank 2, 4 and 8 tests as well as FDD and CA requirements

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

**R4-2311073 Supporting Simulation results for PDSCH demod for 8Rx**

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

**Abstract:**

Supporting simulations for Discussions on Rank 2, 4 and 8 tests as well as FDD and CA requirements

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

**R4-2311089 Discussion on PDSCH resuirements for UE with multiple Rx**

*Type: discussion For: Discussion  
 Source: China Telecom*

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

**R4-2311090 Discussion on PDSCH resuirements for UE with multiple Rx: Simulation results**

*Type: discussion For: Information  
 Source: China Telecom*

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

**R4-2311424 Views on 8Rx UE demodulation requirements for CA**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

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

**R4-2311507 Discussion on 8Rx Demodulation Requirements**

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

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

**R4-2311508 Simulation results for PDSCH demodulation requirements for 8Rx**

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

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

**R4-2311905 On the PDSCH Demodulation Requirements for 8Rx UEs in FR1 in TDD, FDD and CA Modes**

*Type: discussion For: Discussion  
 38.101-4 v CR- rev Cat: (Rel-18)  
  
 Source: Apple*

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

**R4-2311906 Collection of Simulation Results for PDSCH Demodulation Requirements for 8Rx UEs in FR1**

*Type: discussion For: Discussion  
 38.101-4 v CR- rev Cat: (Rel-18)  
  
 Source: Apple*

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

**R4-2312351 discussion and simulation results on 8Rx PDSCH requirements**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312614 Discussion on PDSCH requirements for 8Rx UE**

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

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

**R4-2313271 Discussions on PDSCH requirements for 8Rx**

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

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

**R4-2313308 Remaining issues on PDSCH requirements for 8 Rx in FR1**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Last meeting #107, further progress has been achieved for PDSCH in TDD duplex mode [1], summarized as follow. In this meeting, we extend our proposals for FDD mode and consider carrier aggregation for both modes TDD and FDD.

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

**R4-2313309 Simulation results for 8 Rx PDSCH requirements in FR1**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

In this paper, we present the simulations results for 8Rx PDSCH in FR1. Based on last meeting discussions [1], we carried out simulations for PDSCH considering the agreed parameters. It is worth reminding that FDD simulations have been caried out consider

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

###### 8.4.3.1.3 SDR requirements

Darft CR

**R4-2313306 draft CR on SDR requirements for 8 Rx in FR1**

*Type: draftCR For: Endorsement  
 38.101-4 v18.0.0 CR- rev Cat: B (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Define SDR requirements for 8RX UE in FR1

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

**R4-2311074 Discussion on SDR Demodulation Requirements for 8Rx**

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

**Abstract:**

Within this contribution we discuss SDR demodulation for 8Rx with additional FDD and CA requirements

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

**R4-2311075 Supporting Simulation results for SDR demod for 8Rx**

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

**Abstract:**

Supporting simulations for Discussions on SDR inlcuding FDD.

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

**R4-2311908 Final Discussion on SDR Requirements for 8Rx in TDD, FDD and CA**

*Type: discussion For: Discussion  
 38.101-4 v CR- rev Cat: (Rel-18)  
  
 Source: Apple*

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

**R4-2313311 Remaining issues on SDR requirements for 8 Rx in FR1**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Last meeting #107, the SDR Tables have been agreed in TDD reported in the WF [1] and reminded below. In this meeting, we extend the SDR requirements for 8RX UE in FR1 FDD mode.

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

**R4-2313312 Simulation results for 8 Rx SDR in FR1**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

In this paper, we present the simulations results for 8Rx PDSCH in FR1 FDD mode. Based on last meeting discussions [1], we carried out simulations for SDR considering the agreed Tables.

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

###### 8.4.3.1.4 CQI reporting requirements

Draft CR

**R4-2311093 Draft CR on CQI requirements for UE with multiple Rx**

*Type: draftCR For: Endorsement  
 38.101-4 v18.0.0 CR- rev Cat: B (Rel-18)  
  
 Source: China Telecom*

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

**R4-2313273 draft CR on 38.101-4 Requirements applicability for 8Rx CSI applicabaility rules**

*Type: draftCR For: Endorsement  
 38.101-4 v18.0.0 CR- rev Cat: B (Rel-18)  
  
 Source: Huawei,HiSilicon*

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

**R4-2311076 Discussion on CQI Demodulation Requirements for 8Rx**

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

**Abstract:**

Within this contribution we discuss CQI demdoualtion requirements for 8Rx with additional FDD requirements.

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

**R4-2311077 Supporting Simulation results for CQI demodulation for 8Rx**

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

**Abstract:**

Supporting simulations for Discussions on CQI demodulation inlcuding FDD.

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

**R4-2311091 Discussion on CSI resuirements for UE with multiple Rx**

*Type: discussion For: Discussion  
 Source: China Telecom*

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

**R4-2311092 Discussion on CSI resuirements for UE with multiple Rx: Simulation results**

*Type: discussion For: Information  
 Source: China Telecom*

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

**R4-2311907 Final Discussion on CQI Requirements**

*Type: discussion For: Discussion  
 38.101-4 v CR- rev Cat: (Rel-18)  
  
 Source: Apple*

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

**R4-2312613 Discussion on CQI requirements for 8Rx UE**

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

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

**R4-2313272 Discussions on 8Rx CQI requirements**

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

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

**R4-2313313 Remaining issues on CQI reporting for 8Rx in FR1**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Last meeting #107, more progress has been achieved in this WI for TDD. In this meeting, we go through the remaining issues that still need to be addressed for TDD while start discussing the FDD part [1].

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

**R4-2313314 Simulation results for CQI reporting for 8Rx in FR1**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

In this paper, we present the simulation results for CQI reporting for 8Rx UE in FR1 TDD and FDD. Based on last meeting discussions [1] and the proposed simulation parameters for FDD mode, we carried out simulations for CQI reporting.

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

##### 8.4.3.2 4Tx BS demodulation

Draft CR

**R4-2312213 Draft CR on applicability rule for PUSCH UL 4Tx requirement in TS 38.141-1**

*Type: draftCR For: Endorsement  
 38.141-1 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Samsung*

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

**R4-2311081 draftCR for 38.104 - inclusion of 4Tx Requirements**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of 4TX PUSCH requirements for TS 38.104

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

**R4-2312067 Draft CR for TS38.104 4Tx PUSCH FRC table**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Resubmit the endorsed draft CR for 4Tx FRC table

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

**R4-2312068 Draft CR for TS38.141-2 4Tx PUSCH FRC table**

*Type: draftCR For: Endorsement  
 38.141-2 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Resubmit the endorsed draft CR for 4Tx FRC table

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

**R4-2312214 Draft big CR for PUSCH UL 4Tx requirement in TS 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Samsung*

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

**R4-2311079 Discussion of 4Tx Demodulation Requirements**

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

**Abstract:**

Within this contribution we discuss specifics of the introduction of 4Tx Requirements into TS 38.104

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

**R4-2311080 Supporting simulations for 4Tx Demodulation**

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

**Abstract:**

Supporting simulations for the definition of requirements for 4Tx in TS 38.104

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

**R4-2311506 Simulation results for 4Tx of NR\_ENDC\_RF\_FR1\_enh2**

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

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

**R4-2312066 Simulation results summary for 4Tx demodulation results**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Simulation results for 4Tx PUSCH demodulation

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

**R4-2312212 Simulation results for PUSCH with UL 4-layer transmission**

*Type: discussion For: Discussion  
 Source: Samsung*

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

#### 8.4.4 Moderator summary and conclusions

**[108][319] RF\_FR1\_enh2\_Demod\_Part1, AI 8.4.3.1**

**R4-2314255 Topic summary for [108][319] RF\_FR1\_enh2\_Demod\_Part1**

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

**Decision: Return to**

**Issue 1-1-1: Work plan**

* Proposals
  + Option 1: RAN4 to confirm and create a workplan to accelerate technical discussions in order to complete the entire performance part of the WI by RAN4#109 in November 2023. (Apple)
* Recommended WF
  + TBA

**Issue 1-2-1: Applicability rules for different number of RX antenna ports for FDD PDSCH/PDCCH/PBCH tests**

* Proposals
  + Option 1: Extend the agreed test applicability rules for TDD to FDD (Samsung, Ericsson, Nokia)
* Recommended WF
  + Extend the requirement applicability for TDD to FDD is agreeable.

**Issue 1-2-2: Applicability rules for different number of RX antenna ports for CSI tests**

* Proposals
  + Option 1:Confirm the Requirements applicability agreed in last RAN4#107 meeting (Ericsson, Samsung, Nokia)
* Recommended WF
  + Confirm the agreement made in last RAN4#107.

**Issue 1-3-1: CA test for PDSCH and SDR**

* Proposals
  + Option 1: Define PDSCH and SDR 8Rx CA requirements. (Nokia, Huawei, DoCoMo, Apple, Samsung, ZTE, Ericsson)
* Recommended WF
  + Option 1.

**Issue 1-3-2: CA test with power imbalance**

* Proposals
  + Option 1: Not consider CA test with power imbalance for 8Rx. (Samsung)
  + Other option.
* Recommended WF
  + Option 1

**Issue 1-3-3: CA test for CQI reporting**

* Proposals
  + Option 1: Not consider CQI reporting for CA. (Ericsson)
  + Option 2: Define CQI test for CA (Huawei, Samsung)
* Recommended WF
  + TBD

**Issue 1-4-1: Whether to define PDCCH requirements**

* Proposals
  + Option 1: Regardless of RAN4 RRM discussion on RLM test cases for 8Rx UEs, RAN4 to maintain that no additional PDCCH demodulation requirements for 8Rx UEs will be introduced. (Apple)
* Recommended WF
  + RRM session already agreed to reuse the existing requirements defined for 2Rx and 4Rx
  + Follow the previous agreements that not define 8Rx PDCCH requirements

**Issue 2-1-1: MCS for Rank2 test**

* Proposals
  + Option 1: MCS19 for Table 1 (Nokia, Qualcomm, Huawei, Samsung, MTK)
  + Option 2: MCS20 for Table 2 (China Telecom, Apple, Samsung)
    - Revert to MCS19 for Table 1 if any feasibility/alignment issues are observed to avoid further delays (Apple)
  + Option 3: Both MCS13 (Table 2) and MCS20 (Table 2) (Ericsson)
* Recommended WF
  + TBA

**Issue 2-1-2: MCS for Rank4 test**

* Proposals
  + Option 1: MCS17 for Table 1 (Nokia, Samsung, MTK, Huawei, China Telecom)
  + Option 2: MCS26 for Table 1(Samsung, Ericsson)
    - Revert to MCS17 if any feasibility/alignment issues are observed to avoid further delays (Apple)
* Recommended WF
  + TBA

**Issue 2-1-3: MCS for Rank8 test**

* Background
  + MCS17 has been agreed in last meeting based on WF R4-2309806
  + Nokia: Simulations have shown that MCS 17 provides impairment results (23.1dB) that are within the TxEVM impaired region for PDSCH using CP-OFDM.
* Proposals
  + Option 1: MCS13 for Table 1 (Nokia)
  + Option 2: MCS17 for Table 1 (MTK, Ericsson, Huawei)
* Recommended WF
  + Keep previous agreements. I.e. Use MCS17?

**Issue 2-2-1: PDSCH FDD requirements**

* Proposals
  + Option 1: RAN4 to define PDSCH FDD requirements with same parameters including MCS values, MIMO layers, antenna configuration, propagation conditions as TDD requirements. (Nokia, Huawei, Apple, Samsung, Ericsson)
* Recommended WF
  + Option 1.

**Issue 2-3-1: CBW for PDSCH CA requirements**

* Proposals
  + Option 1: The CBW combination should be selected following RF decision (Nokia)
    - Option 1a: RAN4 Demodulation shall conduct initial simulations on CA to expedite requirements definition performance requirements be agreed to be required by RAN Plenary (Nokia)
  + Option 2: Single bandwidth for each CC: 15kHz/10MHz for FDD and 30kHz/40MHz for TDD separately. (Apple, Ericsson)
  + Option 3: Choose single typical configuration for requirements definition: Single Bandwidth combination and Single Rank. (Huawei)
* Recommended WF
  + TBA

**Issue 2-3-2: Duplex model**

* Proposals
  + Option 1: Consider the following duplex model for 8Rx CA (ZTE, Samsung)
    - FDD 15kHz + TDD 30kHz
    - FDD 15kHz + FDD 15kHz
    - TDD 30kHz + TDD 30kHz
* Recommended WF
  + This depends on CA combinations for 8Rx in RF session.

**Issue 2-3-3: Rank**

* Proposals
  + Option 1: Rank8 only (ZTE, Apple, Ericsson)
  + Option 2: Rank2 only (Samsung)
  + Option 3: Only one Rank configuration (Huawei)
* Recommended WF
  + Rank8?

**Issue 2-3-4: MCS selection**

* Proposals
  + Option 1: MCS13(Table1) and MCS17(Table2) (ZTE)
  + Option 2: MCS19 (Table1) (Samsung)
  + Option 3: MCS17 (Table1) (Ericsson, Apple)
* Recommended WF
  + MCS 17 that is same as single carrier for Rank 8 (if agreed)?

**Issue 2-3-5: Propagation conditions**

* Proposals
  + Option 1: TDLC300-100 Medium B (Samsung)
  + Option 2: TDLA30-10 Low (Apple, Ericsson)
* Recommended WF
  + Same as corresponding single carrier test

**Issue 3-1-1: SDR requirements for FDD**

* Proposals
  + Option 1: Reuse the test setup of TDD requirements (Nokia, Ericsson)
* Recommended WF
  + Reuse the TDD MCS look-up table for FDD SDR requirements

**Issue 3-2-1: Test procedure for SDR CA requirements**

* Proposals
  + Option 1: Choose single bandwidth combination for SDR requirements definition: 40MHz/30kHz SCS and 10MHz/15kHz SCS (Apple)
  + Option 2: Reuse the existing methodology of Re-15 SDR CA test
* Recommended WF
  + TBA

**Issue 4-1-1: Report quantity**

* Proposals
  + Option 1(Huawei)
    - Replace “00000001” by ”00010001” for *codebookSubsetRestriction*.
    - Replace “N/A” by ”00001000” for RI Restriction.
    - TE schedules fixed PMI matrix with =0 when verifying BLER requirements.
* Recommended WF
  + TBA

**Issue 4-1-2: SNR points**

* Proposals
  + Option 1: [1,2] dB and [7,8] dB (Nokia, Apple, Ericsson)
  + Option 2: [4,5]dB and [10,11]dB (China Telecom, Qualcomm, Apple, MTK, Huawei)
* Recommended WF
  + TBA

**Issue 4-2-1: Test parameter**

* Proposals
  + Option 1: (Ericsson)
    - 10 MHz/15 kHz, 52 RBs.
    - CQI index for up to 64QAM.
    - Rank 4.
* Recommended WF
  + Option 1

**Issue 4-2-2: Report quantity**

* Proposals
  + Option 1: (Ericsson)
    - Legacy configuration report quantity 'cri-RI-PMI-CQI '
    - *two-one-TypeI-SinglePanel-Restriction* = 00000001
    - TE sets i2 = 0 during the test
  + Option 2: (Huawei)
    - Replace “00000001” by ”00010001” for *codebookSubsetRestriction*.
    - Replace “N/A” by ”00001000” for RI Restriction.
    - TE schedules fixed PMI matrix with =0 when verifying BLER requirements.
* Recommended WF
  + TBA

**Issue 4-2-3: SNR points**

* Proposals
  + Option 1: [1,2] dB and [7,8] dB (Nokia, Apple, Ericsson)
  + Option 2: [4,5]dB and [10,11]dB (China Telecom, Apple, MTK, Huawei)
* Recommended WF
  + Same as TDD.

**[108][320] RF\_FR1\_enh2\_Demod\_Part2, AI 8.4.3.2**

**R4-2314256 Topic summary for [108][320] RF\_FR1\_enh2\_Demod\_Part2**

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

**Decision: Revised to R4-2313846 (from R4-2314256).**

**R4-2313846 Topic summary for [108][320] RF\_FR1\_enh2\_Demod\_Part2**

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

**Decision: Return to.**

* **Proposal 1 (Nokia):**
* **RAN4 to follow the usual requirements derivation and outlier removal approach from Rel-15.**
  + ***Moderator’s recommendation:***
    - *Please companies carefully check the simulation result summary and confirm on proposal 1 based on the span. Speak up if there is different view on dealing with results otherwise it will be considered as treating the results as usual.*
* **Proposal 2 (Nokia):**
* **RAN4 shall define the new requirements tables for 50 MHz in TS 38.104 as 8.2.1-19 and 8.2.1-20 respectively, i.e., add a new table at the end of the current set of tables.**
  + ***Moderator’s recommendation:***
    - *Previous agreements captured in the WF of RAN4 #106bis-e:*

|  |
| --- |
| *Issue 1-1-7: Specification structure*   * *For the cases of bandwidth 50MHz, add a new table to capture the requirement.* * *For the cases of agreed bandwidths other than 50MHz, adding 4Tx requirements to the same table as 1Tx/2Tx requirements.* |

* + - *It was already agreed to add a new table to capture the requirement for the cases of bandwidth 50MHz. Regarding the position, please companies check if it can be agreed to add the new table at the end of the current set of tables.*

### 8.6 NR RF requirements enhancement for FR2, Phase 3

#### 8.6.4 BS demodulation requirements

##### 8.6.4.1 UL 256QAM performance requirements

**R4-2311082 Discussion on UL 256 QAM BS Demodulation**

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

**Abstract:**

Within this contribution we introduce and discuss UL 256 QAM BS Demodulation and pertinent considerations for RAN4.

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

**R4-2311083 Supporting simulations for UL 256 QAM BS Demodulation**

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

**Abstract:**

Supporting simulations for Discussions on UL 256 QAM BS Demodulation

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

**R4-2311159 Discussion on PUSCH demodulation requirements for FR2 UL256QAM**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

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

**R4-2311831 Discussion on demodulation for FR2-1 UL 256QAM**

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

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

**R4-2312069 Discussion on FR2 UL 256QAM demodulation requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

General view on FR2 PUSCH 256QAM demodulation requirements

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

**R4-2312218 View on BS demodulation requirements for FR2 256QAM**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312687 Discussion on BS PUSCH demodulation performance for 256QAM**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2313665 Discussion on FR2 UL 256QAM performance requirements**

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

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

#### 8.6.5 Moderator summary and conclusions

**[108][321] NR\_RF\_FR2\_req\_Ph3\_Demod, AI 8.6.4**

**R4-2314257 Topic summary for [108][321] NR\_RF\_FR2\_req\_Ph3\_Demod**

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

**Decision: Return to**

**Issue 1-1: PUSCH Requirements**

* Proposals
  + Option 1: The demodulation performance requirements for UL 256QAM will be defined only for PUSCH. (Xiaomi)
* Recommended WF
  + Companies to confirm impact only on PUSCH requirements.

**Issue 1-2: Bands for FR2 256 QAM**

* Proposals
  + Option 1: Introduce FR2-1 PUSCH with 256QAM demodulation requirements except n262. (Ericsson)
  + Option 2:
    - Option 2a: Introduce FR2-1 PUSCH with 256QAM demodulation requirements except above 39 GHz. (Samsung)
    - Option 2b: Only one PUSCH requirement with UL 256QAM will be defined in RAN4, and applicable for both carrier frequencies. (Samsung)
  + Option 3: Other options
* Recommended WF
  + For Discussion.

**Issue 1-3: BS Declaration**

* Proposals
  + Option 1: The PUSCH requirement with FR2 UL 256QAM is only applied for BS declared to support it. Introduce the BS declaration for FR2 UL 256QAM (Samsung)
* Recommended WF
  + For Discussion.

**Issue 2-1: EVM Impact**

* Proposals
  + Option 1: The EVM should be included in impairment results (Huawei)
  + Option 2: Further investigation needed for impact (Ericsson, Samsung, Nokia)
* Recommended WF
  + For discussion at meeting.

**Issue 2-2: SNR Limit**

* Proposals
  + Option 1: 20dB SNR limit for initial FR2-1 PUSCH 256QAM simulations with impairment impact (such as PN and EVM impact). (Ericsson)
  + Option 2: TxEVM imparts a constraint that MCS should not have an operating point above 20.1 dB (Nokia)
* Recommended WF
  + For discussion at meeting.

**Issue 2-3: Phase Noise Model**

* Proposals
  + Option 1: TR 38.808 Set 1 (Nokia)
  + Option 2: Do not explicitly specify the phase noise model (Huawei, Samsung)
  + Option 3: Phase Noise Profiles for Tx and TR 38.803 for Rx (ZTE, Xiaomi)
  + Option 4: Companies deliver simulation results with and without PN impact by preferred PN models. (Ericsson)
* Recommended WF
  + To be discussed.

**Issue 2-4: Channel**

* Proposals
  + Option 1: TDLA 30-75 and/or TDLD30-75 (Ericsson)
  + Option 2: TDLA 30-5 (Huawei)
  + Option 3: TDLA 30-35, TDLA 30-75, TDLD 30-35 (Samsung)
  + Option 4: TDLA 30-10 (Nokia)
  + Option 5: TDLA 30-35 (ZTE, Xiaomi)
  + Option 6 (Moderator): TDLA30-X, X= [5, 10,35,75], FFS on TDLD30-Y, Y= [35, 75]
* Recommended WF
  + Option 6, Companies to further discuss the value for X and TDLD channel during the meeting.

**Issue 2-5: Rank**

* Proposals
  + Option 1: Rank 1 only (Samsung, ZTE, Xiaomi, Nokia)
  + Option 2: Rank 1 and Rank 2 (Huawei)
  + Option 3 (Moderator): Rank 1, FFS on Rank 2
* Recommended WF
  + Potentially Option 3 is a good compromise, for discussion at meeting.

**Issue 2-6: Carrier BW for 60 kHz SCS**

* Proposals
  + Option 1: 50 MHz (NTT Docomo, Xiaomi, Samsung, Nokia)
  + Option 2: 100 MHz (ZTE, NTT Docomo, Xiaomi, Ericsson)
  + Option 3: 200 MHz (NTT Docomo, Xiaomi)
* Recommended WF
  + For discussion at meeting.

**Issue 2-7: Carrier BW for 120 kHz SCS**

* Proposals
  + Option 4: 50 MHz (Huawei, NTT Docomo, Xiaomi, Samsung, Nokia)
  + Option 5: 100 MHz (ZTE, NTT Docomo, Xiaomi, Ericsson)
  + Option 6: 200 MHz (Huawei, NTT Docomo, Xiaomi)
* Recommended WF
  + For discussion at meeting.

**Issue 2-8: Additional DMRS**

* Proposals
  + Option 1: Additional DMRS (Samsung, Ericsson)
  + Option 2: Both single and additional DMRS (ZTE, Xiaomi)
  + Option 3: Single DMRS only (Nokia)
* Recommended WF
  + For discussion at meeting.

**Issue 2-9: DMRS Mapping Type**

* Proposals
  + Option 1: For ‘other’ parameters, such as mapping type, reuse the Rel-15 FR2 Assumption (Samsung)
  + Option 2: Mapping Type B (Xiaomi, ZTE, Nokia)
* Recommended WF
  + To be discussed at the meeting whether Option 2 is agreeable as it is a sub-set of Option 1.

**Issue 2-10: PTRS**

* Proposals
  + Option 1: Enabled, K\_PTRS: 2 and L\_PTRS =1 (Samsung, Nokia)
  + Option 2: Both enabled and disabled (Ericsson, ZTE, Xiaomi)
  + Option 3 (Moderator): Enabled, FFS on disabled.
* Recommended WF
  + Option 3 may be a reasonable compromise, for discussion during the meeting.

**Issue 2.11: Waveform Type**

* Proposals
  + Option 1: CP-OFDM (Huawei, Ericsson, Xiaomi, ZTE, NTT Docomo, Nokia)
* Recommended WF
  + Agree option 1, as all companies that contributed propose CP-OFDM.

**Issue 2-13: Testing Metric**

* Proposals
  + Option 1: 70% of Max Throughput (ZTE, Xiaomi)
  + Option 2: 95% of Max Throughput (Nokia)
* Recommended WF
  + For discussion at meeting.

### 8.7 Requirement for NR FR2 multi-Rx chain DL reception

#### 8.7.4 Demodulation performance and CSI requirements

##### 8.7.4.1 General aspects

**R4-2311349 On General aspects for Multi-RX in FR2 requirements**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2311743 On MultiRx Demodulation performance and CSI requirements - General aspects**

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

**Abstract:**

This paper presents Nokia's view on the open issues with relation to the general aspects for MultiRx Demodulation performance.

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

**R4-2311756 Views on General Aspects for FR2 Multi-Rx**

*Type: discussion For: Discussion  
 Source: Qualcomm India Pvt Ltd*

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

**R4-2311992 Discussion on general aspects of FR2 multiRX DL**

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

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

**R4-2313315 General aspects for FR2 multi-Rx DL chain**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this paper, we present our views on the remaining issues related to the general aspects for UE demodulation and CSI reporting requirements for FR2 multi-Rx chains.

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

**R4-2313651 Discussion on general issues for UE demodulation requirements for FR2 multi-Rx chain DL reception**

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

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

##### 8.7.4.2 PDSCH requirements

**R4-2311350 Performance Evaluation of PDSCH with multi-RX in FR2**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2311744 On MultiRx Demodulation performance and CSI requirements - PDSCH**

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

**Abstract:**

This paper presents Nokia's view on the open issues with relation definition of PDSCH requirements for MultiRx Demodulation performance.

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

**R4-2311745 On MultiRx Demodulation performance and CSI requirements - simulation results**

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

**Abstract:**

This paper presents Nokia's simulation results for MultiRx PDSCH requirements.

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

**R4-2311757 Views on PDSCH Performance Requirements for FR2 Multi-Rx**

*Type: discussion For: Discussion  
 Source: Qualcomm India Pvt Ltd*

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

**R4-2311758 Simulation Results on PDSCH Performance Requirements for FR2 Multi-Rx**

*Type: discussion For: Discussion  
 Source: Qualcomm India Pvt Ltd*

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

**R4-2311993 Discussion on PDSCH requirements of FR2 multiRX DL**

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

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

**R4-2311994 Simulation results of PDSCH requirements of FR2 multiRX DL**

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

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

**R4-2312353 discussion on FR2 Multi-Rx PDSCH demodulation requirements**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2313316 PDSCH demodulation requirements for FR2 multi-Rx chain**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Last meeting #107, several related general aspect parameters have been agreed. In this meeting, we continue discussing the open issue on PDSCH performance requirements.

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

**R4-2313317 Simulation results for PDSCH of FR2 Multi-Rx UE**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

In this paper, we present the initial simulations results for FR2 Multi-Rx PDSCH. Based on last meeting discussions [1], we carried out simulations for PDSCH considering the general agreed parameters and channel model.

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

**R4-2313652 Discussion on UE PDSCH demodulation requirements for NR FR2 multi-Rx chain DL reception**

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

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

##### 8.7.4.3 PMI reporting requirements

**R4-2311351 On PDSCH PMI reporting requirements with multi-RX in FR2**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2311746 On MultiRx Demodulation performance and CSI requirements - PMI**

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

**Abstract:**

This paper presents Nokia's view on the open issues with relation definition of PMI requirements for MultiRx Demodulation performance.

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

**R4-2311995 Discussion on PMI requirements of FR2 multiRX DL**

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

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

**R4-2313318 PMI reporting for FR2 multi-Rx DL reception**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Last meeting #107, it was the third meeting for this WI where discussions mainly focused on general aspects. In this meeting, we expect that we go through the PMI remaining issues stated in [1]

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

**R4-2313653 Discussion on UE CSI reporting requirements for NR FR2 multi-Rx chain DL reception**

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

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

#### 8.7.5 Moderator summary and conclusions

**[108][322] NR\_FR2\_multiRX\_DL\_Demod, AI 8.7.4**

**R4-2314258 Topic summary for [108][322] NR\_FR2\_multiRX\_DL\_Demod**

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

**Decision: Return to**

**Issue 1-1-1: Receiver assumption.**

* Observations
  + Observation 1 (Nokia):
    - * It is expected that scenarios with low AoA (i.e. high values of ρ) will occur in real deployment. In such scenarios joint processing will be required.
      * To facilitate defining requirements with especially the higher candidate values for cross-talk (ρ) and for higher MCS, the use of a receiver capable of joint processing is required.
  + Observation 2 (Apple):
    - Joint processing is needed to achieve 4 layer MIMO with multi-RX in FR2.
    - Joint processing is more complex that separate processing..
  + Observation 3 (Ericsson):
    - It is obvious that each method has its advantages and disadvantages.
* Proposals:
* Option 1 (Nokia):
  + - * For sDCI SDM and mDCI fully overlapping, introduce requirements with joint processing receiver.
* Option 2 (Apple):
  + - * Introduce UE capability for joint processing with multi-RX
* Option 3 (Huawei):
  + Only consider UE perform independent processing with 2x2 channel matrix per TRP for FR2 multi-Rx demodulation requirements definition.
* Option 4 (Ericsson, MediaTek, Qualcomm):
  + Option 4a (Qualcomm): Further discuss receiver options in conjunction with cross-talk power level and PTRS rate-matching assumptions
  + Option 4b (Ericsson): Further discuss with companies on the pros and cons of each UE receiver schemes are needed.
  + Option 4c (MediaTek): Keep receiver options open until we have enough aligned simulation results of both receiver options
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-2: Assumption on AoA offset for multi-Rx demod tests.**

* Proposals
* Option 1 (Apple): Based on UE declaration.
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-3: Whether to extend candidate cross-talk power values.**

* Observations
  + Observation 1 (Nokia):
    - To represent deployment scenarios, where the cross-talk signal level is similar to the level of the wanted signal, additional values of -3dB and 0dB will need to be added to the list of candidate cross-talk power values.
* Proposals
  + Option 1 (Nokia): Yes, extend the candidate cross-talk power values to include -3dB and 0dB, at least for joint demodulation.
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-4: Choice of α and β values.**

* Proposals
  + Option 1 (Huawei): Select α=β=0 in the correlation matrix for all cases.
* Option 2 (Ericsson): RAN4 defines the UE demodulation and CSI reporting requirements for FR2 DL multi-RX chain using the correlation matrices parameters as follow:
* XP Low: α = 0, β = 0, γ = 0.125
* XP Medium: α = 0.3, β = 0.6, γ = 0.125
* XP High: α = 0.9, β = 0.9, γ = 0.125
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-5: MCS and layer selection for sDCI.**

* Proposals
  + Option 1 (Huawei): Select {MCS17, ρ = -6dB, rank 1+1} and/or {MCS13, ρ = -12dB, rank 2+2} for sDCI SDM cases.
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-6: MCS and layer selection for mDCI.**

* Proposals
  + Option 1 (Huawei): Select {MCS17, ρ = -6dB, rank 1+1} and/or {MCS13, ρ = -12dB, rank 2+2} for mDCI fully-overlapping cases
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-7: TxEVM.**

* Proposals
  + Option 1 (Ericsson): Consider Tx EVM at 6% since we are considering up to 64QAM modulation.
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-8: Whether to adopt NT FR2 OTA enhancements when defining demodulation requirements.**

* Proposals
  + Option 1 (MediaTek): Yes
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-9: Cross-polarization coefficient.**

* Observations
  + Observation 1 (Qualcomm): Cross-polarization coefficient of 0.125 corresponds to 9dB.
* Proposals
  + Option 1 (Qualcomm): Consider cross-polarization coefficient of 0.0625 to reflect an isolation level of 12 dB
* Recommended WF:
  + Encourage comments if any.

**Issue 1-1-10: Whether to consider ρ to be cross-talk power ratio.**

* Proposals
  + Option 1 (MediaTek): Yes
* Recommended WF:
  + Encourage comments if any.

**Issue 2-1-1: Channel model**

* Observations
  + Observation 1 (Nokia):
    - * Initial simulation alignment can be done using the agreed channel model (TDLA30-75). High doppler is less important for MultiRx scenarios, hence it can be decided later if TDLA30-300 is to be included.
* Proposals
  + Option 1 (Samsung, Nokia): Only use TDLA30-75 for 100 MHz/120 kHz
  + Option 2 (Nokia, Ericsson): Keep TDLA30-300 as FFS.
* Recommended WF:
  + Encourage comments if any.

**Issue 2-1-2: PTRS Port for sDCI schemes**

* Observations
  + Observation 1 (Nokia):
    - * It cannot be assumed that each TRP will be received with the same phase difference, hence there is likely a need for transmitting PT-RS on each TRP.
      * UE support of two PT-RS ports for sDCI is optional.
    - Observation 2 (Apple):
      * *For sDCI SDM scheme configuring 1 PTRS port per TRP needs additional UE capability for the test.*
      * *Not configuring 1 PTRS port per TRP might lead to performance degradation depending on test configuration.*
* Proposals
  + Option 1 (Qualcomm, Nokia, Apple, Samsung): One PTRS port per TRP for sDCI schemes
    - * Option 1a (Nokia): RAN4 to additionally define requirements using one PT-RS port for sDCI SDM, if found to be feasible
  + Option 2 (Huawei, Ericsson, MediaTek): One PTRS port across TRPs.
  + Option 3 (Apple): Evaluate if 1 PTRS port for sDCI SDM test is sufficient for the agreed test configuration
* Recommended WF:
  + Encourage comments if any.

**Issue 2-1-3: PDSCH rate matching in mDCI transmission**

* Observations
* Observation 1 (Nokia):
  + Based on our evaluation, the current specification only consider single TRP setup with relation to PT-RS configurations.
  + For mDCI configurations it can be assumed that each TRP is seen as an individual TRP, which means PT-RS allocation for TRP1 can overlap with PDSCH allocation for TRP2.
* Observation 2 (Apple):
  + *With overlapping PDSCH for multi-DCI the PDSCH from one TRP will cause interference on PTRS from another TRP and vice versa if PDSCH is not rate matched.*
  + *There is no provision in RAN1 to rate match PDSCH around PTRS from other TRP for multi-DCI transmission.*
  + *For single DCI the PDSCH will be rate matched around PTRS from both TRP.*
* Proposals
* Option 1 (Nokia, Samsung, Qualcomm): PT-RS allocation does not overlap with PDSCH allocation per TRP as a baseline.
  + Option 1aa (Nokia): The baseline assumption can be re-evaluated if decided to ask RAN1 for clarification and RAN1 response does not match the baseline assumption.
* Option 2 (Samsung): PT-RS allocation does not overlap with PDSCH allocation per TRP.
* Option 3 (Ericsson): PT-RS allocation does not overlap with any PDSCH allocation.
* Option 4 (Apple): Evaluate performance with PTRS PDSCH overlap
* Option 5 (Apple): Introduce rate matching for PTRS from other TRP using ZP CSI-RS configuration
* Recommended WF:
  + Encourage comments if any.

**Issue 2-1-4: Sending an LS to RAN1 for specification clarification on PTRS rate matching behaviour for mTRP transmission (if ambiguous)**

* Proposals
* Option 1 (Nokia): RAN4 to send LS to RAN1 for specification clarification on PTRS rate matching behavior for mTRP transmission in case it cannot be agreed in RAN4 that PT-RS allocation does not overlap with PDSCH allocation per TRP.
* Option 2 (Samsung): No need to send LS to RAN1 for specification clarification on PTRS rate matching behaviour for mTRP transmission.
* Option 2 (MediaTek): Send LS to RAN1 for specification clarification on PTRS rate matching behaviour for mTRP transmission
* Recommended WF:
  + Encourage comments if any.

**Issue 2-1-5: Time/frequency offset between TRPs**

* Observations
  + Observation 1 (Nokia): It is not feasible to discuss which time offsets to use for certain configurations efore initial simulation alignment is finalized.
* Proposals
* Option 1 (Nokia): Make decision on which time offset to be used with certain testcases based on the initial simulation alignment and agreements concerning which test cases to define
* Option 2 (Samsung): use four test cases with time and frequency offset as starting point
* sDCI SDM (-0.0625us, 600Hz) and (0.25us, 0Hz)
* mDCI non-overlapping (-0.0625us, 600Hz)
* mDCI full-overlapping (0.25us, 600Hz)
* Option 3 (Ericsson): use four test cases with time and frequency offset as starting point
* sDCI SDM (-0.0625us, 600Hz) and (0.25us, 0Hz)
* mDCI non-overlapping (-0.0625us, 600Hz)
* mDCI full-overlapping (0.25us, 600Hz) and (0.25us, 0Hz)
* Recommended WF:
  + Encourage comments if any.

### 8.11 Support of intra-band non-collocated EN-DC/NR-CA deployment

#### 8.11.4 Demodulation performance requirements

**R4-2311833 Discussion on demodulation requirement for intra-band non-collocated NR-CA**

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

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

**R4-2311910 Testing Criteria for Type-2 UEs in Intra-band Non-collocated Non-contiguous NR CA**

*Type: discussion For: Discussion  
 38.101-4 v CR- rev Cat: (Rel-18)  
  
 Source: Apple*

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

**R4-2311996 Discussion on Intra-Band Non-Collocated NR-CA**

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

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

**R4-2311997 Simulation results of Intra-Band Non-Collocated NR-CA**

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

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

**R4-2312499 Non-collocated Intraband UE Demod**

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

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

**R4-2312788 UE demodulation requirements for non-colocated NR-CA deployment scenario**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the UE demodulation requirements for non-colocated NR-CA deployment scenario.

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

**R4-2313068 Discussion on UE Demodulation for non-collocated FR1 intra-band EN-DC/NR-CA**

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

**Abstract:**

In this paper, we present Nokia’s view on the impact of non-colocated FR1 intra-band EN-DC/NR-CA demodulation requirements, specifically focusing on the open issues of channel modelling, reference signals, and specification impact.

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

**R4-2313279 Discussion on CA requirements with 25dB imbalance power difference**

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

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

#### 8.11.5 Moderator summary and conclusions

**[108][323] NonCol\_intraB\_ENDC\_NR\_CA\_Demod, AI 8.11.4**

**R4-2314259 Topic summary for [108][323] NonCol\_intraB\_ENDC\_NR\_CA\_Demod**

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

**Decision: Return to**

**Issue 1-1-1: Test setup and parameters**

* Proposals
  + Option 1 (ZTE, Nokia): Reuse the existing PDSCH CA power imbalance test requirements (e.g., TS 38.101-4 5.2A.2.2)
  + Option 2 (Ericsson): Reuse the existing PDSCH CA demodulation requirements (e.g., TS 38.101-4 5.2A.2.1)
* Recommended WF
  + There are different views how to specify the Type 2 UE NR-CA demodulation requirements. Some companies propose to reuse the existing power imbalanced requirements, but the other companies propose to reuse the existing CA demodulation requirements.
  + The table below summarizes the moderator’s understanding on the difference among two options and Type 2 UE demodulation requirements.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Power imbalance tests (e.g., TS38.101-4, 5.2A.2.2)** | **CA demodulation tests (e.g., TS38.101-4 5.2A.2.1)** | **Type 2 UE NR-CA demodulation requirements (new)** |
| Received power difference | 6 dB | 0 dB (No difference) | 25 dB |
| Received time difference | 0 µs (No difference) | 0 µs (No difference) | 33 µs |
| Channel model | Static propagation condition with no external noise sources applied | Fading (e.g., TDLA30-10) | [AWGN] |
| Maximum number of HARQ transmission | 1 | 4 | [1] |
| **Issue 1-1-2:** Signal/Noise setting | Noiseless (Set Es only) | Set both Es and Noc to set SNR test points | FFS |
| **Issue 1-1-3:** Throughput measurement procedure | Measure one carrier only | Measure both carriers at the same time | FFS |
| **Issue 1-1-4:** Tx antenna configuration and rank | 1Tx, Rank 1 | 2Tx, Rank 2 | FFS |
| **Issue 1-1-5:** MCS table and MCS index | Table 1 MCS26 | Table 1 MCS13 | FFS |
| **Issue 1-1-6:** Test metric | 85% of the maximum throughput | 70% of the maximum throughput | X% of the maximum throughput |

**Issue 1-1-2: Signal power setting and noise setting**

**Agreement from the last meeting:** Assume the power difference of 25dB and received time difference of 33us under the assumption that requirements introduced under static channel.

* Proposals
  + Option 1 (ZTE, Nokia): Power setting for antenna port of the weaker cc with -112dBm/Hz and the stronger cc with -87dBm/Hz
  + Option 2 (Nokia):
    - Clarify that propagation conditions are to be modelled as static propagation condition with no external noise sources applied”.
    - Adopt the PCell power operating point from prior power imbalance CA requirements and increase SCell power by 25dB in the test setup.
  + Option 3 (Apple): AWGN condition such that a low MCS value is considered for the weaker CC, hence at a power << 112 dBm/Hz much closer to the REFSENS+1dB requirement.
  + Option 4 (Huawei):
    - Add external noise to each CC with Noc equaling to -134 dBm/Hz for both CC.
    - Simulate the target SNR for each MCS and choose a pair of MCS whose target SNR difference is closest to but smaller than 25dB among all pair of MCSs, which are denoted as (SNR low and SNRhigh)
    - Set Es of weaker CC to Noc+ SNRlow and Es of stronger CC to Noc+ SNRlow+25dB
* Recommended WF
  + Discuss options based on Issue 1-1-1.
  + It looks Options 1 and 2 are based on the power imbalance test configuration, and Options 3 and 4 are based on the CA demodulation test configuration. Moderator proposes to conclude the test framework first in Issue 1-1-1.

**Issue 1-1-3: Throughput measurement procedure**

Moderator:

* Proposals
  + Option 1 (Apple): RAN4 discuss what specific implementation assumptions are made by contributing companies that justify that the throughput of both PCell and SCell will be measured at the same time, deviating from previous CA methodology.
  + Option 2 (Nokia): Measure PCell only.
  + Option 3 (Ericsson, Huawei, MediaTek): Measure both carriers.
* Recommended WF
  + Discuss options based on Issue 1-1-1.

**Issue 1-1-4: Tx antenna configuration and rank**

Background: Type 2 UE is assumed to receive signal with 2Rx per CC.

* Proposals
  + Option 1: 2 Tx antennas (MediaTek, ZTE, Ericsson)
    - Option 1a (MediaTek): Rank 2 for PCell and Rank 1 for SCell.
    - Option 1b (ZTE, Ericsson): Rank 2 for both carriers
  + Option 2 (Nokia, Huawei): 1 Tx antenna and Rank 1.
* Recommended WF
  + Discuss options based on Issue 1-1-1.

**Issue 1-1-5: MCS table and MCS index**

* Proposals
  + Option 1 (ZTE): MCS1 (MCS table 1) and MCS23 (MCS table 2)
  + Option 2 (Apple): Choose an MCS value for the weakest carrier that is consistent to the received power regime defined for Type-2 UE requirements, since there is no added value in measure both PCell and SCell, and even less if they are measured at the same time.
  + Option 3 (MediaTek): propose 4 possible configurations:
    - MCS4 (MCS table 1) and MCS22 (MCS table 2)
    - MCS5 (MCS table 1) and MCS23 (MCS table 2)
    - MCS6 (MCS table 1) and MCS24 (MCS table 2)
    - MCS7 (MCS table 1) and MCS25 (MCS table 2)
  + Option 4 (Nokia): MCS26 (MCS table 1) only
  + Option 5 (Ericsson): MCS2 (MCS table 2) and MCS24 (MCS table 2)
  + Option 6 (Huawei): MCS2 (MCS table 2) and MCS26 (MCS table 2)
* Recommended WF
  + Depends on Issue 1-1-3 (Measure one carrier only or both carriers) and Issue 1-1-5 (Tx antenna and configurations).
  + Based on the conclusion, moderator proposes to decide MCS index(es) based on the simulation results in the next meeting.

**Issue 1-1-6: Test metric**

* Proposals
  + Option 1 (ZTE, Nokia, Huawei): Achieve 85% of the maximum throughput at the given test point.
  + Option 2 (Apple, MediaTek, Ericsson): Achieve 70% of the maximum throughput at the given test point.
* Recommended WF
  + Need discussion based on Issues 1-1-1. It is observed the different proposals come from the different test framework proposals. However according to the simulation results from Ericsson, there are no big difference between 70% or 85% under AWGN and no HARQ retransmission.

**Issue 1-1-7: Other parameter configurations**

* Proposals (Nokia):
  + Configure both TRS and SSB in PCell and SCell.
    - Reuse Rel-15 PDSCH requirements common configurations for TRS and TCI states
  + Configure 33us received time difference (RTD) between PCell and SCell.
* Recommended WF
  + Agree with the proposals.

### 8.12 Enhanced NR support for high speed train scenario in frequency range 2

#### 8.12.5 Demodulation performance requirements

##### 8.12.5.1 General and channel modelling

**R4-2312199 On Channel Modelling in HST FR2 Enhanced**

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

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

**R4-2312210 View on channel modeling for Rel-18 FR2 HST demodulation requirement in tunnel scenario**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312493 FR2 HST Enh. UE Demod: General and Channel Modeling**

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

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

**R4-2313088 FR2 HST Enh. UE Demod Simulation Results**

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

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

**R4-2313654 Discussion on deployment and channel modelling for HST FR2**

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

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

##### 8.12.5.2 PDSCH requirements with CA

**R4-2312207 Discussion and simulation results for PDSCH with CA**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312211 Simulation results summary for Rel-18 FR2 HST demodulation requirement**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312494 FR2 HST Enh. UE Demod for CA**

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

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

**R4-2312792 Simulation results of CA PDSCH demodulation requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution provides simulation results of CA PDSCH demodulation requirements for HST FR2 enhancement.

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

**R4-2312795 [NR\_HST\_FR2\_enh-Perf] HST FR2 Enhanced: UE Demodulation PDSCH Requirements with Carrier Aggregation**

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

**Abstract:**

In this paper, we provide our views on Issues related to HST FR2 with Carrier Aggregation

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

**R4-2312798 [NR\_HST\_FR2\_enh-Perf] Simulation Results on HST FR2 Enhanced with Carrier Aggregation**

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

**Abstract:**

In this paper, we present the simulation results on HST FR2 with Carrier Aggregation

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

**R4-2313655 Discussion on UE PDSCH CA demodulation requirements for HST FR2**

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

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

**R4-2313656 Simulation results on UE PDSCH CA demodulation requirements for HST FR2**

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

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

##### 8.12.5.3 PDSCH requirements with multi-Rx Chain DL reception

**R4-2312208 Discussion and simulation results for PDSCH requirements with multi-Rx reception**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312495 FR2 HST Enh. UE Demod with simultaneous multi-panel reception**

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

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

**R4-2312793 UE demodulation requirements for FR2 HST multi-Rx reception**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the open issues on UE demodulation requirements for simultaneous multi-Rx reception scenario in FR2 HST.

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

**R4-2312796 [NR\_HST\_FR2\_enh-Perf] HST FR2 Enhanced: UE Demodulation PDSCH Requirements with Multi-Rx Chain DL Reception**

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

**Abstract:**

In this paper, we provide our views on Issues related to HST FR2 with Multi-RX Chain DL Reception

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

**R4-2312797 [NR\_HST\_FR2\_enh-Perf] Simulation Results on HST FR2 Enhanced with Multi-Rx Chain DL Reception**

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

**Abstract:**

In this paper, we present the simulation results on HST FR2 with Multi-RX Chain DL Reception

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

**R4-2313657 Discussion on UE PDSCH requirements with multi-Rx demodulation requirements for HST FR2**

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

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

**R4-2313658 Simulation results for PDSCH requirements with Multi-Rx for HST FR2**

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

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

##### 8.12.5.4 Demodulation aspects for tunnel deployment scenario

**R4-2312200 On Demodulation Aspects of Tunnel Deployment Scenarios in HST FR2 Enhanced**

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

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

**R4-2312209 View on demodulation requirements for tunnel deployment scenario for Rel-18 FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312496 FR2 HST Enh. UE Demod with Tunnel Deployment**

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

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

**R4-2312794 Tunnel deployment scenario for FR2 HST enhancements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the view on the demodulation aspects for tunnel deployment scenario in FR2.

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

**R4-2313659 Discussion on reference tunnel deployment scenario**

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

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

#### 8.12.6 Moderator summary and conclusions

**[108][324] NR\_HST\_FR2\_enh\_Demod, AI 8.12.5**

**R4-2314260 Topic summary for [108][324] NR\_HST\_FR2\_enh\_Demod**

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

**Decision: Return to**

### 8.13 Air-to-ground network for NR

#### 8.13.3 BS RF requirements

Draft CR to TS 38.104

**R4-2311606 Draft CR for TS 38.104, On ATG BS requirements**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: CATT*

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

**R4-2311803 Draft CR for TS 38.104 on adding RF requirements for ATG BS**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: CMCC*

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

**R4-2313167 Draft CR to TS38.104 Introduction of ATG BS**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: ZTE Corporation*

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

Session chair note: R4-2311458~2311461 move to this AI from AI 8.13.2

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

**R4-2311459 draft CR for 38104 to inoduce ATG BS**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

Draft CR to TS 38.141-1

**R4-2311460 draft CR for 38141-1 to inoduce ATG BS**

*Type: draftCR For: Endorsement  
 38.141-1 v18.2.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2311607 Draft CR for TS 38.141-1, On ATG BS requirements**

*Type: draftCR For: Endorsement  
 38.141-1 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: CATT*

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

Draft CR to TS 38.141-2

**R4-2311461 draft CR for 38141-2 to inoduce ATG BS**

*Type: draftCR For: Endorsement  
 38.141-2 v18.2.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

TP to TR 38.876

**R4-2311458 TP for 38.876 on BS RF requirement**

*Type: draftCR For: Endorsement  
 38.876 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei, HiSilicon*

#### 8.13.5 Demodulation performance requirements

##### 8.13.5.1 General aspects

**R4-2311503 Discussion on ATG scenarios**

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

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

**R4-2311794 Discussion on general issues for ATG**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2311795 Summary of simulation results for ATG UE and BS demodulation requirements**

*Type: other For: Information  
 Source: CMCC*

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

**R4-2312063 Discussion on ATG general demodulation issues**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on specification impact of ATG demod requirements

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

**R4-2312497 ATG UE Demod: General**

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

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

**R4-2313646 Discussion on general aspects for NR ATG demodulation requirements**

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

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

##### 8.13.5.2 UE demodulation performance and CSI requirements

**R4-2311504 Discussion on ATG UE demodulation**

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

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

**R4-2311505 Simulation results for ATG UE demodulation**

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

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

**R4-2311796 Discussion on UE demodulation and CSI requirements for ATG scenario**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2311797 Simulation results for ATG PDSCH demodulation**

*Type: discussion For: Information  
 Source: CMCC*

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

**R4-2312498 ATG UE Demod: UE Demod and CSI requirements**

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

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

**R4-2312549 On UE demodulation requirements for ATG network**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the assumptions and capabilities of UE demodulation for ATG

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

**R4-2312550 Simulation results for ATG PDSCH demodulation requirements**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution submits our simulation results of PDSCH for ATG

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

**R4-2313089 ATG UE Demod Simulation Results**

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

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

**R4-2313647 Discussion on NR UE ATG demodulation requirements**

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

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

**R4-2313648 Simulation results on NR UE ATG demodulation requirements**

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

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

##### 8.13.5.3 BS demodulation performance requirements

**R4-2311510 Discussion on ATG BS demodulation performance requirements**

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

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

**R4-2311511 Simulation results for ATG BS demodulation requirements**

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

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

**R4-2311798 Discussion on BS demodulation requirements for ATG scenario**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2311799 Simulation results for ATG PUSCH demodulation**

*Type: discussion For: Information  
 Source: CMCC*

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

**R4-2312064 Discussion on ATG BS demodulation issues**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on remaining issues of ATG PUSCH demodulation

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

**R4-2312065 Simulation results for ATG PUSCH demodulation**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Simulation results for PUSCH demodulation

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

**R4-2312204 Discussion and simulation results for BS demodulation requirements for Rel-18 ATG**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2313649 Discussion on NR BS ATG demodulation requirements**

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

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

**R4-2313650 Simulation results on NR BS ATG demodulation requirements**

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

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

#### 8.13.6 Moderator summary and conclusions

**[108][303] NR\_ATG\_BSRF, AI 8.13.3**

**R4-2314239 Topic summary for [108][303] NR\_ATG\_BSRF**

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

**Decision: Return to**

**[108][325] NR\_ATG\_Demod, AI 8.13.5**

**R4-2314261Topic summary for [108][325] NR\_ATG\_Demod**

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

**Decision: Return to**

**Topic #1 General aspect**

**Issue 1-1: Channel model**

* Proposals
  + Option 1: Do not consider Doppler shift in ATG UE Demod Requirements (QC)
* *Observation: we achieved following agreements in RAN#107*
  + *Only consider single path AWGN channel with Doppler for ATG incremental requirements*
    - *For FDD: Set Doppler as 200Hz for UL, 220Hz for DL*
    - *For TDD: Set Doppler as 500Hz*
* Recommended WF
  + Don’t revisit the original agreements.

**Issue 1-2: TDD pattern 30D4S6U**

* Proposals
  + Option 1: RAN4 should not define ATG UE Demodulation requirements with 30D4S6U TDD Slot Pattern (QC)
  + Option 2: If RAN4 introduces ATG UE Demodulation requirements which require >16 HARQ processes, these should be optional based on UE capability (QC)
  + Option 3: Wait RAN1 response to the LS and then discuss how to define the cases with new TDD pattern. If RAN1 response that “Increasing the number of HARQ processes” and “K1 range extension” issue can be solved by existing NTN solution, define corresponding demodulation requirements with the new TDD pattern and note should be added in the specification that this pattern is for ATG scenario only. (HW)
* *Observation: we achieved following agreements in RAN#107*
  + *New TDD pattern together with the features ‘Increasing the number of HARQ processes’ and ‘K1 range extension’ can be considered as one of possible solution to mitigate the guard period impact for Rel-18 ATG scenario.*
* Recommended WF
  + Wait RAN1 response. If RAN1 response that “Increasing the number of HARQ processes” and “K1 range extension” issue can be solved by existing NTN solution, define corresponding demodulation requirements with the new TDD pattern and note should be added in the specification that this pattern is for ATG scenario only, these requirements should be optional based on UE capability.

**Issue 1-3: Applicability rule for TDD pattern**

* Proposals
  + Option 1: the legacy TDD pattern can be skipped if the test of new TDD pattern is passed (ZTE, CMCC)
* Recommended WF
  + Option 1 can be agreed.

**Issue 1-4: Applicability rule for antenna configuration**

* Proposals
  + Option 1: 2Rx can be skipped if the test of 4Rx is passed for the ATG CPE supporting both 2Rx and 4Rx (ZTE)
* Recommended WF
  + Option 1 can be agreed.

**Issue 1-5: Specification impact**

* Proposals for ATG UE demodulation requirements
  + Option 1: Introduce a new section under each physical channel for ATG UE demodulation requirements. (Ericsson)
  + Option 2: (CMCC)
    - New clause for ATG applicability of requirements should be introduced
    - New clauses for ATG new incremental PDSCH requirements should be introduced
* Proposals for ATG BS demodulation requirements
  + Option 1: Add a new section for ATG PUSCH demodulation requirements. In this section, clarifications for how to reuse legacy applicability rules and requirements should be added, and new defined PUSCH demodulation requirements could be captured. (Ericsson)
  + Option 2: (CMCC)
    - New clause for ATG new incremental PUSCH requirements should be introduced in 38.104
    - New clause for ATG applicability of PUSCH requirements should be introduced in 38.141-1 and 38.141-2
    - New clause for ATG applicability of PUCCH requirements should be introduced in 38.141-1 and 38.141-2
    - New clause for ATG applicability of PUCCH requirements should be introduced in 38.141-1 and 38.141-2
  + Option 3: Capture ATG demodulation requirement into the same section with legacy requirement to minimize the effort of specification modification with adding the referring statement as “The following requirements in sections of 8.2.1 and 8.2.3 can be applied for BS declared to support ATG scenario”. New dedicated requirement can be added into the corresponding table in section 8.2.1 (Samsung)
* Recommended WF
  + To be discussed

**Issue 1-6: Manufactory declaration for ATG BS**

* Proposals
  + Option 1: Introduce a new manufactory declaration for ATG BS. I.e., in TS38.141-1 (Ericsson)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| D.xxx | Air-to-ground scenario | Declaration of air-to-ground scenario support, i.e. ATG support or no ATG support | x | x |

* Recommended WF
  + Check whether Option 1 can be agreed.

**Topic #2 UE demodulation**

**Issue 2-1-1: MCS**

* Proposals
  + Option 1: For 256QAM, use MCS 27 in Table 2. (CMCC)
  + Option 2: Consider MCS24 (Table-2) for defining requirements for 256QAM (Ericsson, HW)
* Recommended WF
  + Check whether Option 2 can be agreed.

**Issue 2-1-2: Test scope for PDSCH**

* **Proposals for new incremental requirements:**
  + Option 1: following test cases for new PDSCH requirements: (CMCC)

|  |  |  |
| --- | --- | --- |
| FDD  10 MHz 15kHz SCS | 2T2R, 2T4R | 16QAM (MCS [13] in table 1) |
| 64QAM (MCS [22] in table 1) |
| 256QAM (MCS [27] in table 2) |

|  |  |  |  |
| --- | --- | --- | --- |
| TDD  40MHz 30kHz SCS | 7D1S2U  &  New TDD pattern: 30D4S6U(if introduced) | 2T2R, 2T4R | 16QAM (MCS [13] in table 1) |
| 64QAM (MCS [22] in table 1) |
| 256QAM (MCS [27] in table 2) |

* + Option 2: Only test cases with MCS 16QAM to configure new TDD pattern. Propose following test cases for new PDSCH requirements: (Ericsson)

|  |  |  |
| --- | --- | --- |
| FDD  10 MHz 15kHz SCS | 2T2R, 2T4R | 16QAM (MCS [13] in table 1) |
| 64QAM (MCS [22] in table 1) |
| 256QAM (MCS [24] in table 2) |

|  |  |  |  |
| --- | --- | --- | --- |
| TDD  40MHz 30kHz SCS | New TDD pattern: 30D4S6U(if introduced) | 2T2R, 2T4R | 16QAM (MCS [13] in table 1) |
| 7D1S2U | 64QAM (MCS [22] in table 1) |
| 256QAM (MCS [24] in table 2) |

* **Proposals for reusing requirements:**
  + Option 1: no need to further choose existing PDSCH test case for ATG reusing (CMCC)
  + Option 2: Select the following test cases for ATG UE requirements. (HW)
    - Test num 1-3 and 1-4 in Table 5.2.2.1.1-3 (2R FDD)
    - Test num 1-3 and 1-4 in Table 5.2.2.2.1-3 (2R TDD)
    - Test num 1-3 and 1-4 in Table 5.2.3.1.1-3 (4R FDD)
    - Test num 1-3 and 1-4 in Table 5.2.3.2.1-3 (4R TDD)
  + Option 3: Considering that there is no 64QAM rank 1 case in Rel-15 TS 38.101-4, define new requirements for 64QAM by reusing the existing 64QAM rank2 case but change the rank to rank1. (HW)
  + Option 4: Consider the following legacy tests to be applicable to ATG UEs (QC)
    - Test num 1-1, 1-3 and 1-4 in Table 5.2.2.1.1-3, Test num 2-1 in Table 5.2.2.1.1-4 (2R FDD)
    - Test num 1-1, 1-3 and 1-4 in Table 5.2.2.2.1-3, Test num 2-1 in Table 5.2.2.2.1-4 (2R TDD)
* Recommended WF
  + For new incremental requirements:
    - Considering the applicability rule can be introduced between TDD patterns, RAN4 introduces following test cases for new PDSCH requirements (MCS for 256QAM further follows the agreement of Issue 2-1-1):

|  |  |  |
| --- | --- | --- |
| FDD  10 MHz 15kHz SCS | 2T2R, 2T4R | 16QAM (MCS [13] in table 1) |
| 64QAM (MCS [22] in table 1) |
| 256QAM (MCS [27/24] in table 2) |

|  |  |  |  |
| --- | --- | --- | --- |
| TDD  40MHz 30kHz SCS | 7D1S2U  &  New TDD pattern: 30D4S6U(if introduced) | 2T2R, 2T4R | 16QAM (MCS [13] in table 1) |
| 64QAM (MCS [22] in table 1) |
| 256QAM (MCS [27/24] in table 2) |

* + For reusing requirements:
    - For 16QAM/256QAM, reusing following cases:
      * Test num 1-3 and 1-4 in Table 5.2.2.1.1-3 (2R FDD)
      * Test num 1-3 and 1-4 in Table 5.2.2.2.1-3 (2R TDD)
      * Test num 1-3 and 1-4 in Table 5.2.3.1.1-3 (4R FDD)
      * Test num 1-3 and 1-4 in Table 5.2.3.2.1-3 (4R TDD)
    - FFS QPSK and 64QAM

**Issue 2-2-1: Test scope for PDCCH**

* Proposals
  + Option 1: To consider legacy PDCCH requirements for ATG PDCCH requirements. (ZTE, Ericsson)
    - 2T2R FDD: All test cases in 5.3.2.1.2
    - 2T4R FDD: All test cases in 5.3.3.1.2
    - 2T2R TDD: All test cases in 5.3.2.2.2
    - 2T4R TDD: All test cases in 5.3.3.2.2
  + Option 2: Select following legacy test cases for ATG UEs (CMCC)
    - 1T2R FDD: Test number 2, 3 and 4 in 5.3.2.1.1
    - 2T2R FDD: All test cases in 5.3.2.1.2
    - 1T2R TDD: Test number 1 and 2 in 5.3.2.2.1
    - 2T2R TDD: All test cases in 5.3.2.2.2
    - 1T4R FDD: Test number 2, 3 and 4 in 5.3.3.1.1
    - 2T4R FDD: All test cases in 5.3.3.1.2
    - 1T4R TDD: Test number 1 and 2 in 5.3.3.2.1
    - 2T4R TDD: All test cases in 5.3.3.2.2
  + Option 3: Select following legacy test cases for ATG UEs (HW)
    - 1T2R FDD: Test number 1, 3 and 5 in 5.3.2.1.1
    - 2T2R FDD: Test number 3 in 5.3.2.1.2
    - 1T2R TDD: All test cases in 5.3.2.2.1
    - 2T2R TDD: All test cases in 5.3.2.2.2
    - 1T4R FDD: Test number 1, 3 and 5 in 5.3.3.1.1
    - 2T4R FDD: Test number 3 in 5.3.3.1.2
    - 1T4R TDD: All test cases in 5.3.3.2.1
    - 2T4R TDD: All test cases in 5.3.3.2.2
  + Option 4: Do not consider in the ATG scope legacy PDCCH requirements (QC)
* Recommended WF
  + With the spirit of compromise, please check whether Option 1 can be agreed.

**Issue 2-3-1: Test scope for CSI reporting**

* Proposals
  + Option 1: CSI reporting such PMI and CQI is feasible for ATG scenario. (ZTE)
  + Option 2: reuse the legacy CSI reporting requirements under AWGN propagation condition, which including (CMCC)
    - 2T2R FDD: CQI requirements in 6.2.2.1.1.1
    - 2T2R TDD: CQI requirements in 6.2.2.2.1.1
    - 2T4R FDD: CQI requirements in 6.2.3.1.1.1
    - 2T4R TDD: CQI requirements in 6.2.3.2.1.1
  + Option 3: Reuse the CSI reporting cases for ATG scenario from the existing legacy CSI reporting cases. (HW)
  + Option 4: Do not consider in the ATG scope legacy CSI reporting requirements (QC)
* Recommended WF
  + For CQI requirements, reuse the following requirements:
    - 2T2R FDD: CQI requirements in 6.2.2.1.1.1
    - 2T2R TDD: CQI requirements in 6.2.2.2.1.1
    - 2T4R FDD: CQI requirements in 6.2.3.1.1.1
    - 2T4R TDD: CQI requirements in 6.2.3.2.1.1
  + FFS whether to reuse PMI and RI reporting requirements

**Topic #3 BS demodulation**

**Issue 3-1: MCS**

* Proposals
  + Option 1: Capture 256QAM demodulation requirements for ATG PUSCH. Whether to test it is based on the manufactory declaration. (Ericsson, ZTE, CMCC, HW)
    - Option 1-1: For the new test case with new dedicated ATG requirement, cover 256QAM, MCS 22 in table 2 (CMCC)
  + Option 2: Only consider 64QAM MCS28 and 256QAM MCS22 for ATG PUSCH demodulation requirements. (Ericsson)
  + Option 3: For new dedicated requirement, only one feasible MCS was introduced. (Samsung)
* *Observation from Moderator: The agreement from RAN4#107*
  + *For the test case which reusing existing requirements, cover 16QAM, 64QAM at least*
    - *FFS for 256QAM supporting pending on UE RF session conclusion on the supporting UL 256QAM Tx*
  + *For the new test case with new dedicated ATG requirement, cover 16QAM and 64QAM at least* 
    - *FFS for 256QAM supporting pending on UE RF session conclusion on the supporting UL 256QAM Tx*
* Recommended WF
  + Don’t revisit the agreement of last meeting.
  + For the test case which reusing existing requirements, cover 16QAM, 64QAM and 256QAM, whether to test 256QAM based on the manufactory declaration.
  + For the new dedicated ATG requirements, cover 16QAM MCS 16 (Table 1), 64QAM MCS [28] (Table 1) and 256QAM MCS [22] (Table 2), whether to test 256QAM based on the manufactory declaration.

**Issue 3-2: Test metric**

* Proposals
  + Option 1: Only consider 70% throughput requirements for new dedicated requirements. (ZTE, CMCC, Samsung, HW)
  + Option 2: For the test case which reusing existing requirements, the test metric cover SNR at 70% and 30% TP. (CMCC, HW, Ericsson)
* Recommended WF
  + For the test case which reusing existing requirements, the test metric cover SNR at 70% and 30% TP.
  + Only consider 70% throughput requirements for new dedicated requirements.

**Issue 3-3: Test scope for PUSCH**

* Proposals for new incremental requirements
  + Option 1: Introduce following new dedicated requirements for PUSCH, which are separately for FDD and TDD cases. (CMCC)

|  |  |  |
| --- | --- | --- |
| FDD  5 MHz 15kHz SCS  AWGN+200Hz doppler | 1T2R | 16QAM (MCS [16] in table 1) |
| 64QAM (MCS [28] in table 1) |
| 256QAM (MCS [22] in table 2) |

|  |  |  |  |
| --- | --- | --- | --- |
| TDD  10MHz 30kHz SCS  AWGN+500Hz doppler | 7D1S2U  &  FFS on new TDD pattern: 30D4S6U | 1T2R | 16QAM (MCS [16] in table 1) |
| 64QAM (MCS [28] in table 1) |
| 256QAM (MCS [22] in table 2) |

* + Option 2: Reuse current applicability rule “The same requirements are applicable to FDD and TDD with different UL-DL patterns” for Rel-18 ATG BS demodulation requirements. (Ericsson)
  + Option 3: Reusing the legacy TDD pattern for requirement in ATG scenario as “The same requirements are applicable to TDD with different UL-DL pattern”(Samsung)
* Proposals for legacy requirements reusing
  + Option 1: To consider normal PUSCH demodulation and UCI multiplexing on PUSCH as mandatory requirements. (ZTE, CMCC)
* Recommended WF
  + For new incremental requirements:
    - The same requirements are applicable to TDD with different UL-DL pattern
    - Further discuss whether same requirements are applicable to FDD and TDD
  + For legacy requirements reusing:
    - Consider normal PUSCH demodulation and UCI multiplexing on PUSCH as mandatory

### 8.14 NR support for dedicated spectrum less than 5MHz for FR1

#### 8.14.3 BS RF requirements

LS to ECC WG FM

**R4-2311210 UIC input related to R4-2311003 LS from WGFM**

*Type: discussion For: Discussion  
 Source: Union Inter. Chemins de Fer*

**Abstract:**

Proposal 1: Treat the maximum conducted output power subject as an R18 maintenance item for bands

n100 and n101.

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

**R4-2311667 Reply LS on NR bandwidth smaller than 5 MHz at 900 MHz**

*Type: LS out For: Approval  
 to CEPT ECC WG FM, cc RAN  
 Source: Nokia, Nokia Shanghai Bell, UIC*

**Abstract:**

Reply LS on NR bandwidth smaller than 5 MHz at 900 MHz.

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

**R4-2313595 Draft reply LS to the ECC WG FM on less than 5MHz BS requirements**

*Type: LS out For: Approval  
 to ECC WG FM, cc ETSI TC ERM, ETSI TC RT, UIC UGFA, 3GPP TSG RAN  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on feedback received from ECC WG FM in R4-2311003, 3GPP RAN WG4 would like to inform on the related decisions.

Session chair note: Move to this AI from AI 10.2.3.

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

**R4-2313244 Spectrum less than 5 MHz - LS Reply to ECC WG FM**

*Type: LS out For: Approval  
 to ECC WG FM  
 Source: Ericsson*

**Abstract:**

This contribution proposes a LS Reply to ECC WG FM

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

**R4-2311668 BS RF requirements for NR support for dedicated spectrum less than 5MHz for FR1**

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

**Abstract:**

This contribution provides our proposals on these requirements according to the reply LSs from CEPT ECC WG FM and ETSI TC RT

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

Draft CR to TS 38.104

**R4-2312019 draftCR to TS38.104: the introduction of 3 MHz channel bandwidth**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: ZTE Corporation*

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

**R4-2313245 Draft CR to TS 38.104 - Introduction of 3 MHz channel bandwidth**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

This draft CR is our contribution to the introduction of 3 MHz channel bandwidth in bands n26, n28, n85, n105 and n106, according to the work split

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

**R4-2311669 Draft CR to TS 38.104 on introduction of 3 MHz channel bandwidth in clauses 6.3 and 6.6**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Required changes to support 3 MHz channel bandwidth in clauses 6.3 and 6.6.

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

**R4-2313593 Draft CR to TS38.104: updated in-band blocking requirements for 3 MHz channel bandwidth (7.4.2)**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In this contribution we provide updated in-band blocking, including narrowband blocking requirmenets for 3MHz channel in band n100, based on feedback received from ETSI TC RT.

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

**R4-2313594 Draft CR to TS38.104: updated RX IMD requirements for 3 MHz channel bandwidth (7.7)**

*Type: draftCR For: Endorsement  
 38.104 v18.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In this contribution we provide updated RX IMD , including narrowband requirmenets for 3MHz channel in band n100, based on feedback received from ETSI TC RT.

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

**R4-2311670 Big CR to TS 38.104 on introduction of 3 MHz channel bandwidth**

*Type: CR For: Agreement  
 38.104 v18.2.0 CR-0500 rev Cat: B (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Required changes to support 3 MHz channel bandwidth.

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

CR to TS 38.133

**R4-2311671 CR to TS 38.113 on introduction of 3 MHz channel bandwidth in clause 6.1**

*Type: CR For: Agreement  
 38.104 v18.2.0 CR-0501 rev Cat: B (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Required changes to support 3 MHz channel bandwidth in clause 6.1.

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

**R4-2311675 CR to TS 38.113 on introduction of 3 MHz channel bandwidth in clause 6.1**

*Type: CR For: Agreement  
 38.113 v17.4.0 CR-0059 rev Cat: B (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Required changes to support 3 MHz channel bandwidth in clause 6.1.

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

**R4-2313247 CR to TS 38.113: Introduction of 3 MHz channel bandwidth**

*Type: CR For: Agreement  
 38.113 v17.4.0 CR-0063 rev Cat: B (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

This CR proposes updates to support 3 MHz channel bandwidth in BS EMC specifications

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

#### 8.14.5 Moderator summary and conclusions

**[108][304] NR\_FR1\_lessthan\_5MHz\_BW\_BSRF, AI 8.14.3**

**R4-2314240 Topic summary for [108][304] NR\_FR1\_lessthan\_5MHz\_BW\_BSRF**

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

**Decision: Return to**

**Issue 1-1: Conducted output power requirements**

* Proposals
  + Option 1: Treat the maximum conducted output power subject as an R18 maintenance item for bands n100 and n101.
  + Option 2: Not to specify in-block conducted output power requirements for 3MHz channel bandwidth in band n100 in RAN4 specifications.
* Recommended WF
  + Combine the 2 options: Treat the maximum conducted output power subject as an R18 maintenance item for bands n100 and n101, and not to specify in-block conducted output power requirements for 3MHz channel bandwidth in band n100 in this version of RAN4 specifications.

**Issue 1-2: Additional narrow band blocking requirement**

* Proposals
  + Option 1: To specify the requirement also using the same 3MHz channel bandwidth for both wanted and interfering signals as follows:
    - Interfering signal mean power: -39 dBm
    - Wanted signal mean power (dBm): PREFSENS + 6 dB
    - Interfering Signal: 3 MHz DFT-s-OFDM NR signal, 15 kHz SCS, 1 RB
    - Interfering RB centre frequency offset 874.4 MHz -(255 kHz +m\*180), m=0, 1, 2, 3, 4, 7, 10, 13
  + Option 2: TBA
* Recommended WF
  + Option 1

**Issue 1-3: Additional narrow band blocking requirement**

* Proposals
  + Option 1: To specify the additional narrow band blocking requirement for 3 MHz channel bandwidth for band n100 as follows:
    - Interfering signal mean power: -39 dBm
    - Wanted signal mean power (dBm): PREFSENS + 6 dB
    - Interfering Signal: 3 MHz DFT-s-OFDM NR signal, 15 kHz SCS, 1 RB
    - Interfering centre frequency offset: 360 kHz for CW, 960 kHz for 1 RB
  + Option 2: TBA
* Recommended WF
  + Option 1

**Issue 1-4: Reply LS to ECC WG FM**

* Proposals
  + Option 1: Reply LS in R4-2311667
  + Option 2: Reply LS in Annex of R4-2313244
  + Option 3: Reply LS in R4-2313595
* Recommended WF
  + Revise R4-2311667 to merge the contents in the 3 options.

### 8.15 Enhancement of TRP and TRS requirements and test methodologies

#### 8.15.1 General and work plan

**R4-2311056 TP to TR38.870 on TRP TRS test procedure for CA**

*Type: pCR For: Approval  
 38.870 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei Tech.(UK), Rohde & Schwarz*

**Abstract:**

Text proposal for TRP TRS test procedure for CA

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

**R4-2311228 On the impact of RAN5 LS on TxD and GSMA LS on CBW configurations**

*Type: discussion For: Decision  
 Source: Apple*

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

**R4-2312565 3GPP TR 38.870 v0.4.0**

*Type: draft TR For: Agreement  
 38.870 v0.5.0 CR- rev Cat: (Rel-18)  
  
 Source: vivo*

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

#### 8.15.2 Enhancement of test methodology

##### 8.15.2.1 Anechoic chamber test methodology

**R4-2311230 TP to TR38.870 on MIMO radiated output power metric**

*Type: pCR For: Approval  
 38.870 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: Apple*

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

**R4-2311057 on TRP for UL MIMO**

*Type: discussion For: Agreement  
 Source: Huawei Tech.(UK)*

**Abstract:**

discussion on UL MIMO TRP test procedure

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

**R4-2311227 UL MIMO radiated output power metric and test methodology**

*Type: other For: Approval  
 Source: Apple*

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

**R4-2311672 Multi-TPMI TRP time estimation**

*Type: other For: Approval  
 38.870 v CR- rev Cat: (Rel-18)  
  
 Source: Rohde & Schwarz, Keysight Technologies*

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

**R4-2312509 Discussion on TRP test method for UL MIMO and TxD**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312563 (Template) Measurement results for 3GPP Rel-18 TRP TRS AC lab alignment activity**

*Type: other For: Approval  
 Source: vivo*

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

**R4-2312567 Discussions on AC test method**

*Type: other For: Approval  
 Source: vivo*

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

**R4-2312713 Discussion on 2TX test methodology**

*Type: other For: Approval  
 Source: CAICT.*

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

**R4-2312885 Discussion on FR1 2Tx TRP test method**

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

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

**R4-2312898 Further discussion on 2TX configuration**

*Type: other For: Discussion  
 Source: Xiaomi*

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

**R4-2312919 On 2Tx TRP test method**

*Type: other For: Approval  
 Source: OPPO*

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

**R4-2313628 On FR1 UL-MIMO 2Tx TRP Deviation and ECC**

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

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

**R4-2313775 On Phase Impacts on Single-Layer UL MIMO TRP Measurements and 2Tx Test Mode**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

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

##### 8.15.2.2 Reverberation chamber test methodology

**R4-2311061 Loading of Reverberation Chambers for OFDM signal measurements**

*Type: discussion For: Discussion  
 Source: EMITE, NIST*

**Abstract:**

This contribution explores an alternative method for standardized chamber loading for OFDM signal measurements based upon the longest realistic delay spread. The longest realistic delay spread would then be determined from 3GPP channel models upon which t

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

**R4-2311062 Correction to R4-2304468 Discussion on Coherence bandwidth of RC**

*Type: discussion For: Discussion  
 Source: EMITE*

**Abstract:**

In RAN4#106-bis-e meeting, a contribution discussing coherence bandwidth of RC was presented [R4-2304468].

A typo was made in one of the equations along the discussion section. Where it says

B\_(c,0.5)=v3 B\_(env,0.5)

it should have said

B\_(c,0.5)=2v3 B\_(

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

**R4-2312564 (Template) Measurement results for 3GPP Rel-18 TRP TRS RC harmonization activity**

*Type: other For: Approval  
 Source: vivo*

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

**R4-2312568 Further updated working procedure for Rel-18 TRP TRS lab alignment and harmonization campaign**

*Type: other For: Approval  
 Source: vivo*

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

**R4-2312920 On RC harmonization activity**

*Type: other For: Approval  
 Source: OPPO*

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

##### 8.15.2.3 MU assessment

**R4-2311673 TP to TR 38.870 on contents for Annex B**

*Type: pCR For: Approval  
 38.870 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: ROHDE & SCHWARZ*

**Abstract:**

This contribution is intended to provide the Text Proposals endorsed by RAN5 during RAN5#100 (August 2023) on Measurement Uncertainty, and to be included in Annex B of TR 38.870.

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

**R4-2313263 Enhancements to Rel18 Lab Alignment Template**

*Type: discussion For: Decision  
 Source: Apple*

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

##### 8.15.2.4 Testing time reduction

**R4-2311058 on test time reduction for TxD and UL MIMO**

*Type: discussion For: Agreement  
 Source: Huawei Tech.(UK)*

**Abstract:**

suggestion on coarse grid for TxD and UL MIMO

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

#### 8.15.3 Performance requirements

**R4-2311229 TRP TRS device pool information**

*Type: other For: Approval  
 Source: Apple, Telecom Italia*

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

**R4-2311270 Improvement of the working procedure for Rel-18 AC Lab Alignment Campaign**

*Type: discussion For: Decision  
 Source: TELECOM ITALIA S.p.A.*

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

**R4-2311271 Improvement of the working procedure for TRP TRS Performance Test Campaign**

*Type: discussion For: Decision  
 Source: TELECOM ITALIA S.p.A.*

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

**R4-2311272 Definition of the thresholds related to devices pool**

*Type: discussion For: Decision  
 Source: TELECOM ITALIA S.p.A.*

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

**R4-2312566 TP to TR 38.870 on AC lab alignment campaign**

*Type: pCR For: Approval  
 38.870 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: vivo*

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

**R4-2312569 Schedule for Rel-18 TRP TRS measurement campaigns and requirements**

*Type: other For: Approval  
 Source: vivo*

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

**R4-2312921 On AC lab alignment activity**

*Type: other For: Approval  
 Source: OPPO*

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

**R4-2313784 Improvement of the working procedure for Rel-18 AC Lab Alignment Campaign**

*Type: discussion For: Decision  
 Source: Telecom Italia, Vodafone, China Telecom, AT&T, Orange, Deutsche Telekom, T-Mobile USA*

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

**R4-2313785 Improvement of the working procedure for TRP TRS Performance Test Campaign**

*Type: discussion For: Decision  
 Source: Telecom Italia, Vodafone, China Telecom, AT&T, Orange, Deutsche Telekom, T-Mobile USA*

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

**R4-2313786 Definition of the thresholds related to devices pool**

*Type: discussion For: Decision  
 Source: Telecom Italia, Vodafone, China Telecom, AT&T, Orange, Deutsche Telekom, T-Mobile USA*

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

#### 8.15.4 Moderator summary and conclusions

**[108][330] NR\_FR1\_TRP\_TRS\_enh, AI 8.15**

**R4-2314266 Topic summary for [108][330] NR\_FR1\_TRP\_TRS\_enh**

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

**Decision: Return to**

### 8.16 Enhancement of Multiple Input Multiple Output Over-the-Air test methodology and requirements for NR UEs

#### 8.16.1 General and work plan

**R4-2311276 Channel Model Validation Results for FR2 MIMO OTA**

*Type: discussion For: Information  
 Source: ETS-Lindgren Europe*

**Abstract:**

In this contribution the validation results for the FR2 MIMO OTA channel model CDL-C Umi is provided.

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

**R4-2312535 On FR2 MIMO OTA lab alignment schedule**

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

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

#### 8.16.2 FR2 MIMO OTA test methodology enhancement

**R4-2312536 FR2 MIMO OTA channel model validation results**

*Type: discussion For: Discussion  
 Source: CAICT*

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

**R4-2312922 On simulation activity of FR2 MIMO OTA**

*Type: other For: Approval  
 Source: OPPO*

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

**R4-2313220 Discussion on FR2 power validation passfail limit**

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

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

**R4-2313260 On Test methodology for FR2 Channel Model Power Validation**

*Type: CR For: Agreement  
 38.151 v17.4.0 CR-0016 rev Cat: F (Rel-18)  
  
 Source: Apple*

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

**R4-2313799 FR2 CM Validation Corrections**

*Type: CR For: Agreement  
 38.151 v17.4.0 CR-0018 rev Cat: F (Rel-17)  
  
 Source: Keysight Technologies UK Ltd*

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

#### 8.16.3 FR1 MIMO OTA test methodology enhancement

**R4-2311059 on test hand phantom in MIMO**

*Type: discussion For: Agreement  
 Source: Huawei Tech.(UK)*

**Abstract:**

suggest to leave MIMO hand phantom tests to the next release

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

**R4-2311064 Power validation results at Low bands**

*Type: discussion For: Discussion  
 38.151 v CR- rev Cat: (Rel-18)  
  
 Source: MediaTek (Hefei) Inc.*

**Abstract:**

Mediatek FR1 MIMO OTA power validation results update

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

**R4-2311754 On FR1 MIMO OTA channel model validation**

*Type: discussion For: Information  
 Source: Apple*

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

**R4-2312356 CMCC&BUPT joint lab FR1 channel validation results for n1, n5, n8 and n28**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2312537 On necessity of FR1 MIMO OTA test with hand phantom**

*Type: other For: Approval  
 Source: CAICT*

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

**R4-2312899 Channel model validation results for Band n28**

*Type: other For: Discussion  
 Source: Xiaomi*

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

**R4-2312923 On FR1 MIMO OTA in browsing mode**

*Type: other For: Approval  
 Source: OPPO*

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

**R4-2313783 On Phantom Testing and QZ Sizes**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

This contribution discusses FR1 MIMO OTA testing when using phantoms

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

#### 8.16.4 MU assessment

#### 8.16.5 Performance requirements

**R4-2312510 Discussion on handling of PAD measurement results into data pool**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312538 FR1 MIMO OTA channel model validation results for band n28**

*Type: discussion For: Discussion  
 Source: CAICT*

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

**R4-2312924 On measurement campaign of FR1 MIMO OTA**

*Type: other For: Approval  
 Source: OPPO*

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

**R4-2312925 FR1 n28 channel model validation**

*Type: other For: Approval  
 Source: OPPO*

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

#### 8.16.6 Moderator summary and conclusions

**[108][331] NR\_MIMO\_OTA\_enh, AI 5.2.5 (except R4-2311231), 8.16**

**R4-2314267 Topic summary for [108][331] NR\_MIMO\_OTA\_enh**

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

**Decision: Return to**

### 8.17 BS and UE EMC enhancements

#### 8.17.1 General and work plan

#### 8.17.2 BS EMC enhancements

**R4-2312050 Discussion on MSR BS EMC test simplification**

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

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

**R4-2312290 BS EMC enhancements**

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

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

**R4-2312912 Discussion on BS EMC enhancement**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Analysis of the potential gain of BS EMC enhancement and solution of EMC enhancement for Multi-band MSR

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

**R4-2313607 Analysis of the manufacturer declarations implementation in legacy BS EMC specifications**

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

**Abstract:**

In this contribution we provide preparatory work for new EMC-specific declaration introduction, with the analysis of the legacy EMC BS specifications and the way manufacturer declarations were used there.

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

**R4-2313612 Further discussion on EMC requirements simplification for MSR BS and AAS BS**

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

**Abstract:**

In this contribution we provide further analysis and proposals related to the implementation of the MSR BS and AAS BS testing simplifications for EMC requirements.

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

**R4-2313614 draft CR to TS 37.113: example implementation of the MSR BS testing simplification**

*Type: draftCR For: Endorsement  
 37.113 v17.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on related discussion, an early draft CR was generated to initiate discussion on the implementation aspects, and to visualize the expected implementation into TS 37.113.

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

**R4-2313611 CR to TS 36.113: framework for the EMC-specific manufacturer's declarations, Rel-18**

*Type: CR For: Agreement  
 36.113 v17.1.0 CR-0088 rev Cat: F (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In order to align all BS EMC specifications, this CR mirrors modifications from TS 37.113 and TS 37.114, introducing new section for the definition of EMC-specific manufacturer declarations.

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

**R4-2312913 CR to TS 37.113 Implementation of EMC enhancements**

*Type: CR For: Agreement  
 37.113 v17.2.0 CR-0127 rev Cat: B (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Implementation of the proposed RATs reduction for both single-band and multi-band MSR

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

**R4-2313608 CR to TS 37.113: framework for the EMC-specific manufacturer's declarations, Rel-18**

*Type: CR For: Agreement  
 37.113 v17.2.0 CR-0128 rev Cat: F (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In order to properly implement EMC test reduction solution for MSR BS (i.e. new manufacturer declaration), it was identified that multiple issues related to the EMC-specific manufacturer declarations are required to be fixed first, including introduction

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

**R4-2313610 CR to TS 38.113: framework for the EMC-specific manufacturer's declarations, Rel-18**

*Type: CR For: Agreement  
 38.113 v17.4.0 CR-0064 rev Cat: F (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In order to align all BS EMC specifications, this CR mirrors modifications from TS 37.113 and TS 37.114, introducing new section for the definition of EMC-specific manufacturer declarations.

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

**R4-2313615 draft CR to TS 37.114: example implementation of the AAS BS testing simplification**

*Type: draftCR For: Endorsement  
 37.114 v17.1.0 CR- rev Cat: B (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Based on related discussion, an early draft CR was generated to initiate discussion on the implementation aspects, and to visualize the expected implementation into TS 37.114.

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

**R4-2313609 CR to TS 37.114: framework for the EMC-specific manufacturer's declarations, Rel-18**

*Type: CR For: Agreement  
 37.114 v17.1.0 CR-0107 rev Cat: F (Rel-18)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

In order to properly implement EMC test reduction solution for AAS BS (i.e. new manufacturer declaration), it was identified that multiple issues related to the EMC-specific manufacturer declarations are required to be fixed first, including introduction

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

#### 8.17.3 UE EMC enhancements

**R4-2312900 draft CR to 38.124 R18 UE EMC**

*Type: draftCR For: Endorsement  
 38.124 v17.2.0 CR- rev Cat: B (Rel-18)  
  
 Source: Xiaomi*

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

**R4-2313613 Further discussion on EMC requirements simplification for NR UE**

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

**Abstract:**

In this contribution we provide brief analysis on the band combinations selection for the NR UE test simplifications.

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

#### 8.17.4 Moderator summary and conclusions

**[108][305] NR\_LTE\_EMC\_enh, AI 4.3, 8.17**

**R4-2314241 Topic summary for [108][305] NR\_LTE\_EMC\_enh**

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

**Decision: Return to**

**Issue 2-1-1: We have two proposals, see latest WF in R4-2309861**

*o Option 1: Reduce RATs within each band.*

*o Option 2: Reduce number of bands tested.*

* **Proposals:**
  + **Proposal 1**: Reduce the RATs per band, and consider each band independently, as the first step of test simplification for multi-band MSR.
  + **Proposal 2:** Test reduction for the multi-band operation is realized band-by-band, by utilizing the RAT reductions based on manufacturer declaration, as shown in the proposed Table 2 in R4-2313612
* Recommended WF: Option 1

**Sub-topic 2-2: Manufacturer declarations framework**

**Issue 2-2-1: New table with EMC-specific manufacturer declarations for MSR BS test requirements**

* **Proposals:**
  + Proposal 1: introduce a table capturing EMC-specific manufacturer declarations in TS 37.113 and TS 37.114, including their descriptions, individual IDs
  + Proposal 2: introduce a table capturing EMC-specific manufacturer declarations in TS 36.113 and TS 38.113 (under TEI WI code), in order to keep consistency among BS specifications.
* Recommended WF: Discussion

**Issue 2-2-2: Manufacturer to declare which RATs to be tested and which are redundant.**

* **Proposal:** Start from the example in R4-2313612
* Recommended WF: Discussion

**Issue 2-2-3: Possible implementation of the new manufacturer declaration framework**

* **Proposal:** Consider R4-2313614 and R4-2313615 as a starting point
* Recommended WF: Discussion

**Sub-topic 2-3: Test simplification procedure**

* **Proposal**: The test simplification method that provided in previous meeting R4-2308998[4] can be taken as a starting point.
* Recommended WF: Discussion

**Topic #3 UE EMC**

**Issue 1**: For other emission test and other immunity test besides radiated emission and radiated immunity (i.e. RF electromagnetic field, Electrostatic discharge):

* + Option 1: one example combination of CA and DC is selected for each frequency range (i.e. FR1 only, FR1+FR2, FR2 only) if supported.
  + Option 2: only one example combination of CA and DC is selected for all the supported band combination.
* Proposed WF: Discussion is needed

### 8.18 NR demodulation performance evolution

#### 8.18.1 Advanced receiver to cancel inter-user interference for MU-MIMO

##### 8.18.1.1 Receiver assumption and NWA signaling

**R4-2311094 Discussion on the receiver assumption and signaling aspects for the advanced receiver for MU-MIMO**

*Type: discussion For: Discussion  
 Source: China Telecom*

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

**R4-2311352 On advanced receiver to cancel intra-user interference for MU-MIMO**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2311512 Discussion on Receiver assumption and NWA signaling for MU-MIMO**

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

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

**R4-2311737 On Advanced Receivers - Receiver assumption and NWA signaling**

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

**Abstract:**

This paper presents Nokia's views on various open issues with relation to receiver assumptions and NWA signalling for advanced receivers

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

**R4-2311738 Advanced Receivers - Simulation results for receiver assumption study**

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

**Abstract:**

This paper presents Nokia's simulation results for the study on blind detection for detecting interference parameters.

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

**R4-2311776 MU-MIMO advanced receiver discussion**

*Type: discussion For: Approval  
 Source: Qualcomm, Inc.*

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

**R4-2311998 Discussion on MIMO-IC on MU-MIMO**

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

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

**R4-2312354 discussion on advanced receiver assumption and NWA signaling for MU-MIMO**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2312546 On required information for MU-MIMO interference cancellation**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the required RRC-based signaling and the UE capabilities.

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

**R4-2313267 Receiver assumption and Network signalling for advanced receiver for MU-MIMO**

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

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

**R4-2313270 Draft LS on required RRC signalling for advanced receiver on MU-MIMO scenario**

*Type: LS out For: Approval  
 to RAN2  
 Source: Huawei,HiSilicon*

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

**R4-2313734 LS on UE capability and network assistant signalling for advanced receivers**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: Nokia, Nokia Shanghai Bell*

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

##### 8.18.1.2 Test parameters and simulation results

**R4-2311095 Discussion on the test parameters for the advanced receiver for MU-MIMO**

*Type: discussion For: Discussion  
 Source: China Telecom*

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

**R4-2311096 Phase I simulation results for the advanced receiver for MU-MIMO**

*Type: discussion For: Information  
 Source: China Telecom*

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

**R4-2311098 Simulation result collection for advanced receiver for MU-MIMO**

*Type: discussion For: Information  
 Source: China Telecom*

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

**R4-2311739 On Advanced Receivers - Test parameters**

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

**Abstract:**

This paper presents Nokia's views on various open issues with relation to test parameters for advanced receivers

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

**R4-2311740 Advanced Receivers - Simulation results**

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

**Abstract:**

This paper presents Nokia's simulation results for Application Layer Throughput. It includes the configurations agreed in RAN4#106bis to be highest priority.

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

**R4-2311353 On test parameters and simulation results for MU-MIMO**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2311513 Test parameters and simulation results for MU-MIMO**

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

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

**R4-2311999 Simulation results of MIMO-IC on MU-MIMO**

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

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

**R4-2312547 Simulation results for MU-MIMO interference cancellation**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution submits our simulation results for phase I study

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

**R4-2313268 Test parameters and simulation results for advanced receiver for MU-MIMO**

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

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

**R4-2313704 Simulation results of MU-MIMO R-ML receiver**

*Type: discussion For: Discussion  
 Source: Spreadtrum Communications*

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

**R4-2311097 TP to TR38.878: on the phase I conclusion for advanced receiver for MU-MIMO**

*Type: pCR For: Approval  
 38.878 v0.0.1 CR- rev Cat: (Rel-18)  
  
 Source: China Telecom*

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

**R4-2311099 TP to TR38.878: Symbols and abbreviations**

*Type: pCR For: Approval  
 38.878 v0.0.1 CR- rev Cat: (Rel-18)  
  
 Source: China Telecom*

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

**R4-2311100 Draft TR 38.878 v0.1.0 : NR demodulation performance evolution**

*Type: draft TR For: Agreement  
 38.878 v0.1.0 CR- rev Cat: (Rel-18)  
  
 Source: China Telecom*

**Abstract:**

For post-meeting e-mail approval.

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

**R4-2311514 TP for TR 38.878 Receiver structure of MU-MIMO**

*Type: pCR For: Approval  
 38.878 v0.0.1 CR- rev Cat: (Rel-18)  
  
 Source: ZTE Corporation*

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

**R4-2311741 TP for TR38.878: Summary of link level evaluation**

*Type: pCR For: Approval  
 38.878 v0.0.1 CR- rev Cat: (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Text proposal to 38.878 for link level evaluation scheleton

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

**R4-2311777 MU-MIMO TR TP**

*Type: pCR For: Approval  
 38.878 v0.0.1 CR- rev Cat: (Rel-18)  
  
 Source: Qualcomm, Inc.*

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

**R4-2312000 TP to TR38.878 on Scenario and interference modelling**

*Type: pCR For: Approval  
 38.878 v0.0.1 CR- rev Cat: (Rel-18)  
  
 Source: MediaTek inc.*

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

**R4-2312548 TP to TR38.878: Link level simulation results**

*Type: pCR For: Approval  
 38.878 v0.0.1 CR- rev Cat: (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

Re-submit the postponed TP to TR38.878

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

**R4-2313269 Draft TP on TR 38.878 Introduction on parameters for link level evaluation**

*Type: pCR For: Approval  
 38.878 v0.0.1 CR- rev Cat: (Rel-18)  
  
 Source: Huawei,HiSilicon*

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

#### 8.18.2 Absolute physical layer throughput requirements with link adaptation

**R4-2311354 Summary of simulation results for physical layer throughput requirements**

*Type: other For: Information  
 Source: Apple*

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

**R4-2311742 CR for 38.101-4: ATP requirements for FR2.1**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0392 rev Cat: F (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

CR for removal of square brackets

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

**R4-2312349 [NR\_demod\_enh3-Perf] correction CR 38.101-4 on PDSCH absolute physical layer throughput requirements**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0401 rev Cat: F (Rel-18)  
  
 Source: Samsung*

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

**R4-2313274 CR on 38.101-4: Correction on test parameters for ATP test**

*Type: CR For: Agreement  
 38.101-4 v18.0.0 CR-0409 rev Cat: F (Rel-18)  
  
 Source: Huawei,HiSilicon*

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

#### 8.18.3 Moderator summary and conclusions

**[108][326] NR\_demod\_enh3\_Part1, AI 8.18.1**

**R4-2314262 Topic summary for [108][326] NR\_demod\_enh3\_Part1**

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

**Decision: Return to**

**Issue 1-1-1: Selection of reference receiver (To be discussed on Monday)**

* *Status in the last meeting WF in R4-2309892*

|  |
| --- |
| *Candidate options:*   * + *Option 1: Down select to R-ML as the reference receiver*   + *Option 2: Make decision later*   + *Option 3: Keep open in case requirements are to be defined for up to 4 total layers and with high modulation orders* |

* Proposals:
  + Option 1: Down select to R-ML as the reference receiver (China Telecom, ZTE, MTK, Apple if assistant DCI signalling can be introduced)
  + Option 2: Keep the decision open (Nokia, Huawei)
    - HW: Make the decision on August meeting based on RAN1’s agreements.
  + Option 3: Down select to R-ML if requirements for only one advanced receiver is defined. Do not down-select if we consider to define two sets of requirements in phase II (Samsung)
* Recommended WF
  + Considering the phase I study will be completed for this meeting, can companies agree the following:
    - Down select to R-ML as the reference receiver.
    - The above decision can be revisited in case DCI-based assistant signalling cannot be introduced in RAN1.

**Issue 1-1-2: Additional assumptions to the R-ML receiver (To be discussed on Monday)**

* *Status in the last meeting WF in R4-2309892*

|  |
| --- |
| *Candidate options:*   * + *Proposal 1: The total number of layers for target and co-scheduled UE are no more than 4*   + *Proposal 2: Limit the study to DMRS configurations of dmrs-Type=1 with maxLength=1* |

* Proposals:
  + Option 1: R-ML receiver for maximum 4 layers across target and co-UE, with DMRS configuration type 1 with length 1 (Apple, ZTE, Nokia, MTK)
    - Samsung: RAN1 has decided to increase DMRS ports in Rel.18 and introduce new parameter enhanced-dmrs-Type\_r18, RAN4 should clarify whether the enhanced DMRS type introduced in Rel.18 should be considered.
  + Option 2: Not to have additional assumptions to the R-ML receiver (China Telecom, Samsung)
    - CTC: If there is a need to limit the R-ML processing complexity, use similar approach as R-ML for SU-MIMO, i.e., on each RE, the R-ML for at most X streams, where X is the total number of the target and co-scheduled layer, and X ≤ UE Rx number.
* Recommended WF
  + Need discussion on whether Rel-18 enhanced DMRS could be supported in this WI.
  + Need discussion on the 2 options above.

**Issue 1-2-1-1: The DMRS port information for the co-scheduled UE (To be discussed on Monday)**

* *Status in the last meeting WF in R4-2309892*

|  |  |  |  |
| --- | --- | --- | --- |
| ***Information*** | ***RAN4 Default assumption***  *(If N/A, how could be obtained by the UE)* | ***Signalling if RAN4 default assumption not valid*** | ***Way forward on the signalling details if introduced*** |
| *The DMRS port information for the co-scheduled UE* | *N/A (Obtained by UE blind detection)* | *N/A* | *FFS whether additional RRC based assistant signalling can be considered.* |

* Proposals on additional RRC based assistant signalling:
  + Option 1: No need to consider additional RRC signaling for DMRS port (ZTE, China Telecom, MTK, Ericsson, Huawei, Nokia in case maximum 4 layers is assumed to be handled)
  + Option 2: Introduce the assistant RRC signalling such as upper bound on number of ports of co-scheduled UEs to be detected (Samsung)
    - Spreadtrum: Observations from the simulation results
* The higher SNR point is more sensitive to the DMRS port detection error, it’s observed that DMRS port detection error leads to higher performance loss in the higher SNR case, e.g test number 5 shows 2.1dB loss due to FDRA and DMRS port blind detection error, while the corresponding loss in test number 4 is 0.3dB, while noting the two test cases show the highest difference of SNRs.
* Recommended WF
  + Option 1 considering the majorities’ view?

**Issue 1-2-1-5: Frequency domain resource allocation for the co-UE across different PRGs of the target UE (To be discussed on Monday)**

* *Status in the last meeting WF in R4-2309892*

|  |  |  |  |
| --- | --- | --- | --- |
| ***Information*** | ***RAN4 Default assumption***  *(If N/A, how could be obtained by the UE)* | ***Signalling if RAN4 default assumption not valid*** | ***Way forward on the signalling details if introduced*** |
| *Frequency domain resource allocation for the co-UE across different PRGs of the target UE:* | *N/A (Obtained by UE blind detection)* | *N/A* | *No signalling on frequency domain resource allocation information.* |

* Proposals:
  + Option 1: UE assume the same FDRA for target and co-UE, and introduce 1-bit RRC signalling to indicate if default assumption not valid (Apple)
* Recommended WF
  + Encourage feedback.

**Issue 1-2-2-2: The modulation order information of the co-scheduled UE (DCI based assistant signaling) (To be discussed on Monday)**

* *Status in the previous meetings:*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *In RAN4#106bis-e, the following assumptions for R-ML with modulation order blind detection is agreed in WF R4-2305914:*  *The following additional assumptions to the R-ML receiver can be agreed:*   * + *Within each PRB/PRG, UE applies R-ML to all interference layers with prior information that all interference layers have same modulation order*   + *FFS whether to consider the case with interference layers have different modulation orders within one or more PRBs.*   *In RAN4#107, the approved LS to RAN1 in R4-2309895 has included the complete DCI based assistant signaling for R-ML.*   |  |  | | --- | --- | | ***Bit field mapped to index*** | ***Content*** | | *0* | *No co-scheduled UE(s) which has same DMRS sequence as target UE exists* | | *1* | *In all the PRBs allocated to the target UE, all the co-scheduled UE(s), which has the same DMRS sequence as the target UE, have QPSK scheduled* | | *2* | *In all the PRBs allocated to the target UE, all the co-scheduled UE(s), which has the same DMRS sequence as the target UE, have 16QAM scheduled* | | *3* | *In all the PRBs allocated to the target UE, all the co-scheduled UE(s), which has the same DMRS sequence as the target UE, have 64QAM scheduled* | | *4* | *In all the PRBs allocated to the target UE, all the co-scheduled UE(s), which has the same DMRS sequence as the target UE, have 256QAM scheduled* | | *5* | *In all the PRBs allocated to the target UE, all the co-scheduled UE(s), which has the same DMRS sequence as the target UE, have 1024QAM scheduled* | | *6* | *Not covered by cases corresponding to index 0~5.*  *In each individual PRB allocated to the target UE, the following condition is satisfied:*  *Only single modulation order is allocated for the co-scheduled UE(s) which has the same DMRS sequence as the target UE, if the co-scheduled UE(s) exist* | | *7* | *Others* | |

* Proposals on wording updates to the previous approved LS to RAN1:
  + Proposal 1: (Qualcomm)
    - For indexes 1-5, In all the PRGs allocated to the target UE **have co-scheduled UE(s)**, which has the same DMRS sequence as the target UE, scheduled with QPSK/16QAM/… **transmission**.
    - For indexes 1-6, revise ‘PRB’ to ‘PRG’
* Proposals on alternative DCI signalling:
  + Technical concern from Qualcomm:
    - The network MU-MIMO scheduling scheme may punish the blind modulation order detection capable UE by
* Allocating the resources with aligned modulation order to the UEs without blind modulation capability and allocating the resources with misaligned modulation order to UEs with blind modulation detection capability.
  + - Then UE with blind modulation order detection capability may have worse performance
  + Option 1: 1 bit signaling without modulation order information (Qualcomm)

|  |  |
| --- | --- |
| Bit field mapped to index | Content |
| 0 | No co-scheduled UE(s) which has same DMRS sequence as target UE exists |
| 1 | Others |

* + Option 2: 2-bit signaling in which all the cases require blind modulation order detection but with different levels of complexity (Qualcomm)

|  |  |
| --- | --- |
| Bit field mapped to index | Content |
| 00 | No co-scheduled UE(s) which has same DMRS sequence as target UE exists |
| 01 | In all the PRGs allocated to the target UE, all the co-scheduled UEs, which has the same DMRS sequence as the target UE, have the same modulation order. |
| 10 | In each individual PRG allocated to the target UE, the following condition is satisfied:  Only single modulation order is allocated for the co-scheduled UE(s) which has the same DMRS sequence as the target UE, if the co-scheduled UE(s) exist |
| 11 | Others |

* Proposals in case DCI based NWA is not agreed in RAN1:
  + Option 1: RAN4 should further discuss possibility of indicating modulation order NWA via MAC-CE (Apple)
  + Option 2: E-MMSE-IRC will be selected (Huawei)
* Recommended WF
  + On wording updates to the previous approved LS to RAN1:
    - Based on proposal 1, discuss if any update on the wording of LS is needed.
  + On alternative DCI signalling:
    - The previous agreement is kept unless any new agreement can be reached.
  + Proposals in case DCI based NWA is not agreed in RAN1:
    - It is recommended to FFS this issue pending RAN1 conclusions after this meeting.

**Issue 1-2-2-4: Additional evaluation on modulation order blind detection (To be discussed on Monday)**

* *Status in the last meeting WF in R4-2309892*

|  |
| --- |
| *On the evaluation assumption of modulation order blind detection*   * + *It’s encouraged interested companies to further evaluate following case:*   + *Also evaluate the following case with more than 1 co-scheduled UEs:*     - *Target UE: Full CHBW allocation (52PRBs) with MCS 13 rank 1, 2T2R, TDLC300-100, random precoding*     - *Co-UE1: Partial CHBW allocation (0~25 PRBs) with QPSK rank 1*     - *Co-UE2: Partial CHBW allocation (26~51 PRBs) with 16QAM rank 1* |

* Proposals:
  + Option 1: RAN4 to analyse 2 co-UE with different MO and FDRA with ZP-CSI-RS aided blind detection (Nokia)
    - Nokia’s proposal on the exact evaluation assumption and ZP CSI-RS configuration:

|  |
| --- |
| Evaluate case of 2 co-scheduled UEs as proposed in WF [1] with following ZP-CSI-RS configuration:  a. Target UE: Full CHBW allocation (52PRBs) with MCS 13 rank 1, 2T2R, TDLC300-100, random precoding, DMRS port 1000. Aperiodic ZP-CSI-RS with Single port, density 0.5, l\_0=3, k\_0=0, full CHBW, triggered using DCI in every MU-MIMO slot.  Co-UEs frequency multiplexed  i. Co-UE1: Partial CHBW allocation (0~25 PRBs) with QPSK rank 1  ii. Co-UE2: Partial CHBW allocation (26~51 PRBs) with 16QAM rank 1  b. Target UE: Full CHBW allocation (52PRBs) with MCS 13 rank 1, 4T4R, TDLA30-10, random precoding, DMRS port 1000. Aperiodic ZP-CSI-RS with Single port, density 0.5, l\_0=3, k\_0=0, full CHBW, triggered using DCI in every MU-MIMO slot.  Co-UEs spatially multiplexed.  i. Co-UE1: Full CHBW allocation (0~51 PRBs) with QPSK rank 1, DMRS port 1001  ii. Co-UE2: Full CHBW allocation (0~51 PRBs) with 16QAM rank 1, DMRS port 1002 |

* Observations from the simulation results:
  + Spreadtrum: R-ML SNR loss due to modulation order detection error increases with the modulation order increment, it‘s observed that 64QAM shows the highest SNR loss among the three MOs of 64QAM, 16QAM and QPSK.
* Recommended WF
  + Encourage feedback

**Issue 1-3-1: Capability signalling for advanced receiver for MU-MIMO (If introduced) (To be discussed on Monday)**

* *Status in the last meeting WF in R4-2309892*

|  |
| --- |
| *Candidate options*   * + *Option 1: Define optional UE capability signaling on MU-MIMO advanced receiver capability:*     - *Option 1A: UE supporting R-ML receiver with and without modulation order blind detection*     - *Other options are not precluded* |

* Proposals on whether to consider UE capability signalling for Rel-18 advanced receiver for MU-MIMO:
  + Option 1: Introduce optional UE capability signaling on MU-MIMO advanced receiver (China Telecom, Apple, Nokia, MTK, Samsung)
* Proposals on UE capability signalling details:
  + On indication if a UE supports modulation order blind detection or not
    - Option 1: UE capability signaling to indicate if a UE supports modulation order blind detection or not (Nokia, Samsung, Ericsson, Apple, MTK)
* MTK: introduce 3 level UE capabilities for MIMO advanced receiver, i.e., R-ML without blind detection (bit-fields 0-5), R-ML with low complexity blind detection (bit-fields 0-6), R-ML with blind detection (bit-fields 0-7)
  + - Option 2: Define optional features based on UE’s declaration without capability signaling for UE with and without modulation order blind detection (Huawei)
    - China Telecom: RAN4 needs to discuss whether it is beneficial for the network to know the exact R-ML implementation, i.e., with or without modulation order blind detection.
  + On indication of UE maximum supported layers and modulation order:
    - Option 1: (Apple)
* Maximum number of layers of co-UE or total number of layers for joint detection
* UE capability on maximum number of DMRS ports for blind detection
  + - Option 2: (Ericsson)
* Maximum modulation orders of interfering DMRS ports supported.
* Maximum number of interfering DMRS ports supported, which is derived by subtracting the scheduled MIMO layers for the target UE from *maxNumberMIMO-LayersPDSCH*
* Recommended WF
  + It can be agreed to inform the network UE supports Rel-18 advanced receiver for MU-MIMO
  + More discussion is needed on the UE capability definition details

**[108][327] NR\_demod\_enh3\_Part2, AI 8.18.2**

**R4-2314263 Topic summary for [108][327] NR\_demod\_enh3\_Part2**

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

**Decision: Return to**

### 8.19 Study on evolution of NR duplex operation

#### 8.19.1 General and work plan

**R4-2311554 Differences in RAN1 and RAN4 assumptions for SBFD simulations**

*Type: pCR For: Approval  
 38.858 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: Spark NZ Ltd, Nokia, Nokia Shanghai Bell, Ericsson, CableLabs, Charter*

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

**R4-2311809 Draft TR 38.858**

*Type: other For: Approval  
 Source: CMCC*

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

#### 8.19.2 Study the feasibility of and impact on RF requirements

##### 8.19.2.1 Adjacent channel co-existence evaluation

**R4-2311640 SBFD adjacent channel co-existence simulation results**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2311817 Discussion on residual simulation parameters**

*Type: discussion For: Decision  
 Source: CMCC*

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

**R4-2311818 Simulation results of SBFD**

*Type: discussion For: Decision  
 Source: CMCC*

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

**R4-2312278 Results of SBFD adjacent channel co-ex study**

*Type: discussion For: Discussion  
 Source: Samsung*

**Abstract:**

Submit simulation results of SBFD co-ex study.

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

**R4-2312279 Discussions on SBFD adjacent channel co-ex study**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

Discuss the observations from submitted results.

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

**R4-2312289 Discussion on assumptions and simulation results for SBFD coexistence evaluation**

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

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

**R4-2312308 Solutions for inter-operator adjacent co-existence**

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

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

**R4-2312376 Additional simulation results related to SBFD adjacent channel coexistence evaluation**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

At the last RAN4 meeting (RAN4#107 in Incheon) simulation results from several companies were collected in the moderator summary [1]. The majority of submitted results was produced for Scenario 1, 6 and Case 1, 3. In addition [2] we also presented results

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

**R4-2312378 Further considerations on SBFD coexistence evaluation simulation assumptions**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this contribution we elaborate around some of the agreed assumption and corresponding implications on the simulation results. In this contribution we have identified some relevant observations and we present some proposals to progress the work.

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

**R4-2313096 On the co-existence study for NR duplex operation**

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

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

**R4-2313169 Simulation results for full duplex coexistence in adjacent channel scenario**

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

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

**R4-2313216 SBFD coexistence simulation results**

*Type: other For: Approval  
 Source: Qualcomm CDMA Technologies*

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

**R4-2313631 NR duplex evolution adjacent-channel coexistence simulation results**

*Type: discussion For: Discussion  
 Source: CableLabs*

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

**R4-2313817 NR duplex evolution adjacent-channel coexistence simulation results**

*Type: discussion For: Approval  
 38.858 v CR- rev Cat: (Rel-18)  
  
 Source: CableLabs, Charter Communications*

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

**R4-2312277 Draft TP to TR 38.858 on Chapter 11**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Samsung*

**Abstract:**

Contains the skeleton and 'tentative agreements' for Chapter 11 of TR 38.858.

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

**R4-2312377 TP to TR 38.858: Addition of coexistence simulation assumptions to Annex E**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

In this contribution a text proposal to TR 38.858, Annex E has been created based on input from previous agreements. The text proposal is attached at the end of this contribution, and it is presented for approval. Feedback from all participating companies

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

##### 8.19.2.2 Implementation feasibility of SBFD

**R4-2313012 TP to TR 38.858: Section 10.1 Background for analysis**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

TP for background section

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

###### 8.19.2.2.1 Feasibility of FR1 BS aspects

**R4-2313170 Further discussion on full duplex from FR1 BS perspective**

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

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

**R4-2313536 SBFD Implementation feasibility on FR1 WA BS aspects**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2311637 TP for TR 38.858 Feasibility of FR1 Local Area BS aspects**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: CATT*

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

**R4-2311638 TP for TR 38.858 Feasibility of FR1 Wide Area BS aspects**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: CATT*

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

**R4-2312288 TP to TR 38.858: Feasibility of FR1 BS aspects**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2312309 TP to TR 38.858: Self-interference analysis for FR1 Wide Area BS**

*Type: pCR For: Approval  
 38.858 v0.2.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2312310 TP to TR 38.858: Co-site inter-sector interference analysis for FR1 Wide Area BS**

*Type: pCR For: Approval  
 38.858 v0.2.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313013 TP to TR 38.858 section 10.2 Feasibility of FR1 BS aspects**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

TP for FR1 feasibility

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

**R4-2313214 TP to TR 38.858: Feasibility of FR1 wide area BS aspects**

*Type: pCR For: Approval  
 38.858 v0.1.0 CR- rev Cat: (Rel-18)  
  
 Source: Qualcomm CDMA Technologies*

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

**R4-2313537 TP to TR 38.858 on SBFD Implementation feasibility for FR1 BS**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Samsung*

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

###### 8.19.2.2.2 Feasibility of FR2 BS aspects

**R4-2312311 TP to TR 38.858: Self-interference analysis for FR2 BS**

*Type: pCR For: Approval  
 38.858 v0.2.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2312312 TP to TR 38.858: Co-site inter-sector interference analysis for FR2 BS**

*Type: pCR For: Approval  
 38.858 v0.2.0 CR- rev Cat: (Rel-18)  
  
 Source: Huawei, HiSilicon*

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

**R4-2313014 TP to TR 38.858 section 10.4 Feasibility of FR2 BS aspects**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

TP for FR2 feasibility

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

**R4-2313215 TP to TR 38.858: Feasibility of FR2 wide area BS aspects**

*Type: pCR For: Approval  
 38.858 v0.1.0 CR- rev Cat: (Rel-18)  
  
 Source: Qualcomm CDMA Technologies*

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

**R4-2313538 TP to TR 38.858 on SBFD Implementation feasibility for FR2 BS**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Samsung*

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

###### 8.19.2.2.3 Feasibility of FR1 UE aspects

**R4-2311555 TP to TR 38.858: Feasibility of FR1 UE aspects**

*Type: pCR For: Approval  
 38.858 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2312581 TP on UE aspects for FR1 in Full Duplex operation**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: vivo*

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

**R4-2312908 TP to TR 38.858 on Feasibility of FR1 UE aspects**

*Type: pCR For: Approval  
 38.858 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

In the last RAN4#107 meeting, TPs from different companies addressing the feasibility of UE aspects were consolidated and approved in [1]. This paper captured the agreements in the WF [2] and proposed some updates and comments for TR 38.858 on the Feasibi

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

**R4-2313422 TP to TR 38.858 on Feasibility of FR1 UE aspects**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: MediaTek (Shenzhen) Inc.*

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

###### 8.19.2.2.4 Feasibility of FR2 UE aspects

**R4-2311556 TP to TR 38.858: Feasibility of FR2 UE aspects**

*Type: pCR For: Approval  
 38.858 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2312582 TP on UE aspects for FR2-1 in Full Duplex operation**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: vivo*

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

**R4-2312909 TP to TR 38.858 on Feasibility of FR2-1 UE aspects**

*Type: pCR For: Approval  
 38.858 v0.4.0 CR- rev Cat: (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

In the last RAN4#107 meeting, TPs from different companies addressing the feasibility of UE aspects were consolidated and approved in [1]. This paper proposed some updates and comments for TR 38.858 on the Feasibility of UE aspects, i.e., 10.7.

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

##### 8.19.2.3 Impacts on BS RF requirements

**R4-2311639 Discussion on BS RF requirements impact for SBFD**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2311815 Discussion on SBFD BS RF requirement**

*Type: discussion For: Decision  
 Source: CMCC*

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

**R4-2312287 Discussion on BS RF requirements for SBFD**

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

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

**R4-2312313 RF requirements for SBFD operation**

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

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

**R4-2313011 SBFD BS requirements discussion**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discusses BS requirements

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

**R4-2313171 Discussion on BS RF requirement impacts from SBFD perspective**

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

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

**R4-2313539 Impact on BS RF requirements: Further Analysis and TP to TR 38.858**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Samsung*

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

##### 8.19.2.4 Impacts on UE RF requirements

**R4-2311341 On SBFD-aware UE**

*Type: discussion For: Approval  
 Source: Apple*

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

**R4-2312907 Discussion on SBFD UE RF impact**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper discusses the remaining issues on SBFD UE RF impact, particularly on the sub-band filtering for sub-band-aware UE.

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

#### 8.19.3 Summary of regulatory aspects

**R4-2311808 Discussion on regulatory requirements in China**

*Type: discussion For: Decision  
 Source: CMCC*

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

**R4-2313807 Discussion on adding references in SBFD TR 38.858 Regulatory Aspects**

*Type: discussion For: Discussion  
 Source: CableLabs*

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

**R4-2313540 Further discussion on regulatory aspects of SBFD deployment**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2313256 Sub-Band Full Duplex - TP to TR on Regulatory aspects - summary**

*Type: pCR For: Approval  
 38.858 v0.4.1 CR- rev Cat: (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

This contribution proposes a TP to TR 38.858 on the summary of the regulatory aspects for SBFD

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

**R4-2313576 Draft TP on Summary of NR duplex evolution regulatory aspects**

*Type: discussion For: Discussion  
 Source: CableLabs*

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

#### 8.19.4 Moderator summary and conclusions

**[108][306] FS\_NR\_duplex\_evo\_Part1, AI 8.19.1, 8.19.2.2.1, 8.19.2.2.2, 8.19.2.3, 8.19.3**

**R4-2314242Topic summary for [108][306] FS\_NR\_duplex\_evo\_Part1**

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

**Decision: Return to**

**Issue 1-1-1: Differences in RAN1 and RAN4 assumptions for SBFD simulations**

* Proposals/Observations from R4-2311554:
  + Observation 1. It is a common understanding that RAN1 and RAN4 have some differences in simulation assumptions for SBFD.
  + Proposal 1. To include a new section as Annex E for comparison of RAN1 and RAN4 simulation methodology, assumptions, and potential impacts on the results and conclusions as proposed below.

**Issue 2-1-1: Subband filtering feasibility**

* Proposals/Observations from Samsung:
  + Observation 1: With high Q-value RF subband filter being located between the two-stage cascaded LNAs, gNB designer could have the UL subband as passband and a few numbers of PRBs as guard band to allow a desired suppression to filter out interference signals over DL subband(s).
  + Observation 2: High Q-value RF subband filter can be achieved by considering some new structure design for ceramic dielectric filter with reasonable size/weight for compact gNB design.
  + Observation 3: With reasonable RF subband filtering design, the self-interference signal caused by non-ideal RX selectivity is much smaller than the self-interference leakage to the UL subband because of non-ideal TX.
  + Observation 4: With RF subband filtering implemented, the IM3 caused by non-ideal RX selectivity can be mitigated to the level much lower than noise floor.
* [Moderator]: Suggest to further discussion the feasibility of subband filter with the new input.

**Issue 2-1-2: Alternative solution with relaxed Q-value subband filter**

* Proposals/Observations from Samsung:
  + Observation 1: With the alternative solution with the subband filtering having a larger passband than the configured UL subband and larger transition bands for roll-off, the RF filter will be easier to be design.
* 
  + Proposal 1: RAN4 shall consider the alternative RF filter solution with subband filtering having a larger passband than the configured UL subband, which can help to improve the in-band blocking performance and keep a certain level of flexibility for SBFD subband configuration, but allow more easier RF subband filter design.
* [Moderator]: Suggest to further discussion this alternative solution for more relaxed subband filter with the new input.

**Issue 2-1-3: Multi-carrier BS analysis**

* Proposals/Observations from Samsung:
  + Observation 1: Potentially, there are 2 kinds of interpretations of “multi-carrier” support for SBFD-capable BS:
    - Interpretation-1: SBFD operates in only one BS carrier, and legacy TDD operates in other intra-band BS carrier(s) contiguous or non-contiguous to the SBFD carrier;
    - Interpretation-2: SBFD operates in more than one BS carriers, and legacy TDD operates in the other intra-band BS carrier(s) (if any), which is contiguous or non-contiguous to the SBFD carriers.
  + Proposal 1: RAN4 shall only consider the interpretation-1 of multi-carrier support for SBFD-capable BS, i.e., SBFD operates in only one BS carrier, and legacy TDD operates in other intra-band BS carrier(s) contiguous or non-contiguous to the SBFD carrier.
* [Moderator]: Suggest to check P1 can be acceptable to all.

**Issue 3-1-1: General scope**

* Proposals/Observations from CMCC:
  + Proposal 1: At study item, it’s suggested to focus on discussing which legacy requirements are still applicable, which legacy requirements are not applicable and which new requirements are needed. If there is still time left in R18, we can discuss the candidate range for RF requirement and the methodology of requirements introduction.

**Issue 3-1-2: General conclusion for conducted requirements**

* Proposals/Observations from CATT:
  + Proposal 1: The decision for other possible conducted requirements can be left to WI after the BS type decision is made.

**Issue 3-1-3: Time-domain configuration for SBFD-capable BS RF requirement**

* Proposals/Observations from Samsung:
  + Proposal 1: For SBFD-capable BS, Existing RF requirements shall be applied in the OFDM symbols others than SBFD symbols; RAN4 discussion shall only be focused on RF requirement impacts in the SBFD symbols.
  + Proposal 2: For SBFD-capable BS, RF requirement impacts for SBFD operation in symbols configured as UL in *TDD-UL-DL-ConfigCommon* shall be treated as 2nd priority. More preferably, this scenario should be precluded in Rel-18 RAN4 study.

**Issue 3-1-4: Frequency-domain configuration for SBFD-capable BS RF requirement**

* Proposals/Observations from Samsung:
  + Proposal 1: For SBFD-capable BS, RF requirement shall be discussed by restricting the maximum number of UL subbands for SBFD operation in an SBFD symbol (excluding legacy UL symbol) within a TDD carrier to be one.
* Proposals/Observations from CATT:
  + Proposal 2: RB number for DL/UL subband and the guard band need to be decided in WI phase.

**Issue 3-2-1: Base Station output power and radiated transmit power**

* Proposals/Observations from Samsung:
  + Observation 1: Based on existing agreement, RAN4 can draft text proposal for (1) Conducted/OTA base station output power and (2) Radiated transmit power
  + Issue 3-2-2: Output power dynamics
* Proposals/Observations from Samsung/CATT/ZTE/Ericsson:
  + Proposal 1 (Samsung/ZTE): For output power dynamics requirement for SBFD-capable BS:
    - RE power control dynamic range: FFS the requirement set applicability and test applicability rule in work item stage.
    - Total dynamic range: Total dynamic range requirement for non-SBFD symbols is enough for SBFD-capable BS. It is not necessary to define a new total dynamic range requirement for SBFD operation on the DL subband(s).
  + Proposal 1a (CATT): Different for SBFD slot and normal slot, but it’s not necessary to test it.
  + Proposal 2 (Ericsson) Define the total power dynamic range requirement for SBFD slots as the range from declared rated power for SBFD slots to the power level for a single RB for non-SBFD slots.

**Issue 3-2-3: Transmit ON/OFF power**

* Proposals/Observations from Samsung:
  + Observation 1: Transmitter OFF power requirement shall not be applied to SBFD operation in SBFD symbol(s).
  + Proposal 2: For transmit ON/OFF power:
    - Transmitter OFF power: Not applicable to SBFD-capable BS in SBFD symbols.
    - Transmitter transient period (between transmitter ON and OFF period): Not applicable to SBFD-capable BS in SBFD symbols.
* [Moderator] Pls. note the above discussion is about existing ON/OFF power requirement, and new requirement on transmitter transient period between SBFD and non-SBFD is discussed separately in Sub-Topic 3-4.

**Issue 3-2-4: Transmitted signal quality**

* Proposals/Observations:
  + Proposal 1 (Huawei/Samsung/Ericsson): For transmitted signal quality:
    - All the existing requirements for frequency error, modulation quality (EVM) and time alignment error (TAE) shall also be applied to BS in SBFD symbols.
  + Proposal 1a (ZTE): to reuse the existing freq error, EVM and TAE requirement for SBFD BS and further discuss the joint measurement for normal DL symbols/slots and SBFD DL symbols/slots and necessity of relaxation of measurement period.
  + Proposal 2 (Samsung): For transmitted signal quality:
    - Tests shall be performed either on the DL signal in non-SBFD DL symbols or on the DL signal on the DL subband(s) in SBFD symbols, and test applicability rule can be FFS in the work item stage.

**Issue 3-2-5: Unwanted emissions**

* Proposals/Observations on OBW from Samsung/Huawei/Ericsson/ZTE:
  + Proposal 1 (Samsung/Huawei/Ericsson/ZTE): For occupied bandwidth requirement: Apply the existing OBW requirement for the whole BS channel bandwidth in SBFD symbols.
* Proposals/Observations on OBUE from Samsung/Huawei/Ericsson/ZTE:
  + Proposal 2 (Samsung/Huawei/ZTE): For OBUE requirement: Only define OBUE requirement for the spectrum outside the whole BS channel bandwidth in SBFD symbols.
  + Proposal 3 (Ericsson): The RF bandwidth edge from which OBUE is defined is the edge of the carrier (same for both SBFD and non-SBFD slots).
* Proposals/Observations on transmitter spurious emission:
  + Proposal 3 (Samsung/ZTE): For transmitter spurious emission: All the existing requirements shall also be applied to SBFD-capable BS in SBFD symbols, except the requirement of protection of the BS receiver of own or different BS is not applicable.
  + Proposal 3a (Huawei/Ericsson): no change is needed for transmitter spurious emission
* Proposals/Observations from CMCC on “co-located with other BSs”:
  + Observation 1: legacy 30dB MCL assumption between co-located gNB will lead to blocking of SBFD receiver.
  + Proposal 4: before defining co-location requirements, it’s suggested to discuss the MCL assumption for co-location with following two kind of assumption.
    - Re-evaluate whether 30dB MCL assumption is still typical assumption since large scale antenna element is used which will contribute to directional beam compared with 2G area. This MCL is the MCL that doesn’t consider any deployment restriction or isolation material.
    - Define one typical MCL value assuming careful deployment plan and possible isolation material. This MCL value is used to show whether under careful planning, the co-location operation is feasible or not and give more guidance for commercial deployment.
  + Proposal 5: more simulation of 0% grid shift with reasonable co-location MCL assumption is required before define adjacent channel co-location requirements, e.g. ACLR, ACS and blocking requirements.
* Proposals/Observations from Huawei on co-location/co-existence:
  + Proposal 6: for co-location and co-existence with other base station in different bands, existing requirements are applicable for SBFD capable gNB.
* Proposals/Observations from Ericsson on co-location/co-existence:
  + Observation 2: Conformance to co-existence and co-location requirements is declared
  + Observation 3: Co-existence and co-location requirements are already designed to consider unsynchronized TDD between non-adjacent bands
  + Proposal 7: Use the same co-existence and co-location requirements (between bands) for SBFD slots as normal TDD. Conformance to these requirements remains declaration based.
* Proposals/Observations from CATT/ZTE on co-location/co-existence:
  + Observation 4: Co-location requirement can’t use 30 dB coupling loss as the coupling loss assumption for SBFD capable gNB co-location related requirement.

**Issue 3-2-6: Transmitter intermodulation**

* Proposals/Observations from Nokia/Huawei/ZTE:
  + Observation 1 (Nokia): The SBFD Tx IMD performance might be able to be guaranteed by the legacy Tx intermodulation requirements.
  + Proposal 1 (Huawei/ZTE): for SBFD capable gNBs, existing IMD requirements are applicable for normal DL slots and not applicable during SBFD time slots.
  + Proposal 1a (ZTE): if Tx requirement is considered for SBFD slots, then to add the Refsens degradation as one more performance metric in addition to transmitter OBUE/ACLR/spurious emission requirements.
* Proposals/Observations from Samsung/Ericsson:
  + Proposal 3 (Samsung/Ericsson): The transmitter intermodulation requirement shall still be applicable during SBFD symbols:
    - Proposal 3a (Samsung): Whether or not RAN4 can reuse the interfering signal level with 30dB coupling loss can be further discussed in work item stage.
    - Proposal 3b (Ericsson): The SBFD BS is not expected to receive in the RX sub-band during TX IMD testing.
  + Proposal 4 (Samsung): The transmitter intermodulation level shall not exceed the unwanted emission limits in clauses 6.6.3, 6.6.4 and 6.6.5 in the presence of an NR interfering signal.
    - No need to consider receiver degradation for transmitter intermodulation requirement.
* Proposals/Observations from CMCC:
  + Proposal 5: before defining Tx IMD requirements during SBFD time slot, it’s suggested to find out whether co-located gNB would block SBFD receiver.
* Proposals/Observations from CATT:
  + Proposal 6: Revisit the following agreement in last RAN4 meeting,
    - Existing IMD requirements still applicable for normal DL slots on SBFD capable gNBs
  + Proposal 7: The co-location scenario should be revisited for SBFD deployment. How the co-location BS works on the SBFD slots should be considered.

**Issue 3-3-1: Reference sensitivity level and OTA sensitivity**

[Moderator] Existing agreement from last meeting:

|  |
| --- |
| **Issue 3-1-1: Conducted/OTA sensitivity within SBFD time slot**   * Agreement:   + New OTA sensitivity requirements in SBFD time slot with self-interference only can be specified     - Candidate value [0.5 ~1.0] dB degradation       * Final value will be specified in WI phase.     - FFS how to address the digital IC impact on requirement definitions for the case with separate RRU and BBU in gNB     - FFS whether the conductive sensitivity requirements needed or not |

* Proposals/Observations from Samsung:
  + Proposal 1: For conducted reference sensitivity level:
    - The existing requirement for conducted reference sensitivity level shall also be applied to BS in SBFD symbols, i.e, no degradation allowed.
    - Self-interference from TX from transmission in the DL subband(s) is not relevant in the conducted testing.
    - UL subband bandwidth shall be used for BS channel bandwidth in the existing requirement.
* Proposal from CATT:
  + Proposal 1: No conducted REFSENS requirement is needed for SBFD slot.
* Proposal from Huawei:
  + Proposal 2: New OTA sensitivity requirements in SBFD time slot with self-interference only need to be specified in WI phase
    - Candidate value [0.5 ~1.0] dB degradation
      * Final value will be specified in WI phase.
* Proposal from ZTE:
  + Proposal 3a: for the conducted refsens conformance testing, the antenna should be installed during the conformance testing otherwise there are no self interference injected by the OTA.
  + Proposal 3b: for Refsens of SBFD symbols/slots, to define two set of requirement: 1) self interference; 2) self interference+ inter-sector co-channel interference;
  + Proposal 3c: further discuss the degradation levels for Set 1 requirement and Set 2 requirement;
  + Proposal 3d: to further discuss the FRC for Refsens of SBFD UL symbols/slots in the WID phase.
  + Proposal 3f: propose not to consider the digital IC impacts explicitly in SBFD BS conformance testing which is up to the implementation.
  + Proposal 3g: to de-prioritize or not define the conducted conformance testing for SBFD BS if the radiated conformance testing is mandatory.
  + Proposal 3h: for the co-site inter-sector, in-channel blocking, in-channel selectivity and in-channel sub-band leakage, this could be left up to the vendor declaration without defining any specific power or freq offset of the corresponding requirement.
  + Proposal 3i: for the inter-site scenario, propose to further discuss how to handle the BS CLI problem e.g. with RAN4 minimum RF requirement (usually worst assumptions) or with other coordination schemes defined in other WGs.

Issue 3-3-2: Dynamic range

* Proposals/Observations from Samsung/Huawei:
  + Proposal 1: Conducted dynamic range: The existing requirements shall also be applied to BS in SBFD symbols, and self-interference from TX from transmission in the DL subband(s) is not relevant in the conducted testing.
  + Proposal 2: OTA dynamic range: The existing requirements shall also be applied to BS in SBFD symbols and the self-interference impact can be ignored.
* Proposals/Observations from CMCC:
  + Proposal 3: new requirement is needed to evaluate SBFD receiver to receive wanted signal with presence of AWGN interference signal on top of residual self-interference.
* Proposals/Observations from CATT:
  + Proposal 5: Different for SBFD slot and normal slot, but it’s not necessary to test it.
* Proposals/Observations from ZTE:
  + Proposal 6a: for dynamic range requirement of SBFD UL symbols/slots, to consider both DL transmission as interfer in addition to wide-band AGWN interfer and UL configuration as wanted signal;
  + Proposal 6b: to further discuss the IoT level for dynamic range requirement of SBFD uplink symbols/slots;
  + Proposal 6c: to further discuss the FRC for wanted signal and interference signal for dynmic range requirement of SBFD UL symbols/slots in the WID phase.

**Issue 3-3-3: In-band selectivity and blocking**

* Proposals/Observations from Samsung:
  + Proposal 1: ACS requirement shall be determined by RAN4 co-existence study, and for the definition of ACS requirement:
    - Conducted ACS: Self-interference from TX from transmission in the DL subband(s) is not relevant in the conducted testing.
    - OTA ACS: The OTA sensitivity degradation shall be taken into account to determine the level of wanted signal and interference signal mean power.
  + Proposal 2: For in-band blocking requirement:
    - Conducted in-band blocking: Self-interference from TX from transmission in the DL subband(s) is not relevant in the conducted testing.
    - OTA in-band blocking: The OTA sensitivity degradation shall be taken into account to determine the level of wanted signal and interference signal mean power.
  + Proposal 3: For ACS and in-band blocking, the requirements shall be defined out of the BS channel bandwidth instead of uplink subband.
* Proposals/Observations from Ericsson:
  + Observation 1: For SBFD, the RX blocking requirement is based on signal levels from the DL of other operators BS.
  + Observation 2: There are no requirements enabling co-location of SBFD with another operators BS. A blocking requirement considering co-located BS could be introduced, however it would not enable co-location as the other operators BS TX emissions would still badly desensitize the SBFD receiver.
  + Observation 3: Co-location of SBFD BS with other operators BS is not possible.
  + Proposal 4: Study further the DL signal level from other operator BS to assume when defining the SBFD RX blocking requirement.
* Proposals/Observations from ZTE:
  + Proposal 5a: for ACS, IBB, NBB requirement, propose to consider this requirement out of uplink carrier bandwidth instead of uplink sub-band.
  + Proposal 5b: to consider two sets of requirement for ACS/IBB/NBB requirement: 1) with the self interference only; 2) with self interference and in-sector co-channel interference;

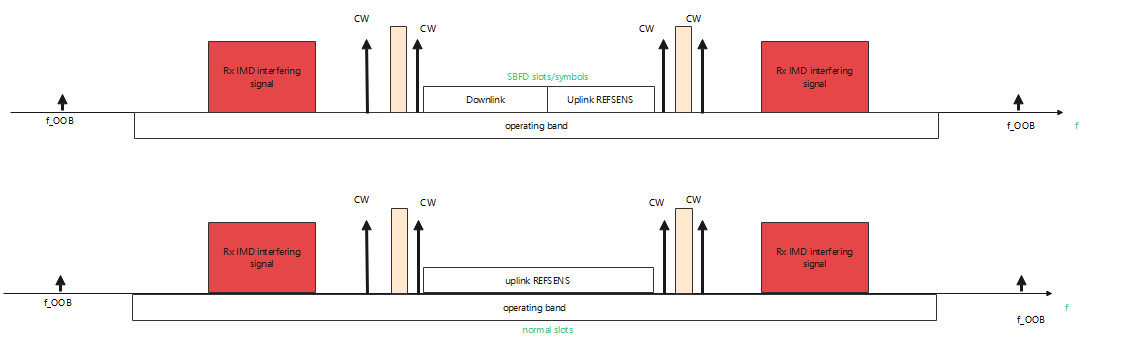
**Issue 3-3-4: Out-of-band blocking**

* Proposals/Observations:
  + Proposal 1 (Samsung): For out-of-band blocking requirement:
    - Conducted out-of-band blocking: Self-interference from TX from transmission in the DL subband(s) is not relevant in the conducted testing.
    - OTA out-of-band blocking: The OTA sensitivity degradation shall be taken into account to determine the level of wanted signal and interference signal mean power.
  + Proposal 2 (Huawei/Ericsson): no change is needed for Receiver spurious emission, out-of-band blocking.
  + Proposal 3 (ZTE):
    - Proposal 3a: for general OOBB requirement, the existing interfering power level for SBFD UL symbols/slot are applicable, wanted signal of general OOBB requirement should consider the self interference and in-sector co-channel interference in addition to OOBB interfer power;
    - Proposal 3b: FFS for co-location OOBB requirement similar as co-location spurious emission and Tx intermodulation requirement;

**Issue 3-3-5: Receiver spurious emissions**

* Proposals/Observations from Samsung/Huawei/Ericsson/ZTE:
  + Proposal 1 (Samsung/Huawei/Ericsson/ZTE): For receiver spurious emissions (for both conducted and OTA tests): Apart from existing requirements for normal reception on UL symbols, no need to specify additional receiver spurious emissions requirement for SBFD operation in SBFD symbols.

**Issue 3-3-6: Receiver intermodulation**

* Proposals/Observations:
  + Proposal 1 (Samsung/Ericsson): For receiver intermodulation requirement:
    - Conducted receiver intermodulation: Self-interference from TX from transmission in the DL subband(s) is not relevant in the conducted testing.
    - OTA receiver intermodulation: The OTA sensitivity degradation shall be taken into account to determine the level of wanted signal and interference signal mean power.
  + Proposal 1a (Ericsson): Investigate whether an additional requirement based on a single input signal placed to cause IM with the RX sub-band provides any additional robustness, and whether such a requirement is anyhow implicitly captured by the SBFD RX blocking requirement.
  + Proposal 2 (Huawei): No specific receiver intermodulation is needed for SBFD
  + Proposal 3 (ZTE): for receiver intermodulation requirement in the SBFD uplink symbols/slot, further consider IMD between CW/NBB/general intermodulation interfering signal intermodulate with SBFD DL transmission as shown in Figure 2.2.6-1.
* 
* Figure 2.2.6-1: Example of Rx intermodulation requirement for SBFD BS

**Issue 3-3-7: In-channel selectivity**

* Proposals/Observations from Samsung/CATT:
  + Proposal 1 (Samsung): For in-channel selectivity: Except the wanted signal and interfering signal shall be located in the configured UL subband, the existing requirements for in-channel selectivity shall still be applied.
  + Proposal 1a (CATT): Requirements are different for SBFD slot and normal slot, but it’s not necessary to test it.
  + Proposal 2 (ZTE):
    - Proposal 2a: for ICS requirement of SBFD UL symbols/slots, to consider both DL transmission as interfer in addition to image interfer and UL configuration as wanted signal;
    - Proposal 2b: to further discuss the IoT level for ICS requirement of SBFD uplink symbols/slots;
    - Proposal 2c: to further discuss the FRC for wanted signal and interference signal for ICS requirement of SBFD UL symbols/slots in the WID phase.

**Sub-topic 3-4: Potentially new requirements for SBFD operation**

*Sub-topic description:*

**Issue 3-4-1: Transmitter transient period between SBFD and non-SBFD**

* Proposals/Observations from Samsung/Nokia/Ericsson:
  + Proposal 1 (Samsung/Nokia/Ericsson/ZTE): For transmitter transient period between SBFD and non-SBFD: New requirement shall be introduced to BS in SBFD symbols, by defining the transient period as the time period which the transmitter is changing from the SBFD operation to non-SBFD operation or vice versa.
* Proposals/Observations from Ericsson:
  + Observation 1 (Ericsson): The same considerations on inter-site interference due to switching occur for SBFD resources when switched between TX/RX as when the whole slot is switched.
  + Proposal 2 (Ericsson): Apply the TDD switching time and off level requirement to SBFD RBs when they are switched between TX and RX.
* Proposals/Observations from Huawei/CATT:
  + Proposal 3: Transmitter ON-OFF power and transition period for SBFD operation can be covered by regular TDD requirement and no new specific to SBFD is needed.
  + Proposal 4: The transition period between the SBFD slot and the normal slot is left to implementation.
* Proposals/Observations from ZTE:
  + Proposal 5: to consider the guard periods at the beginning of SBFD UL symbols/slots.

**Issue 3-4-2: In-channel adjacent subband leakage ratio, In-channel adjacent subband Blocking and adjacent subband selectivity**

* Proposals/Observations from Samsung:
  + Proposal 1: For SBFD-capable gNB, RAN4 shall not introduce new in-channel adjacent subband requirements, including:
    - in-channel adjacent subband leakage ratio,
    - in-channel adjacent subband blocking and
    - in-channel adjacent subband selectivity.
* Proposals/Observations from CMCC/Nokia/Huawei/Ericsson/CATT:
  + Proposal 2 (CMCC/Nokia/Huawei/Ericsson/CATT): new RF requirements should be specified for co-site inter-sector gNB and inter-site gNB, following list the candidate options, partial or all of which can be defined in WI stage.
    - in-channel adjacent subband leakage ratio,
    - in-channel adjacent subband blocking and
    - in-channel adjacent subband selectivity.
    - Adjacent sub-band SEM requirements (Moderator: Need to double check?)
  + Proposal 2a (Huawei): Following new RF requirements can be specified for co-site inter-sector and/or inter-site interference in WI phase:
    - In-channel adjacent sub-band blocking requirements
      * Cover both blocking and adjacent sub-band selectivity
    - In-channel adjacent sub-band leakage requirements
      * 45 dB PSD difference for FR1 and 28 dB PSD difference for FR2-1 can be used as a starting point
  + Proposal 2b (Ericsson): Consider a requirement on the absolute level of emissions in the RX sub-band
  + Proposal 2c (CATT): Whether both conducted and OTA requirements are defined can be decided in WI phase.
  + Proposal 2d (ZTE): for in-channel emission, to consider this emission in the gNB Refsens degradation via self interference and inter-sector interference as shown in Figure 2.1.4-1 implicitly.

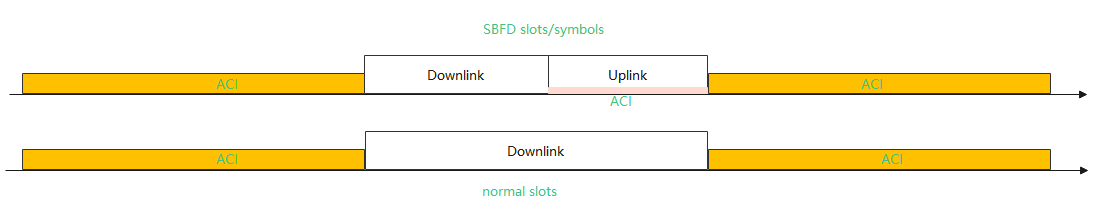


Figure 2.1.4-1: Example of ACLR requirement of SBFD slots

* [Moderator]: (1) Diverged views on this issue. (2)Need to align the terminology firstly, consider the following based on previous WF:
  + in-channel adjacent subband leakage ratio,
  + in-channel adjacent subband blocking and
  + in-channel adjacent subband selectivity.

**[108][307] FS\_NR\_duplex\_evo\_Part2, AI 8.19.2.2.3, 8.19.2.2.4, 8.19.2.4**

**R4-2314243 Topic summary for [108][307] FS\_NR\_duplex\_evo\_Part2**

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

**Decision: Return to**

**Issue 2-1: Company views on subband filtering**

* Proposals
  + Proposal 1: As before companies are encouraged to provide their views on any aspects of the UE, including, for example ,subband filtering.
* Recommended WF
  + Proposal 1

**[108][308] FS\_NR\_duplex\_evo\_Part3, AI 8.19.2.1**

**R4-2314244 Topic summary for [108][308] FS\_NR\_duplex\_evo\_Part3**

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

**Decision: Return to**

**Topic #1 Simulation assumption**

**Issue 1-1: LS**

* Proposals
  + Option 1: RAN4 should consider sending an LS to RAN1 describing the observed detrimental BS-to-BS interference for legacy TDD networks when SBFD operates in UL slots. (CableLabs)

*Moderator note: this meeting is the last meeting for RAN1 SBFD, I’m afraid even if we send the LS to RAN1 in this meeting, it’s too late.*

* Recommended WF
  + Further discuss the necessity of the LS and how could RAN1 receive this LS on time.

**Issue 1-5-1: priority of scenarios and cases**

* Proposals
  + Option 1: Based on input from RAN LS set high priority for Scenario 4 and Case 1 and 2 for all Scenarios. (Ericsson)
* Recommended WF
  + For scenario 4, high priority.
  + For other scenarios, maintain previous priority.

**Issue 1-5-2: Tx power and bandwidth for UMi-to-UMi scenario**

* Proposals
  + Option 1: 46dBm/100MHz
  + Option 2: 38dBm/100MHz
    - but the per antenna element port power is 29 dBm, hence the rationale for using this 38 dBm power level needs to be further clarified. (CableLabs)
  + Option 3: 36dBm/10MHz

Further study the priority of above options. Initial simulation results show final conclusion is sensitive to above parameters. If there is no consensus, both option 1 and option 2 as high priority and companies choose either one or both in their simulation

* Recommended WF
  + both option 1 and option 2 as high priority and companies choose either one or both in their simulation.

**Issue 1-5-3: except for above parameters, other parameters for UMi-to-UMi scenario**

* Proposals
  + Option 1: the same as used in Uma-to-UMi scenario, i.e. defined in R4-2305922
  + Option 2: TBA
* Recommended WF
  + TBD.

**Topic #2 collection of simulation results**

###### Sub-topic 2-2 Scenario 1 FR1 Urban Macro -> Urban Macro (High priority)

**Case 1: aggressor SBFD DU victim NR TDD DL (high priority)**

|  |
| --- |
| Tentative Agreement in last meeting:  All the simulation results for 100% grid shift show SINR/throughput degradation is acceptable. |

Samsung, CMCC, Nokia, Ericsson, ZTE, Qualcomm, CableLabs, CATT companies (8) have contributed simulation results in this meeting.

* Recommended WF
  + All the simulation results for 100% grid shift and baseline assumption show SINR/throughput degradation is acceptable for both SBFD antenna configuration 1 and 2.

Detailed summary of simulation results are listed as below:

* For SBFD interfere legacy TDD DL:
  + at cell-average, the interference lead to less than 5% throughput loss (Samsung for both antenna configuration 1 and 2, CMCC, Nokia, Ericsson, ZTE, Qualcomm, CableLabs, CATT)
  + at cell edge, the interference lead to less than 5% or around 5%. (Samsung:around 5% throughput loss for both antenna configuration 1 and 2, CMCC, Nokia, Ericsson, ZTE, Qualcomm, CableLabs, CATT)

**Case 3: aggressor NR TDD DL victim SBFD DU (high priority)**

Samsung, CMCC, Nokia, Ericsson, ZTE, Qualcomm, CableLabs, Huawei, CATT companies (9) have contributed simulation results in this meeting.

Recommended WF is as below

* For aggressor NR TDD DL interfere SBFD UL:
  + For 100% grid shift, interference is higher than 5% throughput loss is observed.
    - [The degradation is even worse for less grid shift.]
  + But no 100% UL throughput loss is observed at SBFD receiver, this implies there is still UL throughput gain for SBFD for the cell not blocked.
  + Regarding blocking probability, only one company show the results e.g. 2% blocking from Ericsson, any inputs are welcome.
* For aggressor NR TDD DL interfere SBFD DL: TBD

Detailed summary of simulation results are listed as below:

* For legacy TDD DL interfere SBFD UL:
  + at cell-average,
    - most companies show the interference lead to higher than 5% throughput loss (Nokia 14.5% loss for 100% grid shift and 42.6% loss for 10% grid shift; Ericsson 15% degradation; ZTE 76.99% degradation; Qualcomm7.35% degradation; CMCC severe interference; Huawei severe interference; CATT; CableLabs 14% degradation with 100% grid shift, and the degradation increases to 30%, 49%, 67%, and 78% when the grid shift is reduced to 50% (144 m), 25% (72 m), 10% (29 m), and 5% (14 m))
    - Whereas one company show the interference is around 5%. (Samsung)
  + at cell edge, interference is higher than 5% (Samsung, Nokia 32.2% degradation for 100% grid shift and 100% loss for 10% grid shift; Ericsson 60% degradation; ZTE 13% degradation; Qualcomm 47.63% degradation; CMCC 70% degradation; Huawei severe degradation; CATT).
  + Regarding blocking
    - Ericsson: In FR1, approximately a 2% of blocking probability is observed in our simulation, due to the CLI generated by the DL of legacy TDD neighbour operator. This probability of blocking, together with the increment in resulting noise figure, as defined by the blocking model, harmfully impacts the UL performance of SBFD network in such a way that even increasing the BS-BS ACIR, it is not possible to reduce the degradation to an acceptable level, below 5%, with respect to the baseline.
    - Ericsson: The increment of ACIR\_BS\_BS can reduce the impact of BS-to-BS interference, but cannot reduce the risk of blocking of the receiver
* For legacy TDD DL interfere SBFD DL:
  + at cell-average, interference is acceptable (Samsung for antenna configuration 1 and 2, ZTE, Qualcomm, CMCC, CATT).
  + at cell edge,
    - Some companies’ simulation results show the interference is larger than 5% (Samsung for antenna configuration 1; Nokia 10% loss degradation for 100% grid sfhit and 12.6% for 10% grid sfhit)
    - Some companies simulation results show the interference is acceptable with current or increased ACIR (Samsung for antenna configuration 2, ZTE, Qualcomm, CMCC, CATT when SBFD ACS is increased to 36dB)

###### Sub-topic 2-7 Scenario 6 FR2 Urban Macro -> Urban Macro (high priority)

**Case 1: aggressor SBFD DU victim NR TDD DL (high priority)**

Tentative agreements approved in last meeting is listed as below:

|  |
| --- |
| Tentative agreement:  All the simulation results with 100% grid shift based on baseline assumption show SINR/throughput degradation is acceptable. |

Samsung, CMCC, Ericsson, ZTE, Qualcomm, CableLabs, CATT companies (7) have contributed simulation results in this meeting.

* Recommended WF
* All the simulation results for 100% grid shift show SINR/throughput degradation is acceptable with current or enhanced ACIR.

Detailed summary of simulation results are listed as below:

* For SBFD interfere legacy TDD DL:
  + at cell-average, the interference lead to less than 5% throughput loss (Samsung for both antenna configuration 1 and 2. Ericsson, ZTE, Qualcomm, CableLabs, CATT)
    - Compared with baseline, the degradation is negligible (Samsung)
  + at cell edge, the interference lead to less than 5% throughput loss (Samsung for both antenna configuration 1 and 2. ZTE, Qualcomm, CableLabs, CATT) and one company show slightly degradation and 2dB enhancement of ACIR is required (Ericsson)

**Case 3: aggressor NR TDD DL victim SBFD DU (high priority)**

Samsung, CMCC, Ericsson, ZTE, Qualcomm, CableLabs, CATT companies (7) have contributed simulation results in this meeting.

Recommended WF is as below

* For aggressor NR TDD DL interfere SBFD UL:
  + For 100% grid shift, interference is acceptable with current or increased ACIR
  + For less than 100% grid shift or BS power is increased, interference maybe larger than 5% loss and one company show 4% blocking probability at cell edge
* For aggressor NR TDD DL interfere SBFD DL: interference is acceptable for 100% grid shift.

Detailed summary of simulation results are listed as below:

* For legacy TDD DL interfere SBFD UL:
  + at cell-average,
    - for 100% grid shift, the interference is less than 5% (Samsung for antenna configuration 1 and 2, Qualcomm, CableLabs, CMCC, Ericsson, CATT)
    - For less than 100% grid shift or BS power is increased, the interference is larger than 5% loss (Ericsson, Cable labs degradation is 6%, and 12% when the grid shift is reduced to 25% (29 m), and 10% (12 m))
  + at cell edge,
    - for 100% grid shift, Some companies results show the interference is less than 5% (Samsung for antenna configuration 1 and 2, Qualcomm, CMCC, CATT)
    - For 100% grid shift, some companies results interference is acceptable by increasing ACIR (ZTE 13.12%, CableLabs 6% for 100% grid shift)
    - For less than 100% grid shift or BS power is increased, some companies results show larger than 5% degradation ( Ericsson 4% blocking occurs, CableLabs the degradation increases to 100% when the grid shift is 50% (58 m) or larger)
* For legacy TDD DL interfere SBFD DL:
  + at cell-average, the interference is less than 5%(Samsung for antenna configuration 1 and 2, Qualcomm, CMCC, CATT).
  + at cell edge, the interference is acceptable with current or increased UE ACS (Samsung slightly higher than 5% for antenna configuration 1 and less than 5% for antenna configuration 2, Qualcomm, CMCC, CATT with 36dB ACS )

###### Sub-topic 2-3 Scenario 2 FR1 Urban Hotspot -> Urban Hotspot (2nd priority)

**Case 1: aggressor SBFD DU victim NR TDD DL (high priority)**

Nokia, Ericsson, Qualcomm, CableLabs companies (4) have contributed simulation results in this meeting.

More input is welcome before making conclusion.

Detailed summary of simulation results are listed as below:

* For SBFD interfere legacy TDD DL,:
  + at cell-average,
    - some companies show the interference lead to larger than 5% throughput loss (Nokia 11%, CableLabs 10% degradation)
    - whereas other companies show interference is acceptable with current or enhanced ACIR (Qualcomm) .
  + at cell edge,
    - some companies show the interference is acceptable with current or enhanced ACIR (Qualcomm, Ericsson 8.7% degradation respect to ACIR and interference is acceptable when ACIR increment up to at least 34 dB)
    - whereabs other companies show interference is larger than 5% (Nokia 42%, CableLabs 40% degradation)

**Case 3: aggressor NR TDD DL victim SBFD DU (high priority)**

Ericsson, CableLabs, Qualcomm, Nokia companies (4) have contributed simulation results in this meeting.

Recommended WF is as below (similar as case 3 of scenario 1)

* For NR TDD DL interfere SBFD UL:
  + For 100% grid shift, interference is higher than 5% throughput loss is observed.
    - [The degradation is even worse for less grid shift.]
  + But no 100% UL throughput loss is observed at SBFD receiver, this implies there is still UL throughput gain for SBFD for the cell not blocked.
  + Regarding blocking probability, only one company show the results, any inputs are welcome.
* For NR TDD DL interfere SBFD UL: wait for more input

###### Sub-topic 2-4 Scenario 3 FR1 Indoor -> Indoor (2nd priority)

Samsung, Qualcomm, ZTE companies(3) have contributed simulation results in this meeting.

Recommended WF for FR1 indoor -> indoor scenario

* Under baseline assumptions and 100% grid shift, the interference between legacy TDD and SBFD using adjacent channel is acceptable, i.e. less than 5% for both SBFD antenna configuration 1 and configuration 2.

###### Sub-topic 2-5 Scenario 4 FR1 UMa-to-UMi (2nd priority)

**Case 1: aggressor SBFD DU victim NR TDD DL (high priority)**

Samsung, Nokia, Qualcomm, CableLabs companies (4) have contributed simulation results in this meeting.

* Recommended WF
* All the simulation results for 100% grid shift and baseline assumption show SINR/throughput degradation is acceptable.

Detailed summary of simulation results are listed as below:

* For SBFD interfere legacy TDD DL:
  + at cell-average, the interference lead to less less than 5% throughput loss . (Samsung for both antenna configuration 1 and 2, Nokia, Qualcomm, CableLabs)
    - In UMa-to-UMi scenario Case 1, the TDD DL degradation due to the presence of TDD DL or SBFD in the adjacent channel is quite similar. (Nokia)
  + at cell edge, the interference lead to less than 5% throughput loss. (Samsung for both antenna configuration 1 and 2, Qualcomm) or slightly larger than 5% loss (CableLabs 6%) or much larger (Nokia 13.4%)

###### Sub-topic 2-6 Scenario 5 FR1 UMi -> FR1 UMi (2nd priority)

**Case 1: aggressor SBFD DU victim NR TDD DL (high priority)**

Samsung, Nokia, ZTE, Qualcomm, CableLabs, CMCC companies (6) have contributed simulation results in this meeting.

* Recommended WF
* All the simulation results for 100% grid shift show SINR/throughput degradation is acceptable whether the gNB Tx power is 46dBm/100M or 38dBm/100MHz.

Detailed summary of simulation results are listed as below:

* For SBFD interfere legacy TDD DL:
  + at cell-average, the interference lead to less than 5% throughput loss . (Samsung for both antenna configuration 1 and 2, ZTE, Nokia, Qualcomm, CableLabs, CMCC)
    - the SBFD shows higher degradation than TDD DL due to the presence of UE-to-UE ACI (Nokia)
  + at cell edge, some companies simulation results show the interference lead to less than 5% throughput loss . (Samsung for both antenna configuration 1 and 2, ZTE, Qualcomm, CMCC) and some companies show slightly larger than 5% (CableLabs 7%, Nokia 7.9%)
    - the SBFD shows higher degradation than TDD DL due to the presence of UE-to-UE ACI (Nokia)

**Case 3: aggressor NR TDD DL victim SBFD DU (high priority)**

Samsung, CMCC, ZTE, Qualcomm, CableLabs, companies (5) have contributed simulation results in this meeting.

Recommended WF is as below

* For aggressor NR TDD DL interfere SBFD UL:
  + For 100% grid shift, simulation results are much sensitive to gNB Tx power. For lower power, i.e. 38dBm/100MHz, interference is acceptable with current or enhanced ACIR whereas for high power, i.e. 46dBm/100MHz interference is higher than 5% throughput loss is observed.
* For aggressor NR TDD DL interfere SBFD DL: interference is acceptable

Detailed summary of simulation results are listed as below:

* For legacy TDD DL interfere SBFD UL:
  + at cell-average,
    - Some companies simulation show the interference is less than 5% (Samsung for antenna configuration 1 and 2, ZTE, Qualcomm, CMCC)
    - whereas other companies simulation show larger than 5% (CableLabs degraded by 12%, and the degradation increases to 25%, 47%, and 74% when the grid shift is reduced to 50% (83 m), 25% (42 m), and 10% (17 m))
  + at cell edge,
    - Some companies simulation show the interference is less than 5% (Samsung for antenna configuration 1 and 2, Qualcomm )
    - whereas other companies simulation show larger than 5% ( ZTE 15.41% degradation with current ACIR but could be acceptable by enhance ACIR, 100% degradation for CableLabs)
* For legacy TDD DL interfere SBFD DL:
  + at cell-average, the interference is less than 5% (Samsung for antenna configuration 1 and 2, ZTE, Qualcomm, CMCC).
  + at cell edge, the interference is less than 5% (Samsung for antenna configuration 1 and 2, ZTE, Qualcomm, CMCC)

### 8.26 NR NTN enhancement

#### 8.26.1 General and work plan

##### 8.26.1.1 System parameters

**R4-2311642 Discussion on the remaining issues for NTN system parameters**

*Type: other For: Approval  
 Source: CATT*

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

**R4-2313172 Further discussion on system parameter for NTN in Ka band**

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

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

**R4-2313238 NTN enhancement: System parameters**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses the system parameters and band definitions for NTN enhancements

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

##### 8.26.1.2 Regulatory information

**R4-2313242 CR to TS 38.863: NTN Ka-band – Regulatory aspects**

*Type: CR For: Agreement  
 38.863 v17.2.0 CR-0007 rev Cat: B (Rel-18)  
  
 Source: Ericsson*

**Abstract:**

This contribution is a CR to TR 38.863 related to regulatory aspects of the NTN Ka-band

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

##### 8.26.1.3 Others

**R4-2311232 On DMRS bundling with doppler pre-compensation for NTN**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2312976 Discussion on DMRS bundling**

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

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

**R4-2313459 On PUSCH DMRS bundling for NR NTN coverage enhancement**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this contribution, we present our view on the PUSCH DMRS bundling for NR NTN coverage enhancement from RAN1 LS [1].

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

**R4-2313643 Discussion on LS on PUSCH DMRS bundling for NR NTN coverage enhancement**

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

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

**R4-2313845 NTN UE types above 10 GHz and beam steering**

*Type: discussion For: Discussion  
 Source: Inmarsat*

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

#### 8.26.2 Co-existence study for above 10GHz bands

**R4-2311600 Further discussion on remaining issues about simulation assumptions for above 10GHz NTN co-existence study**

*Type: other For: Approval  
 Source: CATT*

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

**R4-2311602 Ka-band NTN co-existence calibration result**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2312443 Updates on NTN calibration and coexistence simulation results for above 10 GHz**

*Type: discussion For: Discussion  
 Source: THALES, Magister Solutions Ltd*

**Abstract:**

The scope of this document is to provide updated calibration/simulation results and proposals to clarify the calibration/simulation assumptions.

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

**R4-2312891 Simulation assumptions for NTN co-existence above 10GHz bands**

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

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

**R4-2312973 Initial simulation results for Rel-18 NTN coexistence study**

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

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

**R4-2312974 Discussion on Rel-18 NTN coexistence study assumption**

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

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

**R4-2313087 Discussion of simulation assumptions and temporary results for above 10GHz NTN co-existence study**

*Type: discussion For: Discussion  
 Source: Samsung Electronics Nordic AB*

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

**R4-2313101 Simulation calibration assumptions and results for above 10GHz NTN co-existence study**

*Type: discussion For: Discussion  
 Source: Samsung Electronics Nordic AB*

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

**R4-2313173 Further discussion on simulation assumption and calibration data for NTN in Ka band**

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

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

**R4-2313239 NTN enhancement: coexistence simulations assumptions**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses the coexistence scenarios and associated assumptions for NTN operation in the Ka-band

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

**R4-2313240 NTN enhancement: coexistence simulations results**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution shares our simluation results for the coexistence study on NTN operation in the Ka-band

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

#### 8.26.3 SAN RF requirements

**R4-2311601 Further discussion on SAN RF requirements for above 10GHz bands**

*Type: other For: Approval  
 Source: CATT*

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

**R4-2312758 SAN requirements and NF in above 10 GHz**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

This contribution considers specific NTN SAN requirements and NTN SAN NF values to be considered for NTN in above 10 GHz.

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

#### 8.26.6 Moderator summary and conclusions

**[108][309] NR\_NTN\_enh\_Part1, AI 8.26.1**

**R4-2314245 Topic summary for [108][309] NR\_NTN\_enh\_Part1**

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

**Decision: Return to**

**Topic #1 30MH CHBW request**

**Issue 1-1-1:** Smaller CBW

* Proposals
  + Option 1: The small CBW request should be proposed in RAN1 (and RAN2), the study and discussion should be led by RAN1. (O1 & P2/[R4-2311642](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311642.zip))
* Recommended WF
  + TBA

**Issue 1-1-2:** Smaller guard band

* Proposals
  + Option 1: The smaller guard band study in RAN4 should be postponed until the decision and the methodology of the small BW support is clear. (P3/[R4-2311642](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311642.zip))
* Recommended WF
  + TBA

**Issue 1-1-3:** Shorter CP

* Proposals
  + Option 1: Shorter CP proposal should be proposed in RAN1. (P4/[R4-2311642](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311642.zip))
* Recommended WF
  + TBA

**Issue 1-1-4:** Relationship with current WI scope for additional CBW/SCS support

* Proposals
  + Option 1: The relationship of the study on additional CBW/SCS support on Ka band and the WI completion should be clarified. (P5/[R4-2311642](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311642.zip))
* Recommended WF
  + TBA

**Topic #2 GSCN**

**Issue 1-2-1: GSCN**

* **Proposals**
  + **Option 1: to use following GSCN for Ka-band as (P1/**[**R4-2313172**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313172.zip) **with Excel file from 06/2019 as proof for calculations, P1/**[**R4-2313238**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313238.zip) **without NOTE 1)**

Table 4: Applicable SS raster entries per *operating band* (FR2-NTN)

|  |  |  |  |
| --- | --- | --- | --- |
| NR *operating band* | SS Block SCS | SS Block pattern (note 1) | Range of GSCN  (First – <Step size> – Last) |
| **n512** | **120 kHz** | **Case D** | **17448 – <12> – 19428** |
|  | **240 kHz** | **Case E** | **17472– <24> – 19416** |
| **n511** | **120 kHz** | **Case D** | **17448 – <12> – 19428** |
|  | **240 kHz** | **Case E** | **17472– <24> – 19416** |
| **n510** | **120 kHz** | **Case D** | **17448 – <12> – 19428** |
|  | **240 kHz** | **Case E** | **17472– <24> – 19416** |
| **NOTE 1: SS Block pattern is defined in section 4.1 in TS 38.213.** | | | |

* + **Option 2: (P1/**[**R4-2311642**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311642.zip)**)**

Table 2: Applicable SS raster entries per *operating band*

|  |  |  |  |
| --- | --- | --- | --- |
| NR *operating band* | SS Block SCS | SS Block pattern (note 1) | Range of GSCN  (First – <Step size> – Last) |
| **n512** | **120 kHz** | **Case D** | **17444 – <12> – 19424** |
|  | **240 kHz** | **Case E** | **17456 – <24> – 19400** |
| **n511** | **120 kHz** | **Case D** | **17444 – <12> – 19424** |
|  | **240 kHz** | **Case E** | **17456 – <24> – 19400** |
| **n510** | **120 kHz** | **Case D** | **17444 – <12> – 19424** |
|  | **240 kHz** | **Case E** | **17456 – <24> – 19400** |
| **NOTE 1: SS Block pattern is defined in section 4.1 in TS 38.213.** | | | |

* **Recommended WF**
  + **Companies encouraged to check the Excel file with the computation Table from** [**R4-2313172**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313172.zip)
  + **In the past there were some Excel files to compute the values, and it seems that Option 1 is corresponding. Please take a look here: https://www.3gpp.org/ftp//Specs/archive/38\_series/38.817-01/38817-01-f50.zip**
  + **If no strong concerns, it is recommended to consider Option 1 (since the same methodology has already been used in the past). It can be also noted that the number of entries for the two Options is identical:**
    - **Option 1: 166 values for 120kHz and 82 values for 240kHz**
    - **Option 2: 166 values for 120kHz and 82 values for 240kHz**

Topic #3 DMRS bundling feature

**Issue 1-3-1:** Timing accuracy/UE transmit timing requirement

* Proposals
  + Option 1: RAN4 investigate the feasibility of an NTN UE to meet the DMRS requirement in the new test condition where DL time would be changing for non-GEO satellite. (P1/[R4-2313459](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313459.zip))
    - Note 1: It is not clear whether the UE will introduce additional time error when making the phase pre-compensation due to time drift in RAN1 working assumption. (O1/[R4-2313459](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313459.zip))
    - Note 2: There is no time accuracy requirement regarding the NTN UE phase pre-compensation in TS 38.133. (O2/[R4-2313459](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313459.zip))
    - Note 3: There is no DL time change in DRMS bundling requirement in TS 38.101-1 and therefore the DL timing change for Non-GEO brings question on the validity of the DMRS bundling requirement for NTN UE. (O3/[R4-2313459](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313459.zip))
  + Option 2: RAN4 should further discuss the applicability of the DMRS bundling feature to Rel-18 NTN and determine whether additional NTN-specific side conditions are needed. (P1/[R4-2311232](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311232.zip))
    - Note 1: RAN4 should update the TA side condition of the maximum allowable phase difference for DMRS bundling requirement to align with the timing pre-compensation procedure used in NTN networks. (O1/[R4-2311232](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311232.zip))
    - Note 2: RAN4 should determine whether additional side conditions on the maximum DMRS bundling length and/or RB allocations are needed for the requirement on the maximum allowable phase difference for DMRS bundling in NTN operation. O2/[R4-2311232](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311232.zip))
    - Note 3: It is expected that the values of the maximum allowable phase difference for DMRS bundling captured in Table 6.4.2.5-1 of TS38.101-1 will remain applicable for NTN. (O3/[R4-2311232](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311232.zip))
  + Option 3: RAN4 to update UE transmit timing requirement (7.1C in 38.133) for NTN-specific PUSCH DMRS bundling, with the RAN1 working assumption: “UE shall not perform TA pre-compensation update within an actual TDW if it causes phase discontinuity that may violate the phase difference limit”. Where the actual TDW is according to RAN1’s conclusion. (P1/[R4-2313643](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313643.zip))
  + Option 4: For NTN-specific PUSCH DMRS bundling, update the applicability of the timing requirements such that the requirements apply only for the first transmission in the TDW. (P1/[R4-2312976](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2312976.zip))
* Recommended WF
  + TBA
  + Moderator Note: it was suggested (but not agreed as potential WF for discussion) a combination of different Options:
    - RAN4 investigate the feasibility of an NTN UE to meet the DMRS requirement in the new test condition where DL time would be changing for non-GEO satellite.
      * It is expected that the values of the maximum allowable phase difference for DMRS bundling captured in Table 6.4.2.5-1 of TS38.101-1 will remain applicable for NTN.
      * RAN4 should determine whether additional side conditions on the maximum DMRS bundling length and/or RB allocations are needed for the requirement on the maximum allowable phase difference for DMRS bundling in NTN operation.
    - If required, update UE transmit timing requirement (7.1C in 38.133) for NTN-specific PUSCH DMRS bundling:
      * Option 1: within an actual TDW if it causes phase discontinuity that may violate the phase difference limit
      * Option 2: such that the requirements apply only for the first transmission in the TDW

**Issue 1-3-2:** Transmit modulation quality

* Proposals
  + Option 1: The requirements specified for Transmit modulation quality in TS 38.101-5 should be revisit considering the duplex difference of bands, phase continuity requirements for NTN UE DMRS bundling, whether current UE capability “maxDurationDMRS-Bundling-r17” can be reused for NTN UE, potential side conditions updates, and the supports of Pi/2 BPSK modulation. (P2/[R4-2312976](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2312976.zip))
* Recommended WF
  + TBA

**Issue 1-3-3:** LS reply to RAN1

* Proposals
  + Option 1: RAN4 to send LS reply to RAN1 to inform RAN4’s agreement upon LS R1-2304094. (P2/[R4-2313643](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313643.zip))
* Recommended WF
  + Agree with Option 1 if no concerns from other companies.
  + Moderator Note: Please also note Working Assumption from RAN1:
    - For NTN-specific PUSCH DMRS bundling, to satisfy the phase difference limit without causing phase discontinuity, it is assumed that pre-compensation to keep phase rotation due to timing drift within the phase difference limit can be performed at UE side.
      * UE shall not perform TA pre-compensation update within an actual TDW if it causes phase discontinuity that may violate the phase difference limit.
        + FFS: how to determine the actual TDW
      * FFS: specification impact

**[108][310] NR\_NTN\_enh\_Part1, AI 8.26.3**

**R4-2314246 Topic summary for [108][310] NR\_NTN\_enh\_Part2**

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

**Decision: Return to**

**Issue 1-1-1:** EISREFSENS\_50M definition - Bandwidth

* Proposals: BW for EISREFSENS\_50M for Ka-band SAN is 66RB, i.e. 66\*12\*60\*1000Hz
  + Agree
  + Disagree
* Recommended WF
  + TBA

**Issue 1-1-2:** EISREFSENS\_50M definition - SNR

* Proposals: -1dB SNR can be reused for EIS for Ka-band SAN.
  + Agree
  + Disagree
* Recommended WF
  + TBA

**Issue 1-2: FRC**

* Proposals: The G-FR2-A1-1, G-FR2-A1-2 and G-FR2-A1-3 for FR2-1 TN BS can be reused for Ka-band SAN.
  + Agree
  + Disagree
* Recommended WF
  + TBA

**Issue 1-3-1: SAN Noise Figure**

* Proposals: RAN4 to use 1 single SAN NF of 3.5 dB in above 10 GHz.
  + Agree
  + Disagree
* Recommended WF
  + TBA

**Issue 1-3-2: SAN Noise Figure – BS classes**

* Proposals: If issue 1-3-1 is not agreeable, RAN4 to use 2 NF values of 3.5 dB and 5.9 dB for SAN in above 10 GHz, and define 2 satellite classes.
  + Agree
  + Disagree
* Recommended WF
  + Note that we might already have GEO and LEO BS classes. If this proposal is agreed, this would then mean 4 BS classes (GEO NF=3.5 dB, GEO NF=5.9 dB, LEO NF=3.5 dB and LEO NF=5.9 dB).

**Issue 1-4-1: SAN parameters**

* Proposals: RAN4 to use Set-1 for SAN parameters.
  + Agree
  + Disagree
* Recommended WF
  + TBA

**[108][311] NR\_NTN\_enh\_Part1, AI 8.26.2**

**R4-2314247 Topic summary for [108][311] NR\_NTN\_enh\_Part3**

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

**Decision: Return to**

**Issue 1-1: Scenario**

* Proposals
  + Option 1: To deprioritize scenario 7 and 8

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Combination | Aggressor | Victim | Frequency band | Scope of Coexistence Simulation |
| 7 | TN with NTN | NTN DL | TN UL | 17 GHz | ACLR NTN SAN to be varied/defined  ACS TN gNB fixed |
| 8 | TN with NTN | TN UL | NTN DL | 17 GHz | ACLR TN UE fixed  ACS NTN UE to be varied/defined |
| NOTE 1: For coexistence between Ka-Band DL and adjacent TN bands, there are no 3GPP defined/specified TN bands. | | | | | |

* Recommended WF
  + Agree on Option 1.

**Issue 1-2: NTN FRF**

* Proposals
  + Option 1: FRF=2 for co-existence study
  + Option 2: FRF=3 for co-existence study
* Recommended WF
  + Further discuss FRF together with whether and/or how circular polarization isolation needs to be considered in co-existence study

**Issue 1-3: NTN UE elevation angle**

* Proposals
  + Option 1: 30 degree
  + Option 2: 20 degree
* Recommended WF
  + It is agreed 90 degree will be used as the first case.
  + Determine Option 1 & 2 by further discussion.

**Issue 1-4: NTN UE pointing accuracy**

* Proposals
  + Option 1: NTN UE antenna points to the satellite accurately
* Recommended WF
  + Agree on Option 1.

**Issue 2-1-1: NTN SAN Channel Bandwidth**

* Proposals
  + Option 1: 400MHz (200MHz per beam for FRF=2)
* Recommended WF
  + TBA

**Issue 2-1-2: NTN SAN SCS**

* Proposals
  + Option 1: In table 2.3.1-2 (R4-2309971), update SCS values for 400 MHz channel BW to 120 kHz and align HPBW values with the agreed values in section 2.4.1.
* Recommended WF
  + TBA

**Issue 2-1-3: NTN SAN G/T calculation**

* Proposals
  + Option 1: To calculate G/T according to this equation:
* G/T = Ga – NF – 10\*LOG (To+(Ta-To)/(100.1\*NF))
* Recommended WF
  + TBA

**Issue 2-2: NTN SAN Antenna Pattern**

* Proposals
  + Option 1: Antenna pattern in section 6.4.1 of TR38.811
* The following normalized antenna gain pattern, corresponding to a typical reflector antenna with a circular aperture, is considered.

1

* where:

- J1(x) is the Bessel function of the first kind and first order with argument;

- x, is the radius of the antenna's circular aperture;

- k = 2f/c is the wave number;

- f is the frequency of operation;

- c is the speed of light in a vacuum and  is the angle measured from the bore sight of the antenna's main beam.

* Note that *ka* equals to the number of wavelengths on the circumference of the aperture and is independent of the operating frequency.
  + Option 2:
* Recommended WF
  + Option 1 & 2 are equivalent, so it’s up to the meeting to choose which term to be used.

**Issue 2-3-1 NTN UE Antenna Pattern**

* Proposals
  + Option 1:
* Recommended WF
  + Further discuss Option 1 taking into account outcome of NTN UE RF discussion.

**Issue 2-3-2: NTN UE Antenna Type**

* Proposals
  + Option 1: NTN UE operating with phased array antenna should build an un-equal weighted phased array pattern modelling, or a hybrid steering method combining both mechanical and electronical tilting should be assumed.
  + Option 2: An agreement should be reached in this RAN4#108 meeting on NTN UE phased array antenna parameters. Without any agreement, such UE type of antenna would be out of scope of Release 18.
* Recommended WF
  + Further discuss Option 1 bearing in mind Option 2 is the consequence of no agreement and outcome of NTN UE RF discussion should also be taken into account.

**Issue 2-4-1: NTN SAN NF**

* Proposals
  + Option 1: 3.5dB
  + Option 2: 5.9dB
  + Option 3: To define 2 SAN classes with different NF valued
* Recommended WF
  + TBA

**Issue 2-4-2: NTN UE NF**

* Proposals
  + Option 1: 6dB
  + Option 2: 5.9dB
  + Option 3: 1.2dB or 2.1dB
  + Option 4: 4dB
  + Option 5: To start with higher NF value
  + Option 6: Use same NF value for both calibration and simulation
* Recommended WF
  + TBA

**Issue 2-5: NTN UE RB number**

* Proposals
  + Option 1: To use the same RB number for both calibration and simulation and to consider more RBs for above 10GHz cases.
  + Option 2: Consider NRB / 10 per NTN UE in UL where NRB is the transmission bandwidth configuration of the signal operating in the NTN beam (i.e NRB= 132 for 200 MHz channel BW signal).
* Recommended WF
  + Further discuss the RB number [2/13/others].

**Issue 2-6: Isolation distance between VSAT and TN BS**

* Proposals
  + Option 1: 35m
  + Option 2: other value
* Recommended WF
  + TBA

**Issue 2-7: TN ACLR**

* Proposals
  + Option 1: ACLR requirement for TN update in turquois as following

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Frequency band | BS | | UE | | ACIR | |
| ACLR | ACS | ACLR | ACS | BS ACLR  UE ACS | UE ACLR  BS ACS |
| 17 GHz | [30] | [26] | 23 | [25] | [23.8] | [21.2] |
| 27 GHz | 28 | 24 | 23 | 23 | 21.8 | 20.5 |

* Recommended WF
  + TBA

**Issue 2-8: TN BS TX power before antenna**

* Proposals
  + Option 1: 41.07 if ohmic loss (2dB) is considered
  + Option 2: 43.07 if ohmic loss (2dB) is not considered
* Recommended WF
  + TBA

**Issue 2-9: TN BS Antenna**

* Proposals
  + Option 1: to update the BS antenna configuration shown in turquois as following

|  |  |
| --- | --- |
|  | **Macro urban** |
| Antenna pattern | TR 38.803 |
| Element gain *GE,max* (dBi) | 5.5 |
| Horizontal *j3dB* /vertical *q3dB* 3 dB beam width of single element (degree) | 90º for H  90º for V |
| Horizontal/vertical front‑to‑back ratio *Am* (dB) | 30 for both H/V |
| Side lobe suppression *SLAv (dB)* | 30 |
| Antenna polarization | Linear ±45º |
| Antenna array configuration (Row × Column) | 16 × 8 elements |
| Horizontal/Vertical radiating element spacing | *dh* = 0.5  *dv* = 0.5 |
| ~~Array Ohmic loss~~ *~~L~~~~E~~* ~~(dB)~~ | ~~2~~ |
| ~~Conducted power (before Ohmic loss) per antenna element (dBm)~~ | ~~22~~ |
| Transmitter power (Total conducted power) (dBm) | 30 |
| Mechanical downtilt (degrees) | 6 |

* Recommended WF
  + To be discussed together with Issue 2-8

**Issue 2-10: TN ISD**

* Proposals
  + Option 1: Update FR2 ISD as 200m (not 300m)
* Recommended WF
  + Agree on Option 1

**Issue 2-11: TN cluster number**

* Proposals
  + Option 1: all the NTN beam has to be filled with multiple TN clusters
  + Option 2: only 1 cluster with 19 TN cells (57 sectors are used)

**Clarification Note:** It does not seem realistic (there is not such FR2 NR deployment to our knowledge) entirely covering an NTN beam, especially in GEO scenario.

* + This is particularly important for instance for Scenario #4 & Scenario #8 **(“All active TN cells in central NTN beam”)** or
  + Scenario #2 (with “Only the active TN cells in central NTN beam”) – consider the active TN cells **from all clusters**? or the active TN cells **from only one cluster**?
* Recommended WF
  + TBA

**Issue 2-12: TN loading factor**

* Proposals
  + Option 1: To use the system loading factor of 20% **only in the dropping of TN clusters inside the NTN beam** and to be clarified in the TN assumptions.
* Recommended WF
  + Agree on Option 1

**Issue 2-13: TN UE Tx parameter**

* Proposals
  + Option 1: 23 dBm as Tx power and 5 dBi element gain with 2x2 elements.
* Recommended WF
  + TBA

**Issue 3-1: Propagation model**

* Proposals
  + Option 1: Do not consider Atmospheric attenuation
  + Option 2: To use a fixed value of 2dB as Atmospheric loss for co-existence study
* Recommended WF
  + TBA

**Issue 3-2: ACLR model**

* Proposals
  + Option 1: To use flat ACIR model when 1 UE is used in TN and NTN, and to use 3 steps ACIR model when using 1 UE in TN and 10 UEs in NTN according to 3GPP TR 36.942.
* Recommended WF
  + TBA

**Issue 3-3: NTN UE Uplink Power Control**

* Proposals
  + Option 1: TPC model specified in TR 36.942, subclause 9.1 is applied
* 
* Where, Pmax = 33dBm, Rmin = 60 dB, γ = 1
* Recommended WF
  + Agree on option 1
  + CLx-ile: see Issue 3-3-1

**Issue 3-3-1: CL** x-ile

* Proposals
  + Option 1:
* CLx-ile = Pmax[dBm]-Po[dBm]=Pmax-(SNRtarget+N)=Pmax-(SNRtarget-174dBm/Hz+10\*log10(BW)+NF)
* where
* NF=3.5 or 5.9dB
* BW is 13RBs or 2RBs (allocated UL NTN VSAT UE BW),
* SNRtarget=15dB
* Pmax=33dBm
  + Option 2:
* CLx-ile = 10\*log10(Pmax) – (SNRtarget + 10\*log10(kTBF))= 33dBm – (15 - 85.1dBm) = 103.1 dB
* (To assume BW is 200MHz)
  + Option 3:
* CLx-ile = –SNR\_target + UE\_max\_eirp– ThermalNoise – BS\_NoiseFigure - 10\*log10(BW)
* where, SNR\_target for FR1 and FR2 is 15 dB.
* Recommended WF
  + These Options seems equivalent. Further discuss the CLx-ile value, e.g. is 103.1dB OK?

**Issue 3-4: SINR-Throughput performance metrics.**

* Proposals
  + Option 1: To confirm Section 5.2.7 of 38.803 is still valid for this study, noting the the exact applicability of Table 5.2.7-1 should be further discussed.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| The throughput of a modem with link adaptation can be approximated by an attenuated and truncated form of the Shannon bound. (The Shannon bound represents the maximum theoretical throughput than can be achieved over an AWGN channel for a given SNIR). The following equations approximate the throughput over a channel with a given SNIR, when using link adaptation:    Where:  S(SNIR) Shannon bound, S(SNIR) =log2(1+SNIR) bps/Hz α Attenuation factor, representing implementation losses SNIRMIN Minimum SNIR of the code set, dB SNIRMAX Maximum SNIR of the code set, dB  The parameters α, SNIRMIN and SNIRMAX can be chosen to represent different modem implementations and link conditions. The parameters proposed in table 5.2.7-1 represent a baseline case, which assumes:  - 1:1 antenna configurations  - AWGN channel model  - Link Adaptation (see table 5.2.7-1 for details of the highest and lowest rate codes)  - No HARQ  Table 5.2.7-1: Parameters describing baseline Link Level performance for 5G NR   |  |  |  |  | | --- | --- | --- | --- | | Parameter | DL | UL | Notes | | α, attenuation | 0.6 | 0.4 | Represents implementation losses | | SNIRMIN, dB | -10 | -10 | Based on QPSK, 1/8 rate (DL) & 1/5 rate (UL) | | SNIRMAX, dB | 30 | 22 | Based on 256QAM 0.93(DL) & 64QAM 0.93 (UL) |   [the exact applicability of the table above should be further discussed]  Note that the parameters proposed in table 5.2.7-1 are targeted for eMBB coexistence scenario. |

* Recommended WF
  + Agree on Option 1

### 8.28 NR Network-controlled Repeaters

#### 8.28.1 General and work plan

**R4-2313178 draft spec skeleton for NCR**

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

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

##### 8.28.1.1 System parameters

##### 8.28.1.2 Others

**R4-2311561 Discussion of updating RF diagrams**

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

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

**R4-2311712 Discussion on RF diagrams for NCR**

*Type: discussion For: Approval  
 Source: NEC*

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

**R4-2311643 Discussion on NCR feature list**

*Type: other For: Approval  
 Source: CATT*

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

**R4-2313177 Discussion on RAN4 feature list for NCR-MT**

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

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

#### 8.28.2 RF core requirements

##### 8.28.2.1 RF requirements for NCR-Fwd

**R4-2311562 Discussion of Spurious Emissions requirements for NCR-Fwd**

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

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

**R4-2311635 Further discussion on RF requirements for NCR-Fwd**

*Type: other For: Approval  
 Source: CATT*

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

**R4-2313006 NCR TX RF requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

NCR TX RF requirements discussion

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

**R4-2313179 Discussion on RF requirements for NCR-Fwd**

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

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

##### 8.28.2.2 RF requirements for NCR-MT

**R4-2311157 RF requirement for LA NCR-MT**

*Type: discussion For: Discussion  
 Source: Murata Manufacturing Co Ltd.*

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

**R4-2311563 Discussion of RF requirement for NCR-MT**

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

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

**R4-2311564 Discussion of mixed type NCRs as part of conformance testing**

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

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

**R4-2311636 Further discussion on RF requirements for NCR-MT**

*Type: other For: Approval  
 Source: CATT*

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

**R4-2311713 Discussion on RF requirements for NCR-MT**

*Type: discussion For: Approval  
 Source: NEC*

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

**R4-2313007 NCR RX RF requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

NCR RX RF requirements discussion

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

**R4-2313180 Discussion on RF requirements for NCR-MT**

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

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

**R4-2313496 Further discussion on RF Requirements for NCR**

*Type: other For: Discussion  
 Source: Dell Technologies*

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

#### 8.28.3 EMC core requirements

**R4-2311560 Discussion of EMC core requirements**

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

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

**R4-2312051 Discussion on network controlled repeater EMC**

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

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

#### 8.28.4 RF conformance testing

**R4-2311158 Discussion on necessity of spurious emissions test when considering mixed type for NCR**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

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

**R4-2311559 Test configurations for NCR repeaters**

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

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

**R4-2311603 Further discussion on RF conformance testing for NCR**

*Type: other For: Approval  
 Source: CATT*

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

**R4-2313008 NCR conformance considerations**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Some observations for conformance

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

**R4-2313181 Discussion on conformance testing requirement for NCR**

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

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

#### 8.28.6 Demodulation performance requirements

**R4-2311515 Discussion on NCR-MT demodulation requirements**

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

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

**R4-2311516 Simulation results for NCR-MT**

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

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

**R4-2312802 [NR\_netcon\_repeater-Perf] NCR Demodulation Performance Requirements**

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

**Abstract:**

In this paper, we provide our views on Issues related to NCR demodulation requirements

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

**R4-2312803 [NR\_netcon\_repeater-Perf] Simulation Results on NCR PDSCH and PDCCH Demodulation Requirements**

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

**Abstract:**

In this paper, we present the simulation results on NCR PDSCH and PDCCH demodulation requrements

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

**R4-2313009 NCR-MT demodulation requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Proposals for demod requirements

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

**R4-2313660 Discussion on demodulation requirements for NR network-controlled repeaters**

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

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

**R4-2313661 Simulation results on demodulation requirements for NR network-controlled repeaters**

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

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

#### 8.28.7 Moderator summary and conclusions

**[108][312] NR\_netcon\_repeater\_RF, AI 8.28.1, 8.28.2, 8.28.3**

**R4-2314248 Topic summary for [108][312] NR\_netcon\_repeater\_RF**

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

**Decision: Return to**

**Issue 1-1: draft spec skeleton**

* + Proposal 1: to discuss the draft spec skeleton for NCR [ZTE, [R4-2313178](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313178.zip)]
* Recommend WF
  + Companies’ views are encouraged during the meeting.

**Issue 1-2: NCR-MT feature list**

* Proposals
  + Proposal 1: There’s no feature list for NCR-Fwd. [CATT, [R4-2311643](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311643.zip)]
  + Proposal 2: Table 1 can be taken as a starting point for further discussion of NCR-MT feature list. [CATT, [R4-2311643](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311643.zip)]
  + Proposal 3: not to define feature list for NCR-Fwd part; [ZTE, [R4-2313177](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313177.zip)]
  + Proposal 4: to further discuss the feature list for NCR-MT as proposed in section 3,4 and 5. [ZTE, [R4-2313177](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313177.zip)]
* Recommend
  + Companies’ views are encouraged during the meeting.

**Topic #3 NCR-MT requirements**

Issue 3-1-1 Transmitter ON-OFF power and transition period

* Proposals
  + Proposal 1: for Wide area NCR-MT transmitter ON-OFF power and transition period requirement, propose to reuse the Wide area IAB-MT requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 2: for Local area NCR-MT transmitter ON-OFF power and transition period requirement, propose to reuse the legacy UE requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 3: for LA NCR-MT transmitter ON-OFF power and transition period requirement, to reuse the legacy UE requirement as baseline. [Murata, [R4-2311157](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311157.zip)]
  + Proposal 4: Option 1: IAB-MT approach [Nokia, [R4-2311564](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311564.zip)]
  + Proposal 5: For transmit ON-OFF power and transition period requirements, follow IAB-MT approach for WA NCR-MT and follow legacy UE approach for LA NCR-MT. [NEC,[R4-2311713](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311713.zip)]
  + Proposal 6: It is suggested to reuse UE transmitter ON/OFF power and transition period requirement for NCR-MT. [Dell,[R4-2313496](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313496.zip)]
  + Proposal 7: Adopt the UE requirements for NCR-MT on/off transition time and FR2 OFF level [Ericsson, [R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 8: For the FR1 OFF level, consider a lower limit than in the UE specification, in particular WA. For example, based on -50dBm in 20MHz. [Ericsson, [R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 9: For transmitter ON/OFF power and transient period, the requirement for FR1 IAB-MT could be reused for Type 1-C and Type 1-H NCR-MT. [CATT,R4-2311636]
* Recommended WF
  + Companies’ views are encouraged in 1st round.

Issue 3-1-2 Transmitter unwanted emission requirement

* Proposals
  + Proposal 1: for Local area NCR-MT, propose to reuse legacy UE SEM requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 2: if the NCR supports simultaneous MT and FWD transmission, then LA NCR-MT OBUE/SEM requirement, to reuse IAB-MT approach. [Murata, [R4-2311157](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311157.zip)]
  + Proposal 3: Re-use same approach as for Local Area IAB-MT (TS 38.174 clause 6.6.4) [Nokia, [R4-2311564](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311564.zip)]
  + Proposal 3: For LA NCR-MT OBUE/SEM requirements, follow Rel-17 repeater approach. [NEC,[R4-2311713](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311713.zip)]
  + Proposal 4: For the Local Area class NCR-MT OBUE/SEM, it is reasonable to reuse UE SEM requirements. [Dell,[R4-2313496](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313496.zip)]
  + Proposal 5: Adopt the UE SEM for NCR-MT. [Ericsson, [R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 6: Apply the same emissions limits as for NCR-FWD in Rel-17 to the combined emissions from NCR-FWD and NCR-MT when transmitting simultaneously. [Ericsson, [R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 7: For operating band unwanted emissions, the requirement for FR1 IAB-MT could be reused for Type 1-C and Type 1-H NCR-MT. For LA class, it is suggested to define OBUE requirements in IAB-MT approach, but the specific UE (PC2) value could be applied. [CATT,R4-2311636]
* Recommended WF
  + Companies’ views are encouraged in 1st round.

Issue 3-1-3 Transmitter spurious emission requirement

* Proposals
  + Proposal 1a: for Wide area NCR-MT transmitter spurious requirement, propose to reuse the legacy repeater uplink transmitter spurious emission requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 1b: for local area NCR-MT transmitter spurious requirement, propose to reuse the legacy UE transmitter spurious emission requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 2: For simultaneous and non-simultaneous transmission of NCR-MT and NCR-Fwd part in the uplink direction, it is suggested to reuse transmitter spurious emissions for FR1 repeater. [CATT,R4-2311636]
* Recommended WF
  + Companies’ views are encouraged in 1st round.

Issue 3-1-4 Transmitter transmitter intermodulation

* Proposals
  + Proposal 1a: for Wide area NCR-MT transmitter intermodulation requirement, propose to reuse the Rel-16 IAB-MT intermodulation requirements. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 1b: for Local area NCR-MT transmitter intermodulation requirement, propose to reuse the Rel-16 IAB-MT intermodulation requirements. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 2: Option 1: IAB-MT approach. [Nokia, [R4-2311564](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311564.zip)]
  + Proposal 3: For transmitter intermodulation requirements, follow corresponding approaches for ACLR, OBUE/SEM, and transmitter spurious emission requirements. [NEC,[R4-2311713](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311713.zip)]
  + Proposal 4: Adopt the BS TX IM requirement for IAB-MT. Base the power level on the NCR-FWD output power. [Ericsson, [R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 5: For output intermodulation, the requirements for FR1 IAB-MT could be reused for Type 1-H NCR-MT; for FR1 Type 1-C NCR-MT, it is suggested to reuse the BS Type 1-C requirements. [CATT,R4-2311636]
* Recommended WF
  + Companies’ views are encouraged in 1st round.

Issue 3-2-1 REFSENS requirement

* Proposals
  + **Proposal 1:** for Local area NCR-MT, to follow the legacy UE noise figure. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + **Proposal 2:** for 15kHz FRC of FR1 IAB-MT, propose to use the following FRC. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]

Table A1-1: FRC parameters for FR1 reference sensitivity level for NCR-MT.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Reference channel | G-FR1-A1-22 | G-FR1-A1-23 | G-FR1-A1-25 | G-FR1-A1-26 | G-FR1-A1-27 | G-FR1-A1-28 |
| Subcarrier spacing (kHz) | 30 | 60 | 30 | 60 | 15 | 15 |
| Allocated resource blocks | 11 | 11 | 51 | 24 | 25 | 106 |
| CP-OFDM Symbols per slot (Note 1) | 9 | 9 | 9 | 9 | 9 | 9 |
| Modulation | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Code rate (Note 2) | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| NOTE 1:   *DL-DMRS-config-type* = 1 with *DL-DMRS-max-len* = 1, *DL-DMRS-add-pos* = pos2 with = 2, = 6 and 9 as per Table 7.4.1.1.2-3 of TS 38.211 [3].  NOTE 2:   MCS index 4 and target coding rate = 308/1024 are adopted to calculate payload size for receiver sensitivity | | | | | | |

* + Proposal 3: Option1: 13dB [Nokia, [R4-2311564](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311564.zip)]
  + Proposal 4: For LA NCR-MT NF assumption for REFSENS for FR1, adopt legacy UE value [NEC,[R4-2311713](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311713.zip)]
  + Proposal 5: Adopt the UE reference sensitivity for LA NCR-MT. [Ericsson, [R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 6: The 13 dB Noise figure for FR1 LA IAB-MT could be reused for FR1 LA NCR-MT. [CATT,R4-2311636]
  + Proposal 7: It is suggested to use the revised Table 2-1 for FRC parameters below for FR1 NCR-MT REFSENS [CATT,R4-2311636]

Table 2-1: FRC parameters for FR1 reference sensitivity level for NCR-MT.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Reference channel | G-FR1-A1-21 | G-FR1-A1-22 | G-FR1-A1-23 | G-FR1-A1-24 | G-FR1-A1-25 | G-FR1-A1-26 |
| Subcarrier spacing (kHz) | 15 | 30 | 60 | 15 | 30 | 60 |
| Allocated resource blocks | 25 | 11 | 11 | 106 | 51 | 24 |
| CP-OFDM Symbols per slot (Note 1) | 9 | 9 | 9 | 9 | 9 | 9 |
| Modulation | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Code rate (Note 2) | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| NOTE 1:   *DL-DMRS-config-type* = 1 with *DL-DMRS-max-len* = 1, *DL-DMRS-add-pos* = pos2 with = 2, = 6 and 9 as per Table 7.4.1.1.2-3 of TS 38.211 [3].  NOTE 2:   MCS index 4 and target coding rate = 308/1024 are adopted to calculate payload size for receiver sensitivity | | | | | | |

* Recommended WF
  + Companies’ views are encouraged in 1st round.

Issue 3-2-2 ACS/IBB

* Proposals
  + Proposal 1: for Local area NCR-MT, propose to use the UE ACS requirement as 33dBc for FR1 NCR-MT and 23,22dBc for FR2 NCR-MT update the IAB-MT or BS requirement accordingly. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 2: for Local area NCR-MT IBB requirement, propose to follow the legacy UE requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 3:for LA NCR-MT ACS/IBB requirement, to reuse the legacy UE requirement as baseline. [Murata, [R4-2311157](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311157.zip)]
  + Proposal 4: Re-use same approach as for Local Area IAB-MT (TS 38.174 clause 7.4.1) [Nokia, [R4-2311564](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311564.zip)]
  + Proposal 5: For LA NCR-MT ACS/IBB requirements, follow legacy UE approach [NEC,[R4-2311713](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311713.zip)].
  + Proposal 6: It is proposed to reuse the UE ACE/IBB requirements for Local Area NCR-MT. [Dell,[R4-2313496](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313496.zip)]
  + Proposal 7: UE ACS can be used for the LA NCR-MT [Ericsson, [R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 8: For Adjacent Channel Selectivity, the requirement for FR1 IAB-MT could be reused for Type 1-C and Type 1-H NCR-MT. [CATT,R4-2311636]
  + Proposal 9: The 5MHz channel bandwidth for ACS requirements should be supplemented in Table 2-2 and Table 2-3 below: [CATT,R4-2311636]
  + Proposal 10: For In-band blocking, the requirement for FR1 IAB-MT could be reused for Type 1-C and Type 1-H NCR-MT. [CATT,R4-2311636]
  + Proposal 11: The 5MHz channel bandwidth for IBB requirements should be supplemented in Table 2-4, Table 2-5 and Table 2-6 below: [CATT,R4-2311636]
* Recommended WF
  + Companies’ views are encouraged in 1st round.

Issue 3-2-3 OOBB requirement

* Proposals
  + Proposal 1: for OOBB requirement for Local area NCR-MT, propose to follow the legacy UE requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 2: for LA NCR-MT OOBB requirement, to reuse the legacy UE requirement as baseline.[Murata, [R4-2311157](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311157.zip)]
  + Proposal 3: Reuse same approach as for out-of-band blocking requirements of IAB-MT (TS 38.174 clause 10.6) [Nokia, [R4-2311564](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311564.zip)]
  + Proposal 4: For LA NCR-MT OOBB requirements, follow legacy UE approach [NEC,[R4-2311713](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311713.zip)].
  + Proposal 5: It is suggested to reuse UE requirements for Local Area NCR-MT OOBB requirements. [Dell,[R4-2313496](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313496.zip)]
  + Proposal 6: It is OK to use the UE requirement for LA NCR-MT OOBB [Ericsson, [R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 7: For Out-of-band blocking, the requirement for FR1 IAB-MT could be reused for Type 1-C and Type 1-H NCR-MT. [CATT,R4-2311636]
* Recommended WF
  + Companies’ views are encouraged in 1st round.

Issue 3-2-4 Receiver spurious emission requirements

* Proposals
  + Proposal 1a: for receiver spurious emission requirement for Wide area NCR-MT, propose to reuse the IAB-MT requirement for it. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 1b: for receiver spurious emission requirement for Local area NCR-MT, propose to reuse the legacy UE requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 2: For receiver spurious emissions, the requirement for FR1 IAB-MT could be reused for Type 1-C and Type 1-H NCR-MT. [CATT,R4-2311636]
* Recommended WF
  + Companies’ views are encouraged in 1st round.

Issue 3-2-5 Receiver intermodulation requirements

* Proposals
  + Proposal 1: for receiver intermodulation requirement for Local areas NCR-MT, propose to legacy UE requirement. [ZTE,[R4-2313180](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313180.zip)]
  + Proposal 2: Re-use same approach as for Local Area IAB-MT (TS 38.174 clause 7.7 and 10.8) [Nokia, [R4-2311564](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311564.zip)]
  + Proposal 3: For LA NCR-MT receiver intermodulation requirements, follow legacy UE approach [NEC,[R4-2311713](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2311713.zip)].
  + Proposal 4: Adopt the IAB/BS RX intermodulation requirement for the NCR-MT. [Ericsson,[R4-2313007](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108/Docs/R4-2313007.zip)]
  + Proposal 5: For Receiver intermodulation, the requirement for FR1 IAB-MT could be reused for Type 1-C and Type 1-H NCR-MT [CATT,R4-2311636]
* Recommended WF
  + Companies’ views are encouraged in 1st round.

**Issue 4-1: Core part of NCR EMC**

* + Proposal 1: The modification of NCR EMC core part should focus on introducing the new concept of NCR type 1-H and 2-O.
  + Proposal 2: For NCR EMC, most of the core requirements are product agnostic, therefore majority jobs should be carried out in perf stage. In core stage, we should at least update NCR type 1-H and 2-O in clauses 1, 2 and 3.
  + Proposal 3: The RF diagrams for NCR in Figures 4-6 in R4-2311560 should take into consideration during the modification.
* Recommend WF
  + Tentative agreements: Agree with proposal 1, 2 and 3.
  + Companies’ views are encouraged during the meeting.

**[108][313] NR\_netcon\_repeater\_RFConformance, AI 8.28.4**

**R4-2314249 Topic summary for [108][313] NR\_netcon\_repeater\_RFConformance**

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

**Decision: Return to**

**Issue 1-1: Mixed type introduction**

* Proposals
  + Proposals in R4-2311158 (NTT DOCOMO, INC):
    - Mix type for NCR should be allowed for deployment scenario because the specification impact is only adding to Rx spurious emissions and the other requirements can be focused on the same NCR type.
  + Proposal in R4-2313008 (Ericsson)
    - [Only introduce mixed types if the need is really clear](file:///C:\Users\shanhuiping\AppData\Local\Temp\360zip$Temp\360$6\R4-2313008%20NCR%20conformance.docx#_Toc142654349)
* Recommended WF
  + Discuss the above proposals in the meeting

**Issue 1-2: Simultaneous UL for NCR –Fwd and NCR-MT**

* Proposals
  + Proposal in R4-2311603 (CATT)
    - Manufacturer should declare NCR-Fwd and NCR-MT simultaneous operation for UL.
* Recommended WF
  + Discuss the above proposal in the meeting

**Issue 1-3: the necessary control information of NCR-Fwd link**

* Proposals
  + Proposal in R4-2313181 (ZTE Corporation)
    - for the necessary control information of NCR-Fwd link, it could follow the BS approach together with C-link.
* Recommended WF
  + Discuss the above proposal in the meeting

**Issue 1-4: UL Rx emission requirement necessity**

* Proposals
  + Proposal in R4-2311158 (NTT DOCOMO, INC)
    - When UL Rx emissions can be separated from DL Tx emissions and vice versa in OTA measurements, the specific requirement of Rx spurious emission is necessary even though NCR include NCR type 1-O.
* Recommended WF
  + Discuss the above proposal in the meeting

**Issue 2-2: NCR-MT measurement setup**

* Proposals
  + Proposal in R4-2313181 (ZTE)
    - Propose to use the existing measurement setup for Rel-16 IAB-MT as baseline for NCR-MT measurement setup and further consider the joint conformance testing setup for emission related requirement if necessary.
* Recommended WF

**Issue 3-1: Proposals in R4-2313008 (Ericsson)**

* Proposals
  + Proposal 1 For NCR-FWD DL testing, continue to use the test configurations already defined in 38.115.
  + Proposal 2 For NCR-MT RX testing, place a single NCR-MT carrier at the upper and lower edges of the RF bandwidth (in each band, if applicable).
  + Proposal 3 For the separate UL testing configurations, the proposals 1 and 2 can be used for NCR-FWD UL and NCR-MT TX.
  + Proposal 4 For joint testing, use the same test configurations as 38.115, but replace one of the NCR-FWD carriers with an NCR-MT carrier. Repeat with NCR-MT placed in each NCR-FWD carrier position.
* Recommended WF
  + Discuss the above proposals in the meeting

**Issue 3-2: Proposals in R4-2311559 (Nokia)**

* Proposals
  + Proposal 1: It is proposed that conformance testing for the REFSENS requirement of the NCR-MT receiver is perform together with ACRR and Input IMD interfering signals.
  + Proposal 2: It is proposed to test the REFSENS requirement of NCR-MT receiver together with ACRR interfering signals together with the DL ACRR requirements for NCR-Fwd using presented test configurations in Figure 3 and 4.
* Recommended WF
  + Discuss the above proposals in the meeting

**[108][328] NR\_netcon\_repeater\_Demod, AI 8.28.6**

**R4-2314264 Topic summary for [108][328] NR\_netcon\_repeater\_Demod**

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

**Decision: Return to**

**Issue 1-1-1: Whether to define 5MHz/15kHz for PDSCH FR1 requirements**

* Proposals
  + Option 1: Define new FR1 requirements for 5 MHz/15 KHz. (Nokia)
  + Option 2: No. (ZTE, HW)
* Recommended WF
  + To be discussed

**Issue 1-1-2: MCS for PDSCH FR2 requirements**

* Proposals
  + Option 1: MCS 4. (HW)
* Recommended WF
  + MCS 4 is for PDSCH FR2.

**Issue 1-1-3: Test scope for PDSCH FR1**

* Proposals
  + Option 1: 4 new simulation is needed.(HW, ZTE)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Case number | Bandwidth (MHz) | SCS (kHz) | Propagation condition | Antenna configuration | Test metric |
| 1 | 10 | 15 | TDLA30-10 | 2x2 | 70% max throughput  1% BLER |
| 2 | 10 | 15 | TDLA30-10 | 2x4 | 70% max throughput  1% BLER |
| 3 | 40 | 30 | TDLA30-10 | 2x2 | 70% max throughput  1% BLER |
| 4 | 40 | 30 | TDLA30-10 | 2x4 | 70% max throughput  1% BLER |

* Recommended WF
  + Please check whether Option 1 is needed for PDSCH FR1 FDD and TDD requirements.
  + And if RAN4 agrees to define 5 MHz/15 KHz for PDSCH requirements, please check new test scope for PDSCH with 5 MHz/15 KHz.

**Issue 1-1-4: Test scope for PDSCH FR2**

* Proposals
  + Option 1: 2 new simulation is needed.(HW, ZTE)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Case number | Bandwidth (MHz) | SCS (kHz) | Propagation condition | Antenna configuration | Test metric |
| 1 | 100 | 120 | TDLA30-75 | 2x2 | 70% max throughput  1% BLER |
| 2 | 100 | 120 | TDLA30-75 | 2x4 | 70% max throughput  1% BLER |

* Recommended WF
  + Please check whether Option 1 is needed for PDSCH FR2 requirements.

**Issue 1-2-1: Whether to define new requirements on PDCCH for signaling of Access link beam change indication**

* Proposals
  + Option 1: Yes. (Nokia)
    - * Option 1A: RAN4 shall adapt test parameters for NCR PDCCH requirements following DCI format 5\_0/2\_8 at least to adapt the max payload size accordingly (i.e., 128 bits).
  + Option 2: No. (HW)
    - * Option 2A: Reuse same DCI type from IAB-MT and legacy UE requirements for NCR PDCCH requirements.
* Recommended WF
  + To be discussed

**Issue 1-2-2: Test scope for PDCCH FR1**

* Proposals
  + Option 1: 1 new simulation is needed. (HW, ZTE)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Bandwidth (MHz) | CORESET RB | CORESET duration | Aggregation level | Propagation Condition | Antenna configuration and correlation Matrix |
| 10 | 48 | 1 | 8 | TDLA30-10 | 2x4 Low |

* Recommended WF
  + Please whether Option 1is needed for PDCCH FR1 FDD requirements.
  + And if RAN4 agrees to define new DCI requirements, please check new test scope for PDCCH FR1.

**Issue 1-2-3: Test scope for PDCCH FR2**

* Proposals
  + Option 1: No new simulation is needed. (HW, ZTE)
* Recommended WF
  + Please check whether Option 1 can be considered.
  + And if RAN4 agrees to define new DCI requirements, please check new test scope for PDCCH FR2.

**Issue 1-3-1: Whether to define PMI requirements**

* Proposals
  + Option 1: Yes. (ZTE, HW)
    - * Testing of performance requirements for PMI reporting is optional. (HW)
  + Option 2: No. (Nokia)
* Recommended WF
  + To be discussed

**Issue 1-3-2: Test scope for CQI requirements**

* Proposals
  + Option 1: No new simulation is needed for FR1 and FR2. (HW)
* Recommended WF
  + No new simulation is needed FR1 and FR2.

**Issue 1-3-3: Test scope for PMI requirements**

* Proposals
  + Option 1: No new simulation is needed for FR1 and FR2. (HW)
* Recommended WF
  + Waiting for the conclusion of Issue 1-3-1.

### 8.33 Mobile IAB (Integrated Access and Backhaul) for NR

#### 8.33.1 General and work plan

#### 8.33.2 Co-existence study

**R4-2311558 Mobile IAB coexistence**

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

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

**R4-2313218 Preliminary mobile IAB and NR coexistence study**

*Type: other For: Approval  
 Source: Qualcomm CDMA Technologies*

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

**R4-2313473 Coexistence simulation results**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our updated coexisting simulation results.

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

#### 8.33.3 RF core requirements

**R4-2313474 On mIAB RF requriement**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on mIAB RF requirement based on updated coexisting simulation results.

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

**R4-2313497 Further discussion on mobile IAB RF requirements**

*Type: other For: Discussion  
 Source: Dell Technologies*

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

#### 8.33.5 Moderator summary and conclusions

**[108][314] NR\_mobile\_IAB\_RF, AI 8.33.2, 8.33.3**

**R4-2314250 Topic summary for [108][314] NR\_mobile\_IAB\_RF**

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

**Decision: Return to**

**Issue 2.2.1-1: O2I penetration loss**

* Proposals
  + Option 1: O2I car penetration loss -model in 38.901 can be used for mIAB co-existence studies (Nokia)
  + Option 2: TBA
* Recommended WF
  + Agree with option 1 following agreements in RAN4#107.

**Issue 2.2.1-2: IAB-MT/DU antenna modelling**

* Proposals
  + Option 1: Reuse IAB-MT antenna modelling for mobile IAB as starting point and suggested to further study and specify the antenna modelling for mobile IAB-DU.
* Recommended WF
  + Agree with option 1.

Sub-topic 2-2: Coexistence results

Simulation results in R4-2311558 (Nokia), R4-2313218 (Qualcomm) and R4-2313473 (Ericsson) are noted.

*Moderator’s note: The observations below will be captured in the WF.*

* Observations from submitted simulation results:
  + The (UL) SINR degradation due to the mIAB interference can be marginal (Nokia, Qualcomm).
  + mIAB-MT transmission power of 33 dBm (TRP) is fine to protect the legacy NR BS (Qualcomm, Ericsson).
  + mIAB-MT maximum transmission power EIRP needs to comply the regulatory requirement (Ericsson).
  + Legacy requirements can be reused for mobile IAB (Qualcomm).

**Issue 2.2.2-1: IAB-MT RF requirements**

* Proposals
  + Option 1: Reusing the legacy ACLR and ACS for mobile IAB-MT for both FR1 and FR2 (Qualcomm, Ericsson)
* Recommended WF
  + Agree with Options 1

**Issue 2.2.2-2: IAB-MT dynamic range**

* Proposals
  + Option 1: UE type of Tx dynamic range is needed for mobile IAB-MT (Ericsson, Dell)
* Recommended WF
  + Agree with option 1.

**Issue 2.2.2-3: Mobile IAB requirements**

* Proposals
  + Option 1: Use the local area IAB-MT to specify the mobile IAB feature (Ericsson)
* Recommended WF
  + Agree with option 1.

## 9 Rel-18 on-going work Items for LTE

### 9.3 New bands and BW allocation for 5G terrestrial broadcast - part 2

#### 9.3.4 BS RF requirements

**R4-2313083 Introduction of 5G broadcast UHF bands to 36.104**

*Type: CR For: Agreement  
 36.104 v18.2.0 CR-4979 rev Cat: B (Rel-18)  
  
 Source: Rohde & Schwarz, SWR, Qualcomm, EBU*

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

**R4-2313084 TP to TR 36.8xx: Addition of summary of emission requirements for 5G broadcast**

*Type: other For: Approval  
 Source: Rohde & Schwarz*

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

**R4-2313788 5G Broadcast basestation EVM**

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

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

#### 9.3.5 Moderator summary and conclusions

**[108][315] LTE\_terr\_bcast\_bands\_BSRF, AI 9.3.4**

**R4-2314251 Topic summary for [108][315] LTE\_terr\_bcast\_bands\_BSRF**

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

**Decision: Return to**

**Issue 1-1: EVM vs. MER requirement for 5G broadcast**

* Proposals
  + Option 1: Use EVM only
  + Option 2: Replace EVM with MER
  + Option 3: Add MER on top of EVM
* Recommended WF
  + Option 1

**Issue 1-2: Window length parameters**

* Proposals
  + Option 1: Use the 10 MHz channel bandwidth window length parameters for 5G broadcast configured with pmch-Bandwidth of 6, 7, and 8 MHz.
  + Option 2: Other
* Recommended WF
  + TBA

## 10 Liaison and output to other groups

#### 10.2.3 Others

**Response LS to RAN5 on NTN clarification**

**R4-2311688 Discussion on LS response to RAN5 on clarifications for Non-Terrestrial Networks**

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

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

**R4-2311767 NTN Doppler handling**

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

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

**R4-2312369 Discussion on RAN5 LS to RAN4 - R5-233672 LS on clarifications for Non-Terrestrial Networks**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The scope of this document is to discuss replies for R5-233672 (LS to RAN4): LS on clarifications for Non-Terrestrial Networks. Please also consider R5-233941 - Ephemeris file generation methodology for NTN NR UE testing.

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

**R4-2313262 Views on RAN5 LS on clarifications for Non-Terrestrial Networks**

*Type: other For: Discussion  
 Source: Apple*

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

**R4-2313372 On the reply to LS R5-233672**

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

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

**R4-2313489 Discussion on the reply LS to RAN5 on NTN clarifications**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Decision:** The document was **not treated**.

**R4-2313635 Clarifications for Non-Terrestrial Networks LS response to RAN5**

*Type: discussion For: Discussion  
 Source: Keysight Technologies UK Ltd, THALES*

**Abstract:**

Related to LS R4-2311011

**Decision:** The document was **not treated**.

**R4-2313640 Reply LS on clarifications for Non-Terrestrial Networks**

*Type: LS out For: Approval  
 to RAN5  
 Source: Keysight Technologies UK Ltd, THALES*

**Decision:** The document was **not treated**.

**R4-2313636 Clarifications to 38.101-5 (Rel-17)**

*Type: CR For: Agreement  
 38.101-5 v17.4.0 CR-0034 rev Cat: F (Rel-17)  
  
 Source: Keysight Technologies UK Ltd, THALES*

**Abstract:**

Related to LS R4-2311011

**Decision:** The document was **not treated**.

**R4-2313637 Clarifications to 38.101-5 (Rel-18)**

*Type: CR For: Agreement  
 38.101-5 v18.2.0 CR-0035 rev Cat: A (Rel-18)  
  
 Source: Keysight Technologies UK Ltd, THALES*

**Abstract:**

Related to LS R4-2311011

**Decision:** The document was **not treated**.

**R4-2313638 Clarifications to 36.102**

*Type: CR For: Agreement  
 36.102 v18.2.0 CR-0019 rev Cat: F (Rel-18)  
  
 Source: Keysight Technologies UK Ltd, THALES*

**Abstract:**

Related to LS R4-2311011

**Decision:** The document was **not treated**.

**R4-2313639 New Annex B.8 definition for High level test procedure for SAN RRM tests**

*Type: CR For: Agreement  
 36.133 v18.2.0 CR-7246 rev Cat: F (Rel-18)  
  
 Source: Keysight Technologies UK Ltd, THALES*

**Abstract:**

Related to LS R4-2311011

**Decision:** The document was **not treated**.

### 10.4 Moderator summary and conclusion

**[108][332] LS\_NTN\_R5-233672, AI 10.2.3 (R4-2311688, R4-2311767 , R4-2313262,R4-2313372, R4-2313489 , R4-2313635 R4-2313636, R4-2313637, R4-2313638, R4-2313639 R4-2313640)**

**R4-2314268 Topic summary for [108][332] LS\_NTN\_R5-233672**

*Type: other For: Information  
 Source: Moderator (Thales)*

**Discussion:**

**Decision: Return to**

**Issue 1-1-1:** GSO & GEO **(GEO is a particular subset of GSO)**

* Proposals
  + Option 1: **Replace GSO with GEO in TS 38.133**, if companies insist to test zero-Doppler and/or zero-time variant conditions for this particular case.
* Recommended WF
  + TBA

**Issue 1-1-2:** Testing **(variable) Doppler effect**

* Proposals
  + Option 1: Consider **testing (variable) Doppler effect** for both GSO and NGSO. (THALES, Huawei)
* Recommended WF
  + TBA

**Issue 1-1-3:** Testing **(variable) time delay/drift**

* Proposals
  + Option 1: Consider **testing (variable) time delay/drift** for both GSO and NGSO.
* Recommended WF
  + TBA

**Issue 2-1-1: Q1a:** Are all the section 6 and section 7 RF Tx/Rx requirements defined in TS 38.101-5 applicable to both GSO and NGSO?

* Proposals
  + Option 1: **Yes.** Requirements defined in section 6 and 7 in TS 38.101-5 are applicable to both GSO and NGSO. In case UE supports both types of satellites worst case requirements testing (NGSO) could suffice to demonstrate requirements compliance for both types of satellites for all the requirements. Same applies to requirements defined in section 6 and 7 in TS 36.102. (Keysight Technologies UK Ltd, THALES, MediaTek, Qualcomm, Apple, Huawei)
    - **Note:** It is RAN4 assumption that the requirements still apply to both GSO and NGSO unless otherwise stated, this applies to both 38.101-5 and 36.102. See specific answers below on Frequency Error.
* Recommended WF
  + Option 1 if no strong concern from other company.

**Issue 2-1-2: Q1b:** Are there any NR NTN demod performance requirements applicable to GSO (even if not defined in TS 38.101-5)?

* Proposals
  + Option 1: Legacy requirements defined in TS 38.101-4 sections 5 and 6 **are applicable to both GSO and NGSO satellites**. (Keysight Technologies UK Ltd, THALES)
  + Option 2: Legacy demod performance requirement in 38.101-4/36.101 **are applicable to GSO**. GSO-only UE is only required to be tested requirements in 38.101-4/36.101 if applicable. (MediaTek)
  + Option 3: Current NR NTN demod performance requirements only apply for NGSO. **There is no demod performance requirement applicable to GSO.** (Apple)
* Recommended WF
  + It seems the answer is YES.
  + Maybe Option 2 could be further considered if no strong concern from other company.

**Issue 2-2-1: Q2a:** With regards to zero Doppler conditions indicated in section 6 and section 7 requirements in TS 38.101-5:

* Q2a1: Specifically, for NGSO where satellite orbit introduces a time varying Doppler shift and time varying propagation delay, is it expected to emulate zero Doppler condition in conformance testing of these section 6 and section 7 requirements?
* Q2a2: For GSO (different from GEO), do we need to emulate any Doppler shift/propagation delay in conformance testing?
* Q2a3: For GEO, do we need to emulate any Doppler shift/propagation delay in conformance testing?
* Proposals
  + Option 1: (Keysight Technologies UK Ltd)
    - Zero Doppler conditions are applicable to all RF requirements specified in sections 6 and 7 in 38.101-5 and 36.102.
      * Consequently, constant delay shall be emulated independently of the type of satellite.
      * This will represent realistic testing conditions for GEO satellites and a static snapshot of the satellite orbit in a concrete instant for GSO satellites (with inclination different from 0º) and NGSO satellites.
  + Option 2: (MediaTek)
    - For NGSO, for zero doppler testing of section 6 and 7 requirements (other than Frequency Error), RAN4 expects the same test conditions as for terrestrial UE conformance testing of those requirements.
      * Therefore RAN4 would expect a test mode to be used such that the UL pre-compensation mechanism and associated functions will not be active in the UE for verification of those requirements.
      * For Frequency Error, it is expected that only non-zero doppler is tested.
    - For GSO, RAN4 expects the same requirements verification approach as for NGSO for requirements other than Frequency Error.
    - RAN4 view is that it is not needed to emulate Doppler shift or time delay variations for GEO.
  + Option 3: (Qualcomm)
    - No. There are no UE RF requirements specific to NGSO.
    - No for RF.
    - No for RF.
  + Option 4: (Apple)
    - Yes except for frequency error requirement where **both zero and non-zero Doppler are emulated**. Applicability to TS 36.102 is the same as for TS 38.101-5.
    - RF requirements do not have GSO/NGSO dependency.
    - RF requirements do not have GEO/MEO/LEO dependency.
  + Option 5: (Nokia, Nokia Shanghai Bell)
    - **For NGSO scenarios there will always be UL Doppler introduced by the UE pre-compensation to be considered by the test equipment. The only way to set this to zero is to create a scenario where the satellite movement is set to zero (akin to the GEO scenario).**
      * Moderator note: Good deduction.
    - For the scope of the work item, the reference scenarios are GEO and LEO (NGSO). So, as long as both reference scenarios are considered, NGSO scenarios are contemplated by the UE conformance. **The focus of the tests seems to be GEO and LEO**, therefore, there in our opinion there is **no need to simulate doppler variation for NGSO scenarios**.
      * Moderator note: here it seems to be a contradiction in the same note. LEO is NGSO and therefore the channel has a high Doppler.
    - For GEO scenarios, Doppler variation might be considered negligible in most cases. But once provided with ephemeris information, the UE will always apply a timing advance corresponding to twice the RTT calculated by the UE. So, in order to check for UL transmissions, the test equipment needs to be aware of the UE pre compensation.
      * Moderator note: Good deduction.
  + Option 6: (Huawei)
    - Yes, according to the current spec. Please RAN5 to confirm the feasibility. In the meantime, RAN4 is considering to remove the zero Doppler condition.
      * Moderator note: It makes sense..
    - No.
      * Moderator note: Is not correct to consider that GSO is equivalent to GEO, GEO is a subclass of GSO as explained in Topic #1.
    - Yes. For example, a max Doppler shift of 0.93 ppm was assumed in the study phase.
      * Moderator note: This is correct.
* Recommended WF
  + TBA
  + Moderator Note: **THALES still believes that NGSO (and GSO different from GEO) should be tested against non-zero Doppler.**

**Issue 2-2-2: Q2b:** Under the zero Doppler conditions defined in section 6/7 of TS 38.101-5 and TS 36.102, what are RAN4 assumptions for UE Doppler and delay pre-compensation mechanisms for conformance testing: activated or deactivated?

* Proposals: (Keysight)
  + Option 1: For all types of satellites, the assumptions are that:
    - Doppler pre-compensation mechanism is deactivated
    - Delay pre-compensation mechanism only compensates for a constant delay

To be noticed that these assumptions are not strictly required for GEO satellites.

* + Option 2: Based on the above responses, RAN4 expects UE precompensation mechanisms to be deactivated for conformance testing, other than for Frequency Error requirements verification where we provide a specific response below. (MediaTek)
  + Option 3: Depends on implementation. Note: Question seems to imply there is an external mechanism to activate/deactivate pre-compensation. (Qualcomm)
  + Option 4: Activated (Apple, Nokia, Nokia Shanghai Bell) – because UE **cannot** turn off the pre-compensation.
* Recommended WF
  + TBA
  + Moderator Note: Option 2 seems to be better formulated in terms of Frequency Error. For this reason, Option 1 has been merged with Option 2:
  + For all types of satellites, the assumptions are that:
    - Doppler pre-compensation mechanism is deactivated
    - Delay pre-compensation mechanism only compensates for a constant delay

**Note 1: To be noticed that these assumptions are not strictly required for GEO satellites.**

**Note 2: To be noticed that for Frequency Error requirements verification there will be provided a specific responses below.**

**Issue 2-2-3: Q2c:** Are the zero Doppler or time varying assumptions applicable for conformance testing of RRM test cases in TS 38.133 Annex A.14 and in TS 36.133 Annexes A.13 and A.14?

* Proposals
  + Option 1: NO. **Zero Doppler conditions are not applicable to RRM test cases in TS 38.133 Annex A.14 and in TS 36.133 Annexes A.13 and A.14.** (Keysight, THALES, Nokia, Nokia Shanghai Bell, Huawei)
  + Option 2: At this moment, RAN4 has not yet introduced Ephemeris data to derive non-zero or time-varying Doppler shift. Besides, current AWGN without Doppler shift has been used in the most of test cases. **RAN4 view is that it is not needed to emulate Doppler shift or time delay variations.** (MediaTek)
  + Option 3: Yes (Apple).
* Recommended WF
  + TBA
  + Moderator Note: Please check THALES contribution **R5-233941** from **RAN5 (“Ephemeris file generation methodology for NTN NR UE testing”)** providing testing environment for Doppler and timing variation.

**Issue 2-2-4: Q2d:** Are the zero Doppler or time varying assumptions applicable for conformance testing of demod performance requirements in section 8 in TS 38.101-5 and 36.102?

* Proposals
  + Option 1: Zero Doppler conditions related to satellite motion for DL in service link are applicable to demodulation or CSI reporting test cases in section 8 in TS 38.101-5 and TS 36.102. However, Doppler related to terrestrial model based on TR 38.901 is not zero. (Keysight)
  + Option 2: The frequency drift is not considered in the current demod performance requirements in section 8 of TS 38.101-5 and 36.102. (MediaTek)
  + Option 3: Zero Doppler (Apple)
* Recommended WF
  + TBA
  + Moderator note: Option 1 (which seems better explained) if no strong concerns from other company.

**Issue 2-3-1: Q3a:** For the NTN frequency error requirements defined in section 6.4.1 of TS 38.101-5, what is RAN4 assumption in terms of constant/variable Doppler and delay conditions for the other than zero Doppler conditions for GSO (different from GEO), GEO and NGSO?

* Proposals
  + Option 1: The assumption for the second case of frequency error verification in section 6.4.1 of TS 38.101-5 and in sections 6.4A.1 and 6.4B.1 of TS 36.102 is to test that second case under worst realistic Doppler and delay testing conditions, i.e.:
    - GSO satellite (with inclination different form 0º): Small and slightly variable Doppler with high and slightly variable delay, using Eckstein-Hechler satellite propagator model.
    - NGSO satellite: High and variable Doppler with low and variable delay, using Eckstein-Hechler satellite propagator model. (Keysight, THALES, Huawei except for the propagator)
  + Option 2: (MediaTek)
    - For GSO and GEO it is expected that the Frequency Error requirement is verified only in zero Doppler conditions.
    - For NGSO it is expected that the Frequency Error requirement is verified in constant doppler and delay conditions. It would be expected that Frequency Error is verified in static channel conditions, i.e. with appropriate satellite data provided and with UE location information explicitly provided to the UE to generate static test conditions for the UE.
  + Option 3: (Qualcomm)
    - RAN4 assumed Doppler is constant for frequency error
  + Option 4: (Apple)
    - RAN4 has not discussed nor made any assumption in terms of constant/variable Doppler and delay conditions for the other than zero Doppler conditions for GSO and NGSO. The Doppler and propagation delay characterization can be referenced to TR 38.811 section 5.3 and the scenario parameters can be referenced to TR 38.821 Table 4.2-2
* Recommended WF
  + TBA
  + Option 1 if no strong concerns from other companies.

**Issue 2-3-2: Q3b:** In case of constant Doppler conditions, does RAN4 assume the UE Doppler and delay pre-compensation mechanisms only apply to the constant Doppler while they don’t apply to any time-varying Doppler or time delay introduced by satellite model in conformance testing?

* Proposals
  + Option 1: N/A (Keysight, THALES, Huawei)
  + Option 2: UL precompensation would need to be unchanged at the UE during the Frequency Error verification. As the UE behaviour for UL precompensation is not fully defined (in order to allow for optimisations in the field), to fix the UL pre-compensation in NGSO scenario, RAN4 would expect some form of testing mode in the UE that allows the UL precompensation to be fixed (once adapted to precompensate the target constant UL doppler) during the test case. (MediaTek)
  + Option 3: RAN4 did not make any assumption on this case. (Qualcomm, Apple)
* Recommended WF
  + TBA
  + Outcome depends on the WF for Q3b.

**Issue 2-4-1: Q4a:** For section 6, section 7, section 8 requirements defined in TS 38.101-5, is RAN4 assuming implementation of a satellite propagator model for the service link in conformance testing? This question also applies to section 6, section 7 and section 8 requirements defined in TS 36.102. Please answer in the context of TS 36.102 also.

* Proposals
  + Option 1: (Keysight, THALES) All requirements in sections 6, 7 and 8 in TS 38.101-5 and in TS 36.102, except for the non-zero Doppler conditions case in frequency error requirements, are not assuming any satellite propagator model, while
    - Non-zero Doppler conditions case in frequency error requirements in section 6.4.1 in TS 38.101-5 and in sections 6.4A.1 and 6.4B.1 in TS 36.102
    - All RRM requirements in TS 38.133 Annex A.14 and TS 36.133 Annexes A.13 and A.14 are all assuming Eckstein-Hechler propagator model for the service link in conformance testing.
  + Option 2: No Satellite propagator model has been assumed for both 36.102/38.101-5. (MediaTek, Qualcomm for section 6 and section 7, Apple, Huawei)
* Recommended WF
  + TBA
  + Option 1 seems to be the correct answer, as it can be found also in the annex of TS 38.133.
  + Moderator Note: Is it obvious that at least the RAN should consider/assume a propagator model, otherwise is impossible to test different UEs (each tested UE using potentially different non-standardised propagator).

**Issue 2-4-2: Q4b:** Which RRM test cases listed under Annex A.14 are assuming a satellite motion trajectory based on the ephemeris using Eckstein-Hechler model as defined in TS 38.133 Annex B.5 (applicable also to 36.133 as per agreement in R4-2306370)?

* Proposals
  + Option 1: All RRM requirements in TS 38.133 Annex A.14 and TS 36.133 Annexes A.13 and A.14 are all assuming Eckstein-Hechler propagator model for the service link in conformance testing. (Keysight, THALES, Huawei)
  + Option 2: RAN4 provides high-level guidance as in TS 38.133 Annex B.5 but without detail of Ephemeris information and the corresponding time-varying Doppler and delay shift in the corresponding measurement channel models for test cases listed under Annex A.14. (MediaTek)
  + Option 3: All RRM test cases unless otherwise stated (Apple)
* Recommended WF
  + TBA
  + Option 1 if no strong concerns from other companies
  + Moderator Note: Please check THALES contribution **R5-233941** from **RAN5 (“Ephemeris file generation methodology for NTN NR UE testing”)** providing testing environment for Doppler and timing variation.
  + Moderator Note: Please also see NOKIA comment “the mobility, timing and measurement requirements are all affected by the doppler and/or time variation. Therefore, we would say that all RRM test cases are bound by the satellite propagator model.”

**Issue 2-5-1: Q5a:** For conformance testing of TS 38.101-5 section 8 requirements in multipath fading channel, should UE location updates follow UE motion?

* Proposals
  + Option 1: For those NTN conformance tests in section 8 in TS 38.101-5 and section 8 in TS 36.102 using multipath propagation conditions, there is no need that UE location follows UE movement. Same assumptions as the ones described in responses to Q2b apply. (Keysight, THALES)
  + Option 2: Therefore, RAN4 view is that it is not needed to update UE location to verify demod requirements in TS 38.101-5 and TS 36.102. (MediaTek)
  + Option 3: UE is expected to be stationary in the test chamber. It is unclear whether GNSS is available for UE location identification. (Apple)
* Recommended WF
  + Option 1 seems agreeable.
  + Option 1 and Option 2 can also be combined in a single one: For those NTN conformance tests in section 8 in TS 38.101-5 and section 8 in TS 36.102 using multipath propagation conditions, there is no need that UE location follows UE movement. Same assumptions as the ones described in responses to Q2b apply. Therefore, RAN4 view is that it is not needed to update UE location to verify demod requirements in TS 38.101-5 and TS 36.102.

**Issue 2-5-2: Q5b:** For conformance testing of TS 38.133 Annex A.14 RRM test cases in multipath fading channel, should UE location updates follow UE motion?

* Proposals
  + Option 1: For those NTN conformance tests in, section A.14 in TS 38.133 and sections A.13 and A.14 in TS 36.133 using multipath propagation conditions, there is no need that UE location follows UE movement. (Keysight, THALES)
  + Option 2: RAN4 view is that it is not needed to update UE location to verify RRM requirements in TS 38.133 and TS36.133. (MediaTek)
  + Option 3: If UE motion cannot be emulated in test chamber, UE location can be provided by TE via AT command. (Apple)
  + Option 4: UE location update is applicable in RRM test cases in clause A.14.1.4/A.14.1.8 and A.14.2.1.5/A.14.2.1.6 of 38.133. In these test cases, UE location is set by test equipment via “Update UE Location Information” procedure. For other RRM test cases, UE location is not updated regardless of whether AWGN or multipath fading channel is used. (Huawei)
* Recommended WF
  + TBA
  + Option 1 seems agreeable.
  + Option 1 and Option 2 can also be combined in a single one: For those NTN conformance tests in, section A.14 in TS 38.133 and sections A.13 and A.14 in TS 36.133 using multipath propagation conditions, there is no need that UE location follows UE movement. Therefore, RAN4 view is that it is not needed to update UE location to verify RRM requirements in TS 38.133 and TS 36.133.