**3GPP TSG-RAN WG4 Meeting #104-bis-e R4-22xxxxx**

**Online Meeting, 10 – 21 October 2022**

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

**Title:** **RAN4#104-e BS\_Demod\_Testing Session meeting minutes**

**Agenda Item:** **2**

**Document for:** **Information**

## 3 Incoming LS and meeting report

### 3.2 Session chair notes

BS RF Demod Test Session email thread list

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#** | **Email title** | **WI** | **Topic areas** | **AI** | **Moderator** |
| 301 | [104-e][301] BSRF\_Maintenance | Rel-15/16 NR maintenance (BS RF) NR\_DL1024QAM\_FR1-Core/Perf NB\_IOTenh4\_LTE\_eMTC6-Core/Perf Rel-17 TEI (BS RF related) | Rel-15/16 LTE/NR BS RF maintenance Rel-17 DL 1024QAM BS/UE RF maintennace Rel-17 NB\_IoT/MTC BSRF, RF conformance Rel-17 TEI (BS RF only) | 4.2 5.2.2.1 9.24.2，9.24.3 5.2.4.5 (R4-2212311) | Johan Sköld  AI 4.8 |
| 302 | [104-e][302] BSConformance\_Maintenance | Rel-15/16 LTE/NR BS RF conformance | Rel-15/16 LTE/NR BS RF conformance | 4.3 | Liehai Liu AI 4.8 |
| 303 | [104-e][303] EMC | Rel-15/16 LTE/NR EMC maintenance NR\_repeaters-Core/Perf | Rel-15/16 BS/UE EMC maintenance Rel-17 NR repeater EMC maintenance | 4.4 9.5.4 | Wubin Zhou AI 4.8 |
| 304 | [104-e][304] NR\_Repeater\_RFMaintenance | NR\_repeaters-Core | Rel-17 NR repeater RF maintnenance | 9.5.1, 9.5.2, 9.5.3 | Chunxia Guo AI 9.5.6 |
| 305 | [104-e][305] NR\_Repeater\_RFConformance\_Part1 | NR\_repeaters-Perf | Rel-17 NR repeater RF conformance general part | 9.5.5.1 | Michal Szydelko AI 9.5.6 |
| 306 | [104-e][306] NR\_Repeater\_RFConformance\_Part2 | NR\_repeaters-Perf | Rel-17 NR repeater conformance test cases | 9.5.5.2, 9.5.5.3 | Huiping Shan AI 9.5.6 |
| 307 | [104-e][307] NTN\_Solutions\_SANRF\_Maintenance | NR\_NTN\_solutions-Core | Rel-17 NR NTN WI: SAN (Satellite Access Node) RF | 9.11.1, 9.11.2 | Dorin Panaitopol AI 9.11.8 |
| 308 | [104-e][308] NTN\_Solutions\_RFConformance | NR\_NTN\_solutions-Perf | Rel-17 NR NTN RF conformance | 9.11.3 | Dominique Everaere AI 9.11.8 |
| 309 | [104-e][309] NTN\_Solutions\_UERF\_Maintenance | NR\_NTN\_solutions-Core | Rel-17 NR NTN RF requirements: UE RF | 9.11.4 | Fei Xue AI 9.11.8 |
| 310 | [104-e][310] NR\_exto71GHz\_BSRF | NR\_ext\_to\_71GHz-Core/Perf | Rel-17 NR extending to 71GHz: BS RF requirements, BS RF conformance | 9.14.4 9.14.5 | Toni lahteensuo AI 9.14.9 |
| 311 | [104-e][311] NR\_eIAB\_RFMaintenance | NR\_IAB\_enh-Core/Perf | Rel-17 NR eIAB RF maintenance and RF conformance testing | 9.15.1 9.15.2 | Yankun Li AI 9.15.4 |
| 312 | [104-e][312] RAIL\_900MHz\_RF | NR\_RAIL\_EU\_900MHz-Core/Perf | Rel-17 5G NR applicable for Rail Mobile Radio on 900MHz | 8.2.1 | Michal Szydelko AI 8.2.3 |
| 313 | [104-e][313] LS\_Response\_ITU-R |  | LS response for ITU-R: LS RP-212699 ITU-R WP5D | 6.1 | Johan Sköld  AI 6.1 |
| 314 | [104-e][314] FS\_NR\_BS\_RF\_evo | FS\_NR\_BS\_RF\_evo | Rel-18 NR BS RF requirements evoluation | 11.4 | Liehai Liu AI 11.4.3 |
| 315 | [104-e][315] FS\_NR\_duplex\_evo | FS\_NR\_BS\_RF\_evo | Rel-18 NR Duplex evoluation SI | 11.13 | Yankun Li AI 11.13.4 |
| 316 | [104-e][316] LTE\_terr\_bcast\_bands\_BSRF | [LTE\_terr\_bcast\_bands\_part2-Core | New bands for 5G terrestrial broadcast: BS RF | 12.4.4  R4-2211555/ R4-2211981/ R4-2211982/ R4-2212099( Proposal3 only), R4-2111585 (proposal 3 only) | Susanne Rath AI 12.4.5 |
| 317 | [104-e][317] IoT\_NTN\_Co-existence\_SANRF | LTE\_NBIOT\_eMTC\_NTN\_req-Core | Rel-18 IoT NTN SAN RF, system parameters and co-existence | 12.5.2, 12.5.3, R4-2214019 (proposal 1 only) | Fei Xue AI 12.5.6 |
| 318 | [104-e][318] Demod\_Maintenance\_BS | Rel-15/16 Demod maintenance Rel-17 BS demod maintenance | Rel-15/16 BS demod maintenance Rel-17 BS demod maintenance | 4.6.3 ~~5.2.4.4 (BS part)~~ | Aijun Cao AI 4.8 |
| 319 | [104-e][319] Demod\_Maintenance\_UE | Rel-15/16 Demod maintenance NR\_DL1024QAM\_FR1-Perf NR\_HST\_FR1\_enh-Perf NR\_UE\_pow\_sav\_enh-Perf | Rel-15/16 Demod maintenance: UE part Rel-17 DL 1024QAM Demod maintenance Rel-17 FR1 HST demod Rel-17 Powersaving demod | 4.6.1,4.6.2 5.2.2.2 5.2.4.4 (UE part) 9.6.3 9.12.3 | Manasa Raghavan AI 4.8 |
| 320 | [104-e][320] NR\_HST\_FR2\_Demod | NR\_HST\_FR2-Perf | Rel-17 NR FR2 HST Demod requirements | 9.7.4 | Yunchuan Yang AI 9.7.5 |
| 321 | [104-e][321] NR\_perf\_enh2\_Demod | NR\_demod\_enh2-Perf | Rel-17 performance requirements enhancement: General, CRS-IM | 9.10 | Shan Yang AI 9.10.3 |
| 322 | [104-e][322] NR\_NTN\_Demod\_Part1 | NR\_NTN\_solutions-Perf | Rel-17 NTN demodulation part: General, UE part | 9.11.7.1 9.11.7.3 | Bin Han AI 9.11.8 |
| 323 | [104-e][323] NR\_NTN\_Demod\_Part2 | NR\_NTN\_solutions-Perf | Rel-17 NTN demodulation part:BS part | 9.11.7.1 (BS part only) 9.11.7.2 | Tricia Li AI 9.11.8 |
| 324 | [104-e][324] NR\_exto71GHz\_Demod\_Part1 | NR\_ext\_to\_71GHz-Perf | Rel-17 NR extending to 71GHz demodualtion:General, BS part | 9.14.8.1, R4-2213804 (proposal 3 and 4) 9.14.8.3 | Rafael Paiva AI 9.14.9 |
| 325 | [104-e][325] NR\_exto71GHz\_Demod\_Part2 | NR\_ext\_to\_71GHz-Perf | Rel-17 NR extending to 71GHz demodualtion:UE part | 9.14.8.2 R4-2212673, R4-2213967, R4-2213804 (proposal 1 and proposal 2), R4-2213803 (Proposal 1), R4-2212105 (Proposal 8 and proposal 9) | Pierpaolo Vallese  AI 9.14.9 |
| 326 | [104-e][326] NR\_cov\_enh\_Demod | NR\_cov\_enh-Perf | Rel-17 NR coverage enhancement WI: demodulation part | 9.16.2 | Jingzhou Wu AI 9.16.3 |
| 327 | [104-e][327] NR\_FeMIMO\_Demod | NR\_feMIMO-Perf | Rel-17 FeMIMO: demodulation part | 9.17.4 | Yunchuan Yang AI 9.17.5 |
| 328 | [104-e][328] NR\_RedCap\_Demod | NR\_redcap-Perf | Rel-17 Reduced capability NR device: demodulation part |  | Kazuyoshi Uesaka AI 9.18.6 |
| 329 | [104-e][329] NR\_IIOT\_URLLC\_enh\_Demod | NR\_IIOT\_URLLC\_enh-Perf | Rel-17 NR\_IIOT\_URLLC\_enh WI: Demodulation part | 9.21.3 | Axel Muller AI 9.21.4 |
| 330 | [104-e][330] NB-IOT\_MTC\_Demod | NB\_IOTenh4\_LTE\_eMTC6-Perf | Rel-17 Additional enhancements for NB-IoT and LTE-MTC: demodulation part | 9.24.6 | Tricia Li AI 9.24.7 |
| 331 | [104-e][331] NR\_MIMO\_OTA | FS\_NR\_MIMO\_OTA\_test NR\_MIMO\_OTA | Rel-16 MIMO OTA SI maintenance Rel-17 NR MIMO OTA Test | 4.7 9.1 | Xuan Yi AI 9.1.4 |
| 332 | [104-e][332] FR1\_TRP\_TRS\_Part1 | NR\_FR1\_TRP\_TRS | Rel-17 FR1 TRP, TRS: General, SA, EN-DC test methodology | 9.2.1, 9.2.2.1, 9.2.2.2, 9.2.3 | Ruixin Wang AI 9.2.4 |
| 333 | [104-e][333] FR1\_TRP\_TRS\_Part2 | NR\_FR1\_TRP\_TRS | Rel-17 FR1 TRP, TRS: Multi antenna, Others including test time reduction | 9.2.2.3, 9.2.2.4 | Qifei Liu AI 9.2.4 |
| 334 | [104-e][334] FS\_NR\_FR2\_OTA\_enh | FS\_NR\_FR2\_OTA\_enh | Rel-18 FR2 OTA test method enhancement | 11.5 11 (R4-2213179,2213180) | Bin Han AI 11.5.4 |

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

### 4.8 Moderator summary and conclusions

**[104-e][301] BSRF\_Maintenance, AI 4.2, 5.2.2.1, 9.24.2, 9.24.3, 5.2.4.5 (R4-2212311)– Johan Sköld**

**R4-2214161 Email Discussion Summary for [104-e][301] BSRF\_Maintenance**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][302] BSConformance\_Maintenance, AI 4.3– Liehai Liu**

**R4-2214162 Email Discussion Summary for [104-e][302] BSConformance\_Maintenance**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][303] EMC, AI 4.4, 9.5.4 – Wubin Zhou**

**R4-2214163 Email Discussion Summary for [104-e][303] EMC**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][318] Demod\_Maintenance\_BS, AI 4.6.3– Aijun Cao**

**R4-2214178 Email Discussion Summary for [104-e][318] Demod\_Maintenance\_BS**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][319] Demod\_Maintenance\_UE, AI 4.6.1,4.6.2, 5.2.2.2, 5.2.4.4 (UE part), 9.6.3, 9.12.3– Manasa Raghavan**

**R4-2214179 Email Discussion Summary for [104-e][319] Demod\_Maintenance\_UE**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

## 5 Rel-17 maintenance for LTE and NR

### 5.3 Moderator summary and conclusions

## 6 LS response to ITU

**[104-e][313] LS\_Response\_ITU-R, AI 6.1– Johan Sköld**

**R4-2214173 Email Discussion Summary for [104-e][313] LS\_Response\_ITU-R**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

## 7 Rel-17 feature list

## 8 Rel-17 spectrum related WIs for NR

### 8.2 Introduction of 900 MHz spectrum to 5G NR applicable for Rail Mobile Radio

#### 8.2.3 Moderator summary and conclusions

**[104-e][312] RAIL\_900MHz\_RF, AI 8.2.1, Michal Szydelko**

**R4-2214172 Email Discussion Summary for [104-e][312] RAIL\_900MHz\_RF**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

## 9 Rel-17 non-spectrum related work items for NR and LTE

### 9.1 Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) requirements for NR UEs

#### 9.1.4 Moderator summary and conclusions

**[104-e][331] NR\_MIMO\_OTA, AI 9.1– Yuan Yi**

**R4-2214191 Email Discussion Summary for [104-e][331] NR\_MIMO\_OTA**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.2 Introduction of UE TRP (Total Radiated Power) and TRS (Total Radiated Sensitivity) requirements and test methodologies for FR1 (NR SA and EN-DC)

#### 9.2.4 Moderator summary and conclusions

**[104-e][332] FR1\_TRP\_TRS\_Part1, AI 9.2.1, 9.2.2.1, 9.2.2.2, 9.2.3– Ruixin Wang**

**R4-2214192 Email Discussion Summary for [104-e][332] FR1\_TRP\_TRS\_Part1**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][333] FR1\_TRP\_TRS\_Part2, AI 9.2.2.3, 9.2.2.4– Qifei Liu**

**R4-2214193 Email Discussion Summary for [104-e][333] FR1\_TRP\_TRS\_Part2**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.5 NR repeater

#### 9.5.6 Moderator summary and conclusions

**[104-e][304] NR\_Repeater\_RFMaintenance, AI 9.5.1, 9.5.2, 9.5.3– Chuaxia Guo**

**R4-2214164 Email Discussion Summary for [104-e][304] NR\_Repeater\_RFMaintenance**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][305] NR\_Repeater\_RFConformance\_Part1, AI 9.5.5.1– Michal Szydelko**

**R4-2214165 Email Discussion Summary for [104-e][305] NR\_Repeater\_RFConformance\_Part1**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][306] NR\_Repeater\_RFConformance\_Part2, AI 9.5.5.2, 9.5.5.3– Huiping Shan**

**R4-2214166 Email Discussion Summary for [104-e][306] NR\_Repeater\_RFConformance\_Part2**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.7 NR support for high speed train scenario in FR2

#### 9.7.5 Moderator summary and conclusions

**[104-e][320] NR\_HST\_FR2\_Demod, AI 9.7.4– Yunchuan Yang**

**R4-2214180 Email Discussion Summary for [104-e][320] NR\_HST\_FR2\_Demod**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.10 Further enhancement on NR demodulation performance

#### 9.10.3 UE demodulation and CSI requirements

**[104-e][321] NR\_perf\_enh2\_Demod, AI 9.10– Shan Yang**

**R4-2214181 Email Discussion Summary for [104-e][321] NR\_perf\_enh2\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecom)*

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**GTW minutes on August 16th**

**List of open issues**

* Topic #1: MMSE-IRC receiver for inter-cell and intra-cell inter-user interference
  + Issue 1-1: Interference modelling in PDCCH region
  + Issue 1-2: T-put gain requirement for MMSE-IRC based CQI reporting
* Topic #2: CRS-IM in scenarios with overlapping spectrum for LTE and NR
  + Issue 2-1-1: Whether the same CRS-IM test requirements can be applied in the two sets of test setup in scenario 2
  + Issue 2-1-2: Extra time for CHBW information detection in the test with only inter-RAT MO configured in scenario 2
  + Issue 2-2-1: Test applicability for CRS-IM scenario 2
  + Issue 2-4-1: How to solve the problem that if default assumptions is invalid
  + Issue 2-4-2: Whether Cell ID should be mandatory to be signalled when network decides to indicate other parameters to the UE

**Topic #1: MMSE-IRC receiver for inter-cell and intra-cell inter-user interference**

**Issue 1-1: Interference modelling in PDCCH region**

* Proposals
  + Option A: Assume PDCCH is interfered by the neighbor cell interference (China Telecom, Apple, Nokia, CMCC, Ericsson, MTK, NTT DOCOMO)
    - Option A1: All the REs in control region filled with QPSK randomly modulated symbols with random precoding for the number of antenna ports (Nokia, CMCC slightly preferred, Ericsson, MTK, NTT DOCOMO)
      * Nokia, CMCC: option 1 is easiest, while option 2 will require companies to reach an agreement on defining the PDCCH parameters
    - Option A2: Assume PDCCH transmission from interference cells, and for each cell, OCNG signal is transmitted on each RE that is not occupied by the PDCCH of this cell (China Telecom, Apple - slightly preferred, MTK)
  + Option B: Assume PDCCH transmission from interference cells which is non-overlapping with serving cell. (Huawei)
* Discussion:
  + Apple: We prefer A2, we can reuse same configuration from serving cell for interference. We are fine with A1 as well since no difference from UE performance aspect.
  + Huawei: We can compromise to A1 to simplify the test.
  + CMCC: How to reflect option A1 into specification, similar way as LTE?
  + Nokia: We can reuse the same way as LTE.
* Agreement: Option A1 agreed. “All the REs in control region filled with QPSK randomly modulated symbols with random precoding for the number of antenna ports”

**Issue 1-2: T-put gain requirement for MMSE-IRC based CQI reporting**

* Proposals
  + For 2Rx:
    - Option 1: 2.0 (CTC, Nokia, Ericsson, Huawei, MTK, Qualcomm)
    - Option 2: 1.8 (Apple)
  + For 4Rx:
    - Option 1: 2.5 (CTC)
    - Option 2: 2.0 (Nokia, Ericsson, Huawei, MTK, Qualcomm)
    - Option 3: 1.9 (Apple)
  + CTC: the averaged T-put gain is at least 2.11 for 2Rx, and 2.53 for 4Rx.
  + Apple: From the simulation results setting the TP gain as requirement a 2.0 for 2RX and 2.2 for 4RX seems suitable. Taking into account impairment and implementation margin.
* Discussion:
  + Apple: Based on the simulation results and considering the extra implementation margin, we proposed option 2 (1.8) for 2Rx and option 3(1.9) for 4Rx.
  + Ericsson: We will provide the summary on results and we can further check based on the collected results

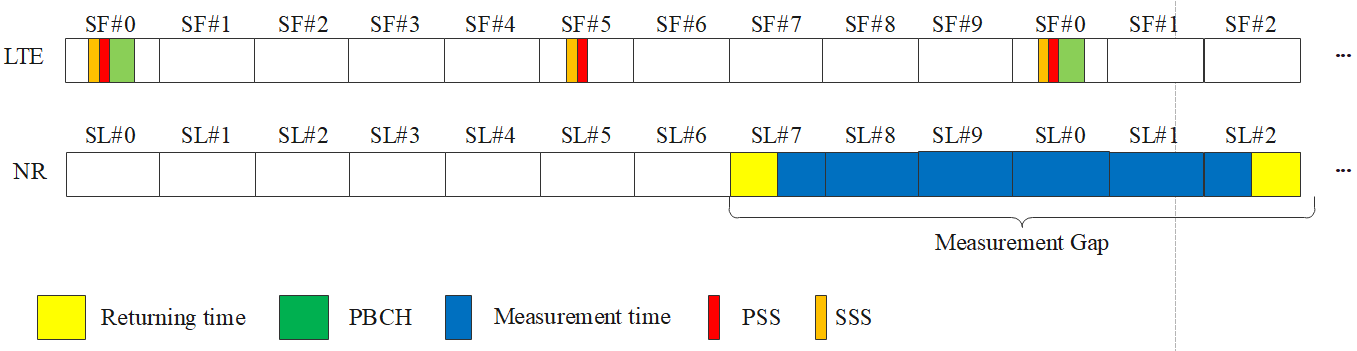
**Topic #2: CRS-IM in scenarios with overlapping spectrum for LTE and NR**

**Issue 2-1-1: Whether the same CRS-IM test requirements can be applied in the two sets of test setup in scenario 2**

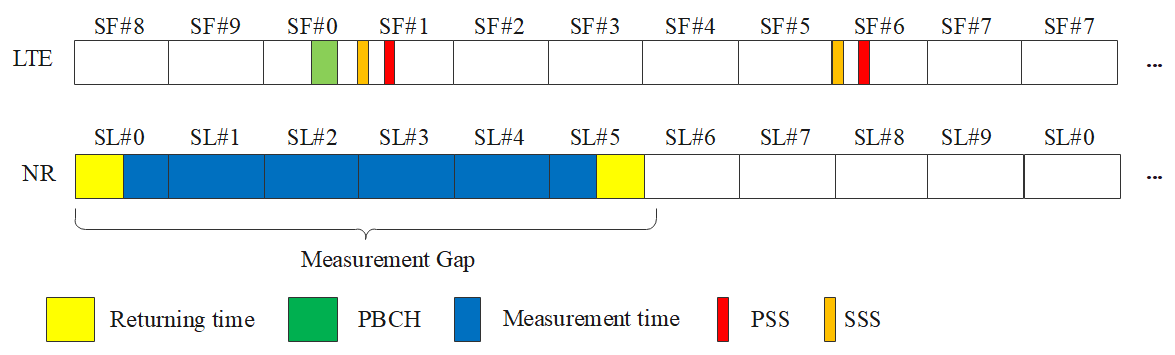
* Proposals:
  + Option 1: Same requirement applies for the two sets of test setup (i.e., with NWA and with only inter-RAT MO configured) in scenario 2. (China Telecom, CMCC, QC, E///, Nokia, ZTE, Apple)
* Agreement: Option 1 agreed

**Issue 2-1-2: Extra time for CHBW information detection in the test with only inter-RAT MO configured in scenario 2**

* Proposals on the Measurement Gap offset:
  + Option 1: For 15 kHz SCS, configure gap offset to 7 for FDD and 0 for TDD to make LTE’s PBCH in middle of measurement gap. (Huawei)



**Figure: Measurement gap pattern for 15 kHz FDD**



**Figure: Measurement gap pattern for 15 kHz TDD**

* + Option 2: No need to restrict the PBCH decoding to be in the middle of the gap. (E///, ZTE, Apple)
    - E///: There is a description in 38.133: 'When measurement gaps are needed, the UE is not expected to detect SSB which start earlier than the gap starting time + switching time, nor detect SSB which end later than the gap end – switching time. Switching time is 0.5ms for frequency range FR1 and 0.25ms for frequency range FR2'
* Proposals on the time period length before PDSCH scheduling
  + Proposals on Period 1 for cell identification
    - Option 1: 3840ms (CMCC, ZTE, Huawei, Apple, Qualcomm)
      * Apple: both LTE cells are on the same frequency layer
    - Option 2: 2 x 3840ms = 7680ms (Ericsson)
      * E///: Considering 2 interference cells, parameter CSSFinterRAT should be as 2
  + Proposals on Period 2 for PBCH decoding
    - Option 1: 500 ms (CMCC, ZTE, Huawei, Ericsson)
    - Option 2: 800 ms (Apple, E/// - fine, Qualcomm)
      * Apple: For the weaker LTE cell, in the presence of interference from other LTE cell, for 99.99% successful decoding 6 samples are needed for 2x2 and 5 samples are needed for 4x2. Considering implementation margin, we think 8 coherence times are necessary for successful PBCH decoding on both LTE cells.
* Discussion:

Measurement gap offset

* + Huawei: Option 1 with configured PBCH in the middle can ensure the best performance to avoid the overlapping with serving cell PBCH and CSI-RS signals.
  + Apple: CSI-RS can always be configured to avoid the overlapping with PBCH.
  + CMCC: Option 2 is the criteria we can follow; option 1 is detailed configured which also following the criteria. We are fine with option 1 or other configuration options.
  + MTK: We slightly prefer no limitation in RAN4 specification, we can leave the details of test set-up to RAN5.
  + Ericsson: We believe TS 38.133 already have clear definition; we should not introduce any additional restrictions.
  + Qualcomm: We would like to check with our RRM colleagues and come back later.
  + China Telecom: We agree with CMCC, the criteria in option 2 is the correct understanding. For detailed test set-up, option 1 also fine with us. We also need to consider NR carrier 30kHz SCS. We think this parameter need to be specified in RAN4.

Period 1 for cell identification/ Period 2 for PBCH decoding

* + Ericsson: We are fine with option 1 based on the clarifications from companies.
  + Qualcomm: For period 1, we support option 1; for period 2, we support option 2.
  + Apple: We proposed 800ms for PBCH decoding based on the evaluation results with implementation margin into account.
  + Huawei: Our results show 500ms feasible, but we are also fine with 800ms.
  + MTK: For period 1, we support option 1; and period 2 we support option 2.
  + ZTE: For period 1, option 1 fine; period 2, we think 500ms enough.
  + CMCC: For period 1, option 1 fine; period 2 we are fine with option 2 also we prefer shorter value.
  + China Telecom: For period 2, we think 500ms enough based on the analysis in previous RAN4 meeting; meanwhile considering the major purpose of this requirement is to verify CRS-IM processing we are also fine to have more margin on period 2.
* Agreement:
  + Measurement gap offset: The test set-up for measurement gap offset shall follow the criteria specified in TS 38.133; companies further check RRM specification.
  + Period 1 for cell identification/ Period 2 for PBCH decoding:
    - Period 1: 3840ms
    - Period 2: 800ms

**Issue 2-2-1: Test applicability for CRS-IM scenario 2**

* Proposed test applicability for UEs declare to support CRS-IM both with and without NWA on a certain each SCS
  + Option 1: UE is only required to pass performance requirements without NWA signalling based test setup, i.e. UE capability #2 and #4. (China Telecom, CMCC, Ericsson, ZTE, Nokia - compromise)
  + Option 2: The UE is only required to pass performance requirements with NWA signalling based test setup, i.e. UE capability #3 and #5. (Nokia, Huawei slightly preferred, Apple)
* Discussion:
  + Apple: Our preference is option 2 since the baseline assumption will be with NWA signaling.
  + China Telecom: We prefer option 1. We believe without NWA require more UE complexity with detection on BW required.
  + CMCC: We share same view as China Telecom, if UE can ensure performance without NWA, then UE can also support CRS-IM with NWA signaling.
  + Huawei: We slightly prefer option 2 since test case without NWA signaling require more complicated test set-up.
  + ZTE: We prefer option 1. We need to verify UE no mis-detection if UE declares to support CRS-IM without NWA.
  + Nokia: This is specific for the case UE support both cases with and without NWA signaling. We think the test cases already be there.
  + Ericsson: We support option 1, otherwise we can’t ensure UE shall detect parameters without NWA signaling.
* Agreement: Option 1: UE is only required to pass performance requirements without NWA signaling based test setup, i.e. UE capability #2 and #4.

**Issue 2-4-1: How to solve the problem that if default assumptions is invalid**

* Proposals:
  + Proposal 1: Invite companies to give some feedback how to solve the problem that if default assumption is invalid and UE doesn't know that, UE will perform CRS-IM with wrong assumptions and system performance degradation will be observed. (Huawei)
  + Proposal 2: Define a single bit network assistance signaling to indicate whether it is known that deployment is aligned with default network assumptions or not. (Qualcomm, Apple, Huawei, MTK)
  + Nokia: From RAN4-102e WF: “Note: It’s RAN4 common understanding it’s up to UE implementation to turn on/off CRS-IM with reasonable performance.”
* Discussion:
  + Huawei: We support proposal 2 since it can avoid the performance degradation and bring benefits for saving power assumption.
  + QC: We understand that there is agreement in previous meeting to leave it for UE implementation. We would like to avoid performance degradation.
  + Nokia: We brought up this issue 2 meetings ago, at that time we leave it to UE implementation with reasonable performance. We should be careful for the cross WG impact given Rel-17 ASN.1 already frozen.
  + CMCC: If the default assumption not valid, NWA signaling can be indicated to UE; not clear what’s the issue?
  + China Telecom: We think option2 can’t fully resolve the issue mentioned in option 1. For new bit on disable CRS-IM receiver, we are open for the discussion.
  + Apple: We are discussing if the default assumption not valid, and UE not aware of this, then performance will be degraded.
  + MTK: We support proposal 2.
  + Huawei: Inform UE that default assumption not valid, then it’s up to UE implementation turn on/off CRS-IM receiver.
  + QC: We have similar comment as Huawei.
  + Nokia: In previous agreement, UE need to ensure reasonable performance.
  + CMCC: It’s still not clear what’s the purpose of this 1bit signaling.
  + ZTE: We think this can leave to UE implementation.

**Issue 2-4-2: Whether Cell ID should be mandatory to be signalled when network decides to indicate other parameters to the UE**

* Proposals:
  + Proposal 1: if network decides to indicate other parameters in network assistance information, it should also indicate the Cell Id so that the UE can distinguish which cell that information belongs to. (Qualcomm, Apple)
  + Not support proposal 1 (E///, Nokia, ZTE, CMCC, Huawei)
    - Nokia, ZTE: v-shift information shall not be informed. So if Cell ID is mandatory to be signalled
* Discussion:
  + QC: NW can inform information with up to 8 cells, it’s better to inform Cell ID information otherwise it’s difficult for UE to use NWA information. V-shift can be acquired by cell ID information.
  + Huawei: We don’t think cell ID information is always necessary.
  + Nokia: We think existing NWA didn’t preclude to include cell ID information. If no cell ID information provided, then the parameters applied for cells. Currently NWA design quite flexible and we didn’t strong need to need to update.
  + ZTE: In previous meeting, we already agreed cell ID/v-shift can be informed.
  + CMCC: We share similar view as Huawei.
  + QC: Cell ID information still be optional, we are proposing if other NWA information except v-shift informed, then cell ID information shall be provided as well. I don’t it’s reasonable the parameters applied for all cells if cell ID not provided.
  + Nokia: We still see the possibility the information can be generic.
  + QC: How does UE know the parameters applied for all cells or single cell?
    - If no cell-D/v-shift informed, then parameters indicated by NWA are applied for cells from UE receiver baseline assumption.
    - If NW indicated NWA information except v-shift for multiple cells, then associated cell-ID shall be included.

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.11 Solutions for NR to support non-terrestrial networks (NTN)

#### 9.11.8 Moderator summary and conclusions

**[104-e][307] NTN\_Solutions\_SANRF\_Maintenance, AI 9.11.1, 9.11.2, Dorin Panaitopol**

**R4-2214167 Email Discussion Summary for [104-e][307] NTN\_Solutions\_SANRF\_Maintenance**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**GTW Agenda on August 17th**

List of open issues

* Issue 1-2-1: SAN OTA Tx spurious requirements
* Issue 1-2-2: SAN requirements for the Extreme conditions testing

**Issue 1-2-1: SAN OTA Tx spurious requirements**

* Proposals
  + Option 1: **Specify SAN OTA Tx spurious requirement based on the manufacturer declaration parameter Prated,c,EIRP**
  + Option 2: TBA
* Discussion
  + Ericsson: We think current definition only applied for 1-H, which need to be updated for 1-O.
  + ZTE: Shall be TRP instead of EIRP for spurious emission requirements?

**Issue 1-2-2: SAN requirements for the Extreme conditions testing**

* Proposals
  + Option 1: Remove SAN output power accuracy requirements for the extreme test conditions from TS 38.108.
  + Option 2: TBA
* Discussion:
  + Ericsson: If no extreme condition specified in Rel-17, then core requirement can be removed for this.
  + ZTE: We have same view with Ericsson.
* Agreement: Remove SAN output power accuracy requirements for the extreme test conditions from TS 38.108 by assuming Rel-17 SAN conformance test only cover “normal test condition”

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][308] NTN\_Solutions\_RFConformance, AI 9.11.3– Dominique Everaere**

**R4-2214168 Email Discussion Summary for [104-e][308] NTN\_Solutions\_RFConformance**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**GTW Agenda on August 17th**

List of open issues

* Issue 1-4-1: Extreme conditions
* Issue 1-3-1: Rooms used for testing
* Issue 3-1-2: Measurement set-up (OTA)
* Issue 3-1-1: Measurement uncertainties for radiated requirements
* Issue 1-2-1: Conducted and radiated declarations
* Issue 2-1-3: Dynamic range and EVM conducted
* Issue 3-1-3: Dynamic range and EVM OTA

**Issue 1-2-1: Conducted and radiated declarations**

* Proposals: Independent declaration identifier for conducted testing and radiated testing, using declaration identifier D.x for conducted testing, and declaration identifier DE.x for radiated testing, where x=1, 2
  + Yes (CATT)
  + No. Please, make another proposal.
* Discussion:
  + Huawei: We have single specification covering both radiated and conductive for SAN conformance.
  + CATT: We are fine with single table or separate table but some update needed to discriminate conductive and radiated.
  + Thales: No strong preference.
* Agreement: further discuss offline

**Issue 1-3-1: Rooms used for testing**

* Proposals: For testing purposes, the SAN components can be located in several rooms with different classes.
  + Yes, in clean room up to ISO class 8 (Thales)
  + No. Please, elaborate why.
* Discussion:
  + Thales: We have different classes for clean room with different test conditions. The values seem close to existing TN BS specification.
  + Huawei: We would like to have more discussion for this proposal which seems not applicable for TN. Which document I can refer to? Can we consider only single class?
  + ZTE: Test set-up in RAN4 is informative and we shall the information generic and not sure such details in 3GPP.
  + CATT: There is overlapping for the definition in “clean room” and “normal test condition”. Clean room applied for both conductive and radiated test?
  + Thales: Such information is public from ISO. We can consider a note to refer to ISO.
  + Qualcomm: We consider some informative information in the Annex.
* Agreement:
  + Further discuss whether some relevant informative information can be included in the conformance specification Annex.

Sub-topic description: This sub-topic is related to the test under extreme conditions.

**Issue 1-4-1: Extreme conditions**

* Proposals: Based on ZTE observations, would you agree with the following Way Forward:
  + Evaluate NTN scenario to assess how to define extreme power supply and extreme temperatures for SAN – as the manufacturer declares those limits as operating limits.
  + Other extreme conditions as humidity, are not relevant.
  + Evaluate if and how the Normal test environment may be redefined
  + Investigate testing aspects for the vacuum conditions
* Discussion:
  + Thales: We provide CR for TS 38.108, and explained the reason not considering “extreme test condition” since this pending on manufacture declaration.
  + ZTE: Extreme condition including several parameters besides temperature e.g., barometric pressure.
  + Huawei: I tend to agree that humidity not relevant to SAN, and temperature control system is out of 3GPP scope. We need more study for barometric.
  + Ericsson: Radio performance shall be verified considering real condition in realistic.
  + Thales: The comments from ZTE and Huawei make sense.
  + Ligado/Hughes: We agree with Thales, no need to consider “extreme test condition”.
* Agreement:

Only consider “normal test condition” for Rel-17 SAN RF conformance testing

* Current parameters from BS conformance specification 38.141 shall be considered as starting point
  + Further discuss the parameters including temperature/power supply and barometric pressure and refinement on the values not precluded
* The definition of “normal test condition” shall not impact the agreed SAN RF core requirements.

It’s not precluded to consider “extreme test condition” in future release or Rel-17 conformance maintenance phase.

**Issue 3-1-1: Measurement uncertainties for radiated requirements**

* Proposals: adopt measurement uncertainties in Table 4.1.2.2-2 for OTA transmitter tests and Table 4.1.2.3-2 for OTA receiver tests.

Table 4.1.2.2-2: Maximum OTA Test System uncertainty for FR1 OTA transmitter tests

| Clause | Maximum OTA Test System uncertainty |
| --- | --- |
| 9.2 Radiated transmit power | Normal condition:  ±1.1 dB, f ≤ 3 GHz |
|  | Extreme condition:  ±2.5 dB, f ≤ 3 GHz |
| 9.3 OTA base station output power | ±1.4 dB, f ≤ 3.0 GHz |
| 9.4.3 OTA total power dynamic range | ±0.4 dB |
| 9.6.2 OTA frequency error | ±12 Hz |
| 9.6.3 OTA modulation quality | ±1 % |
| 9.7.2 OTA occupied bandwidth | ±100 kHz, BWChannel 5 MHz, 10 MHz  ±300 kHz, BWChannel 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz, 50 MHz  ±600 kHz, BWChannel 60 MHz, 70 MHz, 80 MHz, 90 MHz, 100 MHz |
| 9.7.3 OTA ACLR/CACLR | f ≤ 3.0 GHz  ±1 dB, BW ≤ 20MHz  ±1 dB, BW > 20MHz  Absolute power ±2.2 dB, f ≤ 3.0 GHz |
| 9.7.4 OTA operating band unwanted emissions | Absolute power ±1.8 dB, f ≤ 3.0 GHz |
| 9.7.5.2 OTA transmitter spurious emissions, mandatory requirements | ±2.3 dB, 30 MHz < f ≤ 6 GHz  ±4.2 dB, 6 GHz < f ≤ 19 GHz |
| 9.7.5.3 OTA transmitter spurious emissions, protection of SAN receiver | ±3.1 dB, f ≤ 3 GHz |
| NOTE 1: Fulfilling the criteria for CLTA selection and placement in clause 4.10 is deemed sufficient for the test purposes. When these criteria are met, the measurement uncertainty related to the selection of the co-location test antenna and its alignment as specified in the appropriate measurement uncertainty budget in TR 37.941 [29] shall be used for evaluating the test system uncertainty.  NOTE 2: Test system uncertainty values are applicable for normal condition unless otherwise stated. | |

Table 4.1.2.3-2: Maximum OTA Test System uncertainty for FR1 OTA receiver tests

|  |  |
| --- | --- |
| Clause | Maximum OTA Test System uncertainty |
| 10.2 OTA sensitivity | ±1.3 dB, f ≤ 3.0 GHz |
| 10.3 OTA reference sensitivity level | ±1.3 dB, f ≤ 3.0 GHz |
| 10.4 OTA dynamic range | ±0.3 dB |
| 10.5.1 OTA adjacent channel selectivity | ±1.7 dB, f ≤ 3.0 GHz |
| 10.6 OTA out-of-band blocking (General) | fwanted ≤ 3.0 GHz:  ±2.0 dB, finterferer ≤ 3.0 GHz  ±2.1 dB, 3.0 GHz < finterferer ≤ 6.0 GHz  ±3.5 dB, 6.0 GHz < finterferer ≤ 12.75 GHz |
| 10.7 OTA receiver spurious emissions | ±2.5 dB, 30 MHz ≤ f ≤ 6.0 GHz  ±4.2 dB, 6.0 GHz < f ≤ 19 GHz |
| 10.9 OTA in-channel selectivity | ±1.7 dB, f ≤ 3.0 GHz |
| NOTE 1: Fulfilling the criteria for CLTA selection and placement in clause 4.10 is deemed sufficient for the test purposes. When these criteria are met, the measurement uncertainty related to the selection of the co-location test antenna and its alignment as specified in the appropriate measurement uncertainty budget in TR 37.941 [29], shall be used for evaluating the test system uncertainty.  NOTE 2: Test system uncertainty values are applicable for normal condition unless otherwise stated. | |

* + Yes (CATT)
  + No. Please describe your proposal.
* Discussion:
  + Huawei: We can use above values as starting point based on the assumption of test set-up can be maintained.
  + Thales: Some refinement needed for spurious emission (5th harmonic and CHBW and frequency ranges).
  + CATT: We can harmonize the changes aligned with TS 38.108 and MU is critical for completing the conformance work.
* Agreement: Endorsed the values with [ ] and further refinement not precluded;
  + The parameters need to be aligned with core specification TS 38.108 for spurious emission and CHBW

**Issue 3-1-2: Measurement set-up**

* Proposals: to use the existing measurement set-up as following for SAN 1-O conformance testing:
  + Yes (ZTE)
  + No, explain why.
* Discussion:
  + Huawei: We are ok taking existing measurement set-up as starting point. How to consider the applicable OTA chamber size? If larger chamber size needed, then MU need to be considered?
  + ZTE: Gateway can be connected by cable and out of chamber room and then existing chamber size can be maintained.
  + Thales: The assumption from ZTE is correct. We also can consider separate ISO classes for clean room for different SAN components.
* Agreement: Use existing measurement set-up from 38.141 for SAN 1-O conformance testing as starting point with necessary refinement if identified

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][309] NTN\_Solutions\_UERF\_Maintenance, AI 9.11.4 – Fei Xue**

**R4-2214169 Email Discussion Summary for [104-e][309] NTN\_Solutions\_UERF\_Maintenance**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][322] NR\_NTN\_Demod\_Part1, AI 9.11.7.1, 9.11.7.3 – Bin Han**

**R4-2214182 Email Discussion Summary for [104-e][322] NR\_NTN\_Demod\_Part1**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][323] NR\_NTN\_Demod\_Part2, AI 9.11.7.1, 9.11.7.2 – Tricia Li**

**R4-2214183 Email Discussion Summary for [104-e][323] NR\_NTN\_Demod\_Part2**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.14 Extending current NR operation to 71GHz

#### 9.14.9 Moderator summary and conclusions

**[104-e][310] NR\_exto71GHz\_BSRF, AI 9.14.4, 9.14.5– Toni lahteensuo**

**R4-2214168 Email Discussion Summary for [104-e][310] NR\_exto71GHz\_BSRF**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**GTW discussion on August 17th**

List of open issues

* Topic #2: Conformance testing
  + Sub-topic 2-2: Test models and TDD pattern
  + Sub-topic 2-3: General measurement environment/chamber
  + Sub-topic 2-4: Link budget inside chamber
  + Sub-topic 2-5: Measurement uncertainty and calibration
  + Sub-topic 2-6: Upper and lower frequency limits
  + Sub-topic 2-7: Measurement frequency step size
  + Sub-topic 2-8: Tx OFF measurement
  + Sub-topic 2-9: OOB blocking feasibility
* Topic #3: BS demod OTA test methodology

**Topic #2: Conformance testing**

Sub-topic 2-2: Test models and TDD pattern

**Issue 2-2-1: Applicable test models**

* Proposals
  + Proposal 1: only NR-FR2-TM1.1, NR-FR2-TM2 and NR-FR2-TM3.1 are applicable for FR2-2.71GHz.
  + Proposal 2: TBA
* Recommended WF
  + TBA
* Agreement: Proposal 1 agreed

**Issue 2-2-2: Test model data length**

* Proposals
  + Proposal 1: Adopt 5ms for test model data length for FR2-2
  + Proposal 2: Focus on using a fixed number of slots ([80 slots]) for EVM measurement time length and test model data length and select the number of slots to ensure a good trade-off between the test time and MU for BS type 2-O transmitter testing in the frequency range between 52.6GHz and 71GHz.
  + Proposal 3: There is no need to adjust the EVM measurement time length depending on TDD pattern used in the text model for BS type 2-O EVM test in the frequency range between 52.6GHz and 71GHz.
* Discussion:
  + Keysight: We proposed 80 slots to proceed the work.
  + ZTE: With fixed number of slots, the duration in general table need to be refined.
* Agreement: Proposal 2 agreed ([80 slot])

Sub-topic 2-3: General measurement environment/chamber

**Issue 2-3-1: General framework**

* Proposals
  + Proposal 1: The suitability of each OTA chamber (Far field anechoic chamber, CATR, Near field chamber, PWS, etc.) for each test in the frequency range between 52.6GHz and 71GHz should be studied and confirmed by TE vendors, or the list of OTA chamber should be updated for each BS type 2-O transmitter test in the frequency range between 52.6GHz and 71GHz.
  + Proposal 2: the existing measurement setup framework in TS 38.141-2 Annex D and Annex E could also been applicable for FR2-2. (*moderator: Already agreed in R4-2210638)*
* Discussion:
  + Moderator suggestion: No update on TS 38.141-2 Annex D and Annex E; and the suitability of OTA chambers analysis can be captured into TR 37.941.
  + Nokia: We encourage to provide some informative information on the suitable OTA chambers.
  + Ericsson: We believe some update still required in Annex D/E for FR2-2. The Annex D/E can be considered as baseline meanwhile additional component maybe required for FR2-2.
  + Huawei: We support the ideal from moderator.
  + ZTE: I tend to agree with Ericsson, some notes maybe required in TS 38.141-2 Annex.
* Agreement: Proposal 1 agreed; FFS any update needed or not in TS 38.141-2 Annex and/or TR 37.941

Sub-topic 2-4: Link budget inside chamber

**Issue 2-4-1: Path loss**

* Proposals
  + Proposal 1: For FR2-2 consider CATR pathloss values for a CATR suitable for FR2-2 testing. Pathloss values in Table 2.1-2 can be used as baseline for FR2-2 (*moderator: see R4-2212465 for the values)*
* **Table 2.1-2: Coupling loss for CATR with area of 2 m2 with , (0 dB)**

|  |  |
| --- | --- |
| **Carrier frequency**  **(GHz)** | **(dB)** |
| 38.0 | 56.1 |
| 47.0 | 57.9 |
| 52.6 | 58.9 |
| 71.0 | 61.5 |

* + Proposal 2: TBA
* Discussion:
  + Keysight: We have concern on the proposal value in proposal 1 which seems not achievable.
  + Nokia: The feedback from TE vendors appreciated.
  + Ericsson: We only consider in-band related test here. Different test cases require separate test set-up.
* Agreement: Further discuss the suitable pathloss values for FR2-2 testing. TE vendors’ feedback is encouraged.

Sub-topic 2-5: Measurement uncertainty and calibration

**Issue 2-5-2: Additional components**

* Proposals
  + Proposal 1: Use of LNA should be in MU budget for FR2-2 except Tx off power measurement.
  + Proposal 2: For MU budget table for Rx testing. MU term of up converter (mixer) and additional power amplifier should be added.
  + Proposal 3: Introduce external mixer stage test setup and corresponding calibration procedures for receiver requirements and out-of-band requirements to improve measurement uncertainty. *(moderator: calibration is further discussed in next issue)*
  + Proposal 4: Consider two configurations for out of band spurious measurement system below 110 GHz and above up to 142 GHz
    - For out of band spurious measurement system, both use or not to use mixer case to consider and then pick larger MU case to use for calculating total test system MU. For above 110 GHz up to 142 GHz, mixer should be assumed and used for MU budget calculation like FR2-1 spurious emission.
* Discussion:
  + Ericsson: We would like to get reasonable MU with feasible test set-up.
  + Keysight: Additional components can be considered in test set-up. Mixer usually have large MU.
  + Ericsson: Additional calibration procedure/step can be considered to control MU.
* Agreement:
  + Use of LNA if applicable should be in MU budget for FR2-2 except Tx off power measurement.
  + FFS whether mixer can be considered for some of test cases if applicable

**Issue 2-5-3: Measurement system calibration**

* Proposals
  + Proposal 1: Add intermediate calibration stage of spectrum analyser absolute power accuracy for DL EIRP measurement, with the intension to break the trend with very large measurement uncertainties for high frequencies.
  + Proposal 2: For test system measurement uncertainty, extend measurement procedures to enable for test setups to break the trend where measurement uncertainty grows rapidly as function of frequency
  + Proposal 3: Introduce external mixer stage test setup and corresponding calibration procedures for receiver requirements and out-of-band requirements to improve measurement uncertainty. *(moderator: focus on calibration, need for components discussed in previous issue)*
  + Proposal 4: Use of power sensor/meter for signal leveling should not be mandated for test system setup because limited condition for use of sensor.
* Discussion:
  + Keysight: Not sure we can use system calibration to reduce MU.
  + Ericsson: MU specified in RAN4 is too relaxed, we would like to consider system calibration which industry already considered to get reasonable MU budget for FR2-2.

**Issue 2-5-4: Measurement uncertainty contributions**

* Proposals
  + Proposal 1: For equipment MU number up to 80 GHz, because these already exist as agreed number, use numbers used in budget for UE. These are;
    - Power measurement equipment for spurious, 1 sigma number from 40.8 GHz to 80 GHz is 2.00
    - Network analyzer, 1 sigma number from 40.8 GHz to 80 GHz is 0.85
* Discussion:
  + Keysight: This value comes from UE budget table; we should reuse for BS/
  + Ericsson: We also need to consider the discussion on the extension of AAS in FR2.
* Agreement:
  + For equipment MU number up to 80 GHz, use numbers used in budget for UE as starting point. These are;
    - Network analyzer, 1 sigma number from 40.8 GHz to 80 GHz is 0.85

Sub-topic 2-6: Upper and lower frequency limits

**Issue 2-6-1: Upper and lower frequency limits**

* Proposals
  + Proposal 1: Choose a frequency slightly larger than Fstep,6 (127GHz) as max limit frequency point, e.g., 130GHz.
  + Proposal 2: Align the maximum limit frequency point for RX with that for TX.
* Discussion:
  + Nokia: Can we check is that possible to consider 142 GHz (2nd harmonic)?
  + Keysight: We would like further check.
  + Ericsson: We follow the logic as FR2-1 with reasonable value for FR2-2 below 2nd harmonic.
  + CATT: We are also fine with 142 GHz if no difficulty observed by TE vendors.
  + Keysight: Beyond 110GHz, no much difference between 130 and 142GHz.
  + ZTE: We agree with CATT.
* Agreement:
  + Proposal 2 agreed
  + Max limit frequency point: [142] GHz

Sub-topic 2-7: Measurement frequency step size

**Issue 2-7-1: Interferer signal step size for OOB blocking**

* Proposals
  + Proposal 1: 120 MHz can be considered as measurement step size for interferer signal step size for 800MHz, 1600MHz, and 2000MHz CBW for OTA in-band blocking and OTA out-of-band blocking.
  + Proposal 2: Update Table 7.6.4.2.3-1 in TS 38.141-2 to include larger step size 120MHz or 240MHz for minimum supported BS channel bandwidth larger than 400MHz for NR operation in 52.6 – 71 GHz range.
* Agreement:
  + Update Table 7.6.4.2.3-1 in TS 38.141-2 to include larger step size 240MHz for minimum supported BS channel bandwidth larger than 400MHz for NR operation in 52.6 – 71 GHz range.

**Issue 2-9-1: OOB blocking feasibility**

* Proposals
  + Proposal 1: For out of band blocking, further consider feasibility.
  + Proposal 2: TBA
* Discussion:
  + Keysight: We think more consideration for OOB blocking feasibility.
  + Ericsson: We need to further work how to generate feasible test set-up.
* Agreement: Further consideration required for the OOB blocking test feasibility.

Topic #3: BS demod OTA test methodology

**Issue 3-1: AWGN offset**

New proposals in this meeting are provided below

* Proposals
  + Proposal 1: RAN4 to define demodulation requirements for FR2-2 including opportunity for AWGN\_offset reduction as specified for FR2-1
  + Proposal 2: For demod setup, consider using 15dB margin for lowering AWGN level. This reduces risk of not finding appropriate amplifier.
* Discussion:
  + Keysight: No difference between proposal 1 and proposal 2.
  + Nokia: We share the view as Keysight. Does Keysight analysis consider 2GHz CHBW and 20dB SNR?
  + Keysight: We can do more analysis for above worst case mentioned by Nokia.
* Agreement:
  + RAN4 to define demodulation requirements for FR2-2 including opportunity for AWGN\_offset reduction as specified for FR2-1
    - AWGN\_offset = [0-15] dB
  + Demodulation requirements can be proceeded based on the agreements from RF session.

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][324] NR\_exto71GHz\_Demod\_Part1, AI 9.14.8.1, 9.14.8.3 – Rafael Paiva**

**R4-2214184 Email Discussion Summary for [104-e][324] NR\_exto71GHz\_Demod\_Part1**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

**[104-e][325] NR\_exto71GHz\_Demod\_Part2, AI 9.14.8.1, 9.14.8.2 – Pierpaolo Vallese**

**R4-2214185 Email Discussion Summary for [104-e][325] NR\_exto71GHz\_Demod\_Part2**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.15 Enhancements to Integrated Access and Backhaul (IAB) for NR

#### 9.15.4 Moderator summary and conclusions

**[104-e][311] NR\_eIAB\_RFMaintenance, AI 9.15.1, 9.15.2- Yankun Li**

**R4-2214171 Email Discussion Summary for [104-e][311] NR\_eIAB\_RFMaintenance**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.16 NR coverage enhancements

#### 9.16.3 Moderator summary and conclusions

**[104-e][326] NR\_cov\_enh\_Demod, AI 9.16.2 – Jingzhou Wu**

**R4-2214186 Email Discussion Summary for [104-e][326] NR\_cov\_enh\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecom)*

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**GTW miniutes on August 16th**

**List of open issues**

* Issue 1-3-3: Additional DM-RS position for BS PUSCH demod requirements with JCE (for FR1)
* Issue 2-1-1: DMRS configuration for PUCCH format 3
* Issue 1-3-6: Phase offset modelling for BS PUSCH demod requirements with JCE
* Issue 1-3-7: CFO modelling for BS PUSCH demod requirements with JCE
* Issue 1-3-1: TDD UL-DL pattern for BS PUSCH demod requirements with JCE
* Issue 1-2-1: Manufacturer declaration for TBoMS

**Issue 1-3-3: Additional DM-RS position for BS PUSCH demod requirements with JCE (for FR1)**

* Companies’ simulation results observations:
  + CTC: For TDD with aTDW length of 2, larger JCE gain can be achieved with DMRS 1+1. For FDD with aTDW length of 8, larger JCE gain can be achieved for DMRS 1+0 because the baseline PUSCH repetition performance is poorer.
  + E///: No clear performance difference between DM-RS 1+0 and 1+1 configurations
* Proposals:
  + Option 1: Use DMRS 1+1 for TDD and DMRS 1+0 for FDD (CTC)
  + Option 2: DMRS 1+1 only (E///)
  + Option 3: Cover both DMRS 1+1 and DMRS 1+0 configurations for JCE requirements (Nokia)
  + Option 4: DMRS 1+0 only (Samsung, Huawei)
* Discussion
  + Ericsson: From JCE feature aspect, more DMRS symbols can achieve more performance gain. We prefer to option 2 covering typical 1+1 case. We didn’t obser much difference between 1+0 and 1+1 case.
  + Samsung: The number of DMRS is pending on channel condition. TDLA with 10Hz, 1+0 and 1+1 no performance difference and meanwhile 1+0 has less overhead.
  + China Telecom: We propose option 1 as we would like to show performance difference between JCE and legacy scheme. From submitted results, 1+0 cannot show enough performance difference for TDD case.
  + Huawei: We observe more performance gain with 1+1 but the difference is negilable . We prefer to consider 1+0 only.
  + Nokia: We observe 1+1 show more performance gain. We prefer option 3.
  + Ericsson: 1+1 can achieve higher MCS.
  + Huawei: The criteria for performance gain: performance with JCE only or the performance delta between JCE and non JCE?
* Agreement:
  + Decide DMRS configuration based on the performance comparison between JCE and non-JCE

**Issue 2-1-1: DMRS configuration for PUCCH format 3**

* Proposals:
  + Option 1: Use the same DMRS configuration for PUSCH JCE (CTC)
  + Option 2: Both DM-RS 1+1 and DM-RS 1+0 (Nokia)
  + Option 3: DMRS 1+1 only (E///, Nokia)
  + Option 4: DMRS 1+0 only (Samsung, Huawei)
* Discussion
  + Samsung: We are ok with option 1.
* Agreement: Option 1: Use the same DMRS configuration for PUSCH JCE

**Issue 1-3-6: Phase offset modelling for BS PUSCH demod requirements with JCE**

* Proposals:
  + Option 1: consider the phase offset in the impairment results (CTC, E///, Samsung)
  + Option 2: phase offset non-idealities to be part of the TE test uncertainty (Nokia, Huawei)
    - Huawei: RAN4 consider Tx error in test uncertainty and consider Rx error in impairment results
* Discussion
  + Nokia: During test, if TE didn’t implement phase offset modeling and usually the performance better than UE; we can leave it to TT.
  + Ericsson: There are 2 modelling from RF session, it seems hard to impact the performance requirements we specified.
  + Huawei: We never consider Tx phase offset in previous performance requirements and strongly pending TE implementation.
* Agreement:
  + No exact phase offset modelling in simulation; how to consider phase offset in the impairment results is subject to interested companies.

**Issue 1-3-7: CFO modelling for BS PUSCH demod requirements with JCE**

* Status in the last meeting WF (R4-2210666):
  + Do not consider CFO modelling for the PUSCH JCE test and choose one of the following
    - Option 1: companies can consider the CFO impact in the impairment results.
    - Option 2: CFO impact will be covered by TE side in the test uncertainty
* Proposals:
  + Option 1: consider the CFO impact in the impairment results (CTC, E////, Samsung, Huawei)
    - Huawei: RAN4 consider Tx error in test uncertainty and consider Rx error in impairment results
  + Option 2: CFO impact to be part of the TE test uncertainty (Nokia)
* Agreement:
  + No exact CFO modelling in simulation; how to consider CFO in the impairment results is subject to interested companies.

**Issue 1-3-1: TDD UL-DL pattern for BS PUSCH demod requirements with JCE**

* Proposals on the exact TDD patterns for 15/60/120 kHz SCS:
  + Option 1: (CTC, Samsung)
    - 7D1S2U, S=6D:4G:4U for 15kHz
    - DDSUU, S=10G:2G:2U for 60/120kHz
  + Option 2: (Nokia)
    - DDSUU, S=10G:2G:2U for 15/60/120 kHz SCS
  + Option 3: (Huawei)
    - Use DSUUU pattern and disable the UL transmission on the last U slot
* Proposals on the test requirement applicability for different TDD patterns for each SCS (To be captured in the test parameter tables)
  + Proposal 1: (Nokia, Samsung)
    - JCE requirements can be applied for different TDD patterns if the number of consecutive slots (aTDW length) is the same.
  + Proposal 2: (CTC)
    - JCE requirements can be applied for different TDD patterns with more than 1 physical UL consecutive slots.
    - Note that for the TDD pattern with odd number of UL consecutive slots, UL transmission on the first or the last UL slot is disabled.
  + Proposal 3: (HW)
    - JCE requirements can be applied for different other TDD patterns with same number of physical consecutive slots (aTDW length).
    - For the TDD pattern with odd number of consecutive ‘U’ slots, UL transmission on the the last UL slot is disabled.
  + Proposal 4: (E///)
    - JCE requirements can be applied for different TDD patterns by setting repetitions and configurable time domain bundling windows for DM-RS bundling as 2 slots.
* Discussion
  + Huawei: We believe DSUUU is more realistic in deployment.
  + China Telecom: We will discuss test applicable rule later; now we are focused on test set-up for derive performance requirements/simulation.
  + Samsung: We need to ensure 2UL slot available, we would like to respect the operators’ feedback.
  + Ericsson: We need to consider odd number of uplink slots in the end. For 15kHz either option is ok for us.
  + Nokia: We are fine with either option 1 or option 2.
  + China Telecom: For the odd number slots issues, we can address with test applicable rules.
  + Ericsson: We only can configure cTDW instead of aTWD length.
  + China Telecom: The exact aTDW is important from performance requirements aspect.
  + Nokia: We think it’s important to keep aTDW in the test applicable rule.
  + Huawei: We can only control cTDW length. If 1 aTDW disable/not transmitted, then requirements can be applied.
* Agreement:
  + The exact TDD patterns for 15/60/120 kHz SCS (baseline assumption)
    - 7D1S2U, S=6D:4G:4U for 15kHz
    - DDSUU, S=10G:2G:2U for 60/120kHz
  + On the test requirement applicability for different TDD patterns for each SCS (To be captured in the test parameter tables):
    - JCE requirements can be applied for different TDD patterns with 2 or more physical UL consecutive slots and with the same [aTDW] length of 2 consecutive slots.
      * Note: Further work on the clarification for cTDW configuration if needed
    - The UL throughput is not measured on the aTDW including only 1 UL slot

**Issue 1-2-1: Manufacturer declaration for TBoMS**

* Proposals:
  + Option 1 (China Telecom, E///, Nokia)

|  |  |  |
| --- | --- | --- |
| D.yyy | PUSCH TB over Multi-slots (TBoMS) | Declaration of PUSCH TB over Multi-slots support |

* + - CTC: Once supported, TBoMS can be performed regardless of the supported TDD pattern, thus the supportive of TBoMS should be independent on the supported TDD pattern for each SCS.
  + Option 2: (Huawei)

|  |  |  |
| --- | --- | --- |
| D.xxx | SCS for PUSCH TBoMS | Declaration of supported SCS for PUSCH TBoMS, i.e. {15kHz, 30kHz, 60kHz 120kHz} |

* + - Huawei: Need to introduce BS manufacturer declaration with corresponding SCS for PUSCH TBoMS to distinguish a BS support multiple SCS but only support TBoMS feature on 30kHz SCS with 7D1S2U TDD pattern.
* Discussion
  + Nokia: We support option 1.
  + Huawei: We think this feature is special, the processing complexity is pending on TDD pattern with different available UL slots. We prefer option 2 with SCS basis.
  + Ericsson: We think available UL slots not depending on SCSs. We prefer option 1.
  + China Telecom: We prefer option 1, TBoMS should be supported not related TDD pattern and SCS.
  + Huawei: How to deal with the case that BS supports 7D1S2U pattern with 30kHz SCS only case?
    - 15kHz SCS is not typical scenario in real NW deployment. BS may not support 15kHz toghther with this new feature.
  + China Telecom: BS only can be verified based on the declared supported SCSs similar as other features.
  + Ericsson: We share same view as China Telecom, we have dedicated declaration for supporting SCSs.
* Agreement:
  + Introduce new Manufacturer declaration for TBoMS.
    - FFS whether declaration shall be per SCS basis or agnostic to SCSs

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.17 Further enhancements on MIMO for NR

#### 9.17.5 Moderator summary and conclusions

**[104-e][327] NR\_FeMIMO\_Demod, AI 9.17.4 – Yunchuan Yang**

**R4-2214187 Email Discussion Summary for [104-e][327] NR\_FeMIMO\_Demod**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.18 Support of reduced capability NR devices

#### 9.18.6 Moderator summary and conclusions

**[104-e][328] NR\_RedCap\_Demod, AI 9.18.5 – Kazuyoshi Uesaka**

**R4-2214188 Email Discussion Summary for [104-e][328] NR\_RedCap\_Demod**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.21 Enhanced IIoT and URLLC support

#### 9.21.4 Moderator summary and conclusions

**[104-e][329] NR\_IIOT\_URLLC\_enh\_Demod, AI 9.21.3 – Axel Muller**

**R4-2214189 Email Discussion Summary for [104-e][329] NR\_IIOT\_URLLC\_enh\_Demod**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**GTW miniutes on August 16th**

**List of open issues:**

* Issue 1-1-1: Introduction of sub-slot PUCCH repetition requirements
* Issue 1-2-1: PUCCH format
* Issue 1-2-8: PUCCH repetitions across “14-symbol slot” boundaries
* Issue 1-2-9: Symbol level PUCCH resource configuration [Number of PUCCH symbols per sub-slot]
* Issue 1-2-6: Number of UCI information bits
* Issue 1-2-4: SCS/CBW

**Issue 1-1-1: Introduction of sub-slot PUCCH repetition requirements**

* Options
  + Option 1 (Ericsson, Samsung): Define new requirement for sub-slot PUCCH repetition HARQ-ACK.
  + Option 2 (Nokia): RAN4 to define PUCCH demodulation performance requirements for PF0, with sub slot repetition and inter sub-slot hopping, but condition introduction in the specification on the availability of at least 2 simulation inputs.
  + Option 3 (Huawei): Introduce PF0 performance requirements with sub slot repetition.
  + Option 4 (Moderator): Introduce performance requirements with sub slot repetition.
* Agreement: option 3 agreed

**Issue 1-2-8: PUCCH repetitions across “14-symbol slot” boundaries**

* Options
  + Option 1 (Ericsson, Samsung, Huawei): No.
  + Option 2 (Nokia): Yes.
* Discussion
  + Samsung: We think within 1slot configuration already serve test purpose, no need to consider multi-slots configuration.
  + Huawei: We share similar view as Samsung. We shall focus on to verify the repetition performance with 2 repetitions.
  + Ericsson: We share similar view as Huawei and Samsung.
  + Nokia: The test configuration across slot boundaries may bring performance degradation and can be considered to ensure test coverage.
  + Samsung: More repetitions can improve the performance, meanwhile PUCCH should not the bottleneck for uplink; in previous test case for multi-slot PUCCH, also consider 2 slots.
  + Huawei: We share similar as Samsung.
  + Nokia: We are ok to compromise to option 1.
* Agreement: option 1 agreed

**Issue 1-2-9: Symbol level PUCCH resource configuration [Number of PUCCH symbols per sub-slot]**

* Options
  + Option 1 (Ericsson, Samsung): Samsung/Ericsson is correct with inter-(sub)slot
    - Symbols per sub-slot / PUCCH length = 2  
      Sub-slot repetitions (nrofSlots) = 2  
      Sub-slot length (subslotLengthForPUCCH-r16) = 7  
      First symbol of PUCCH (startingSymbolIndex) = 5
  + Option 2 (Nokia):
    - Symbols per sub-slot / PUCCH length = 2  
      Sub-slot repetitions (nrofSlots) = 4  
      Sub-slot length (subslotLengthForPUCCH-r16) = 7  
      First symbol of PUCCH (startingSymbolIndex) = 5
  + Option 3 (Huawei):
    - Symbols per sub-slot / PUCCH length = 2  
      Sub-slot repetitions (nrofSlots) = 2  
      Sub-slot length (subslotLengthForPUCCH-r16) = 2  
      First symbol of PUCCH (startingSymbolIndex) = 12
* Agreement: option 1 agreed

**Issue 1-2-6: Number of UCI information bits**

* Options
  + Option 1 (Ericsson, Huawei): 1 bit.
  + Option 2 (Nokia): 2 bits.
* Agreement: option 1 agreed

**Issue 1-2-4: SCS/CBW**

* Options:
  + Option 1 (Ericsson): 15kHz/5MHz and 30kHz/10MHz.
  + Option 2 (Huawei): 30kHz/20MHz.
* Discussion
  + Huawei: For Rel-15 PUCCH multi-slot, only 30kHz SCS considered. We propose 30kHz as typical configuration to reduce simulation work. For CHBW, either option fine with 1 RB allocation.
  + Samsung: we prefer typical values for different SCSs, but also ok considering minimum CHBW.
  + Ericsson: We proposed minimum CHBW. But also, fine only consider 30kHz.
  + Nokia: We have similar view as Samsung/Ericsson to use minimum CHBW.
* Agreement:
  + 30kHz/10MHz

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 9.24 Additional enhancements for NB-IoT and LTE-MTC

#### 9.24.7 Moderator summary and conclusions

**[104-e][330] NB-IOT\_MTC\_Demod, AI 9.24.6– Tricia Li**

**R4-2214190 Email Discussion Summary for [104-e][330] NB-IOT\_MTC\_Demod**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

## 10 Rel-18 spectrum related WIs for NR

## 11 Rel-18 non-spectrum related work items and study items for NR

### 11.4 Study on NR BS RF requirement evolution

#### 11.4.3 Moderator summary and conclusions

**[104-e][314] FS\_NR\_BS\_RF\_evo, AI 11.4- Liehai Liu**

**R4-2214174 Email Discussion Summary for [104-e][314] FS\_NR\_BS\_RF\_evo**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 11.5 Study on NR FR2 OTA testing enhancements

#### 11.5.4 Moderator summary and conclusions

**[104-e][334] FS\_NR\_FR2\_OTA\_enh, AI 11.5, Bin Han**

**R4-2214194 Email Discussion Summary for [104-e][334] FS\_NR\_FR2\_OTA\_enh**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 11.13 Study on evolution of NR duplex operation

#### 11.13.4 Moderator summary and conclusions

**[104-e][315] FS\_NR\_duplex\_evo, AI 11.13, Yankun Li**

**R4-2214175 Email Discussion Summary for [104-e][315] FS\_NR\_duplex\_evo**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

## 12 Rel-18 Work Items for LTE

### 12.4 New bands and BW allocation for 5G terrestrial broadcast - part 2

#### 12.4.5 Moderator summary and conclusions

**[104-e][316] LTE\_terr\_bcast\_bands\_BSRF, AI 12.4.4, Susanne Rath**

**R4-2214176 Email Discussion Summary for [104-e][316] LTE\_terr\_bcast\_bands\_BSRF**  *Type: other For: Information  
 Source: Moderator (EBU)*

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

### 12.5 NB-IoT/eMTC core & perf. requirements for NTN

#### 12.5.6 Moderator summary and conclusions

**[104-e][317] IoT\_NTN\_Co-existence\_SANRF, AI 12.5.2, 12.5.3, Fei Xue**

**R4-2214177 Email Discussion Summary for [104-e][317] IoT\_NTN\_Co-existence\_SANRF**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**Decision: Return to.**

**Conclusions after 1st round**

**Conclusions after 2nd round**

## 13 Liaison and output to other groups

## BACKUP

**R4-22ABABA Big CR for TS 3x.1xx (Rel-13)**

*Type: CR For: Agreement  
 38.1xx-0y v16.2.0 CR- rev Cat: F (Rel-1x)  
  
 Source: XXXX*

**Decision: Return to.**

**R4-22AAAAA Email discussion summary for [104-e][10x] x**

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

**Abstract:**

This contribution provides the summary of email discussion and recommended summary.

**[104-e][10x] R17\_Maintenance, AI x.x.x – XX**

**Conclusions after 1st round**

**Conclusions after 2nd round**

Email Discussion Summary for [104-e][214] NR\_NTN\_solutions\_RRM\_1

Email Discussion Summary for [104-e][215] NR\_NTN\_solutions\_RRM\_2

Email Discussion Summary for [104-e][216] NR\_UE\_pow\_sav\_enh

Email Discussion Summary for [104-e][217] NR\_SL\_enh\_RRM

Email Discussion Summary for [104-e][218] NR\_ext\_to\_71GHz\_RRM\_1

[Email Discussion Summary for 104-e][219] NR\_ext\_to\_71GHz\_RRM\_2

Email Discussion Summary for [104-e][220] NR\_IAB\_enh\_RRM

Email Discussion Summary for [104-e][221] NR\_feMIMO\_RRM\_1

Email Discussion Summary for [104-e][222] NR\_feMIMO\_RRM\_2

Email Discussion Summary for [104-e][223] NR\_redcap\_RRM\_1

Email Discussion Summary for [104-e][224] NR\_redcap\_RRM\_2

Email Discussion Summary for [104-e][225] NR\_pos\_enh\_1

Email Discussion Summary for [104-e][226] NR\_pos\_enh\_2

Email Discussion Summary for [104-e][227] LTE\_NR\_DC\_enh2

**Decision: Return to.**

**R4-22ABABA WF on**

*Type: other For: Approval  
 Source: XXXX*

**Decision: Return to.**