## 6 Rel-17 non-spectrum related work items for NR

### 6.4 NR RF requirement enhancements for frequency range 2 (FR2)

#### 6.4.6 RRM core requirements

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**Email discussion: [101-bis-e][202] NR\_RF\_FR2\_enh2\_RRM**

**R4-2202553 Email discussion summary: [101-bis-e][202] NR\_RF\_FR2\_enh2\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202719 (from R4-2202553).**

**R4-2202719 Email discussion summary: [101-bis-e][202] NR\_RF\_FR2\_enh2\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 24th)**

Issue 1-1-1C: Should it be defined in MRTD table or scheduling restriction?

* Proposals:
  + Option 1: Adding a note in MRTD (Vivo, Qualcomm, Huawei, LGE, Nokia, ZTE, MTK, OPPO, Ericsson)
  + Option 2: Scheduling restriction (Apple)
* Tentative agreement
  + Performance degradation due to network driven Rx beam switch e.g. TCI state change (Case 1) will be specified as a note in MRTD clause
* Discussion
  + Apple: Not clear on the proposed Note wording. Based on the proposals either first or last symbol will be affected. There should be no ambiguity, which symbol is affected. We are ok with Note but would like to clarify.
  + Nokia: The note is expected to say that there will be some impact.
  + Apple: When we mention impact it means that UE may not be able to detect the symbol. From network perspective this means that network may need to skip scheduling in these symbols, otherwise there will be slot-level performance degradation. So, we need to know which exactly symbols will be affected (first, last or both)
  + Nokia: We prefer that exact symbols are known. However, the set of affected symbols may depend on actual timing difference (positive/negative).
  + QC: We already have similar notes in the MRTD table. We think Scheduling restrictions is more strict comparing to the performance degradation impact note. Note leaves room for network and UE optimizations.
  + Apple: we prefer to make the location of the symbol more predictable (e.g. always last symbol)

Issue 1-1-1A: Impacted symbols due to performance degradation

* Proposals:
  + Option x: This requirement applies to the UE capable of common beam management for FR2 inter-band CA. If the receive time difference exceeds [X] of that SCS, demodulation performance degradation is expected for [impacted symbols] in the in the SCells of the other band, where X is defined in Table 7.6.4.
    - Option 1: the first or the last symbol of the slot (Vivo, Qualcomm, Huawei, LGE, Nokia, ZTE, MTK)
    - Option 2: the last symbol of every [Y] slot (Ericsson)
    - Option 3: all the OFDM symbols of the slot (OPPO)
* Discussion
  + Nokia: we are fine with Option 1.
  + Apple: Prefer to keep a single symbols (last or first)
  + OPPO: Same view that requirements should be straightforward. Can compromise to Option 2.
  + E///: We prefer to protect the first symbol
  + QC: Ideally we should limit to 1 symbol. Not sure how to address the case when SCell arrives earlier than PCell. PCell needs to be prioritized. If we go with Option 2 there will be some UE impact. If we want to limit the position, then we should keep the first symbol only.
  + Apple: For FR2 in case of 120kHz the symbol duration is 8us. MRTD is 3us. Even for the worst case when SCell arrives before PCell there is still opportunity to switch the beam in the last symbol of SCell.
  + Huawei: Different view from Apple. Network cannot predict MRTD and prefer Option 1.
  + MTK: Same view as QC and Huawei. This is CBM and it is reasonable to prioritize PCell.
  + E///: Agree with Apple’s view
* Agreement
  + Performance degradation due to network driven Rx beam switch e.g. TCI state change (Case 1)
    - Performance degradation will be specified as a note in MRTD clause
    - Option 1: If the receive time difference exceeds [X] of that SCS, demodulation performance degradation is expected for the first or the last symbol of the slot in the in the SCells of the other band, where X is defined in Table 7.6.4.
    - Option 2: If the receive time difference exceeds [X] of that SCS, demodulation performance degradation is expected for the first symbol of the SCell of the other band, where X is defined in Table 7.6.4.

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202581 | WF on RRM requirements for FR2 Inter-band DL CA and UL CA | Nokia |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2201538 | draftCR on MRTD for CBM inter-band FR2 DL CA | Nokia | Revised | Pending on open issues discussion |
| R4-2201589 | Timing requirements for inter-band DL CA | Ericsson | Revised | Pending on open issues discussion |
| R4-2200929 | Introduction of SCell activation delay requirement for FR2 inter-band CA with common beam management | Mediatek | Revised | Pending on open issues discussion |
| R4-2201374 | Draft CR on scheduling restriction for FR2 inter-band DL CA for CBM UE | Ericsson | Revised | Pending on open issues discussion |
| R4-2201540 | draftCR on measurement restriction for CBM inter-band FR2 DL CA | Nokia | Revised | Pending on open issues discussion |
| R4-2201609 | DraftCR on interruption requirements for FR2 inter-band CA with CBM | Huawei | Revised | Pending on open issues discussion |
| R4-2201376 | Draft CR on RRM requirements for FR2 inter-band UL CA for IBM UE | Ericsson | Revised | Pending on RF session progress. |
| R4-2201541 | draftCR on RRM requirements for IBM inter-band FR2 UL CA | Nokia | Revised | Pending on RF session progress. |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202581 WF on RRM requirements for FR2 Inter-band DL CA and UL CA**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2201536 Draft Big CR: RRM requirements for Rel-17 NR FR2 Inter-band CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Draft Big CR on RRM requirements for FR2 Inter-band CA

**Decision: For email approval.**

##### 6.4.6.1 Inter-band DL CA requirements for CBM

###### 6.4.6.1.1 MRTD requirements

**R4-2200391 Further considering on remaining issues for RRM requirements for inter-band DL CA in NR FR2**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200425 MRTD requirements for CBM based Inter-band DL CA**

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

**Decision: Noted.**

**R4-2200559 Discussion on MRTD for FR2 inter-band CA based on CBM**

*Type: discussion For: (not specified)  
 Source: LG Electronics*

**Abstract:**

It discusses X value in MRTD requirements for CBM based FR2 inter-band CA.

**Decision: Noted.**

**R4-2200927 Discussion on CBM MRTD requirement for FR2 inter-band DL CA**

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

**Decision: Noted.**

**R4-2201129 MRTD requirements for FR2 inter-band DL CA enhancements**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201537 discussion on MRTD for CBM inter-band FR2 DL CA**

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

**Abstract:**

discussion on MRTD requirements for inter-band FR2 DL CA for CBM

**Decision: Noted.**

**R4-2201538 draftCR on MRTD for CBM inter-band FR2 DL CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

draftCR on MRTD requirements for inter-band FR2 DL CA for CBM

**Decision: Revised to R4-2202582 (from R4-2201538).**

**R4-2202582 draftCR on MRTD for CBM inter-band FR2 DL CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

draftCR on MRTD requirements for inter-band FR2 DL CA for CBM

**Decision: Return to.**

**R4-2201588 Timing requirements for inter-band DL CA**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Analysis of CBM requirements and remedies for MRTD=3 µs.

**Decision: Noted.**

**R4-2201589 Timing requirements for inter-band DL CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

CR for MRTD requirements for CBM UE.

**Decision: Revised to R4-2202583 (from R4-2201589).**

**R4-2202583 Timing requirements for inter-band DL CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

CR for MRTD requirements for CBM UE.

**Decision: Return to.**

**R4-2201607 Discussion on MRTD requirements for FR2 inter-band DL CA with CBM**

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

**Decision: Noted.**

###### 6.4.6.1.2 Other RRM requirements

**R4-2200426 RRM requirements for CBM based Inter-band DL CA**

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

**Decision: Noted.**

**R4-2200742 Other RRM requirements for FR2 inter-band DL CA requirements for CBM**

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

**Decision: Noted.**

**R4-2200928 Discussion on CBM RRM requirements for FR2 inter-band DL CA**

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

**Decision: Noted.**

**R4-2200929 Introduction of SCell activation delay requirement for FR2 inter-band CA with common beam management**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2202584 (from R4-2200929).**

**R4-2202584 Introduction of SCell activation delay requirement for FR2 inter-band CA with common beam management**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2201130 Other RRM requirements for FR2 inter-band DL CA enhancements**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201373 Discussion on RRM requirements of inter-band DL CA for CBM UE**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution, we provide our views on RRM requirements for FR2 inter-band DL CA UEs operating with CBM.

**Decision: Noted.**

**R4-2201374 Draft CR on scheduling restriction for FR2 inter-band DL CA for CBM UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

We provide draft CR to introduce Scheduling restriction requirements for CBM UE

**Decision: Revised to R4-2202585 (from R4-2201374).**

**R4-2202585 Draft CR on scheduling restriction for FR2 inter-band DL CA for CBM UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

We provide draft CR to introduce Scheduling restriction requirements for CBM UE

**Decision: Return to.**

**R4-2201539 discussion on other RRM requirements for CBM inter-band FR2 DL CA**

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

**Abstract:**

discussion on other RRM requirements for inter-band FR2 DL CA for CBM

**Decision: Noted.**

**R4-2201540 draftCR on measurement restriction for CBM inter-band FR2 DL CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

draftCR on measurement restriction for inter-band FR2 DL CA for CBM

**Decision: Revised to R4-2202586 (from R4-2201540).**

**R4-2202586 draftCR on measurement restriction for CBM inter-band FR2 DL CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

draftCR on measurement restriction for inter-band FR2 DL CA for CBM

**Decision: Return to.**

**R4-2201608 Discussion on other RRM requirements for FR2 inter-band DL CA with CBM**

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

**Decision: Noted.**

**R4-2201609 DraftCR on interruption requirements for FR2 inter-band CA with CBM**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202587 (from R4-2201609).**

**R4-2202587 DraftCR on interruption requirements for FR2 inter-band CA with CBM**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

##### 6.4.6.2 Inter-band UL CA for IBM

**R4-2201131 Inter-band UL CA requirements for IBM**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201375 Discussion on RRM requirements for inter-band UL CA for IBM UE**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution, we provide our views on number of UL carrier to be supported for FR2 inter-band UL CA for IBM UE.

**Decision: Noted.**

**R4-2201376 Draft CR on RRM requirements for FR2 inter-band UL CA for IBM UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

We introduce draft CR for FR2 inter-band UL CA

**Decision: Revised to R4-2202588 (from R4-2201376).**

**R4-2202588 Draft CR on RRM requirements for FR2 inter-band UL CA for IBM UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

We introduce draft CR for FR2 inter-band UL CA

**Decision: Return to.**

**R4-2201541 draftCR on RRM requirements for IBM inter-band FR2 UL CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

draftCR on RRM requirements for IBM inter-band FR2 UL CA

**Decision: Revised to R4-2202589 (from R4-2201541).**

**R4-2202589 draftCR on RRM requirements for IBM inter-band FR2 UL CA**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

draftCR on RRM requirements for IBM inter-band FR2 UL CA

**Decision: Return to.**

##### 6.4.6.3 UL gaps for self-calibration and monitoring

### 6.8 Enhancement for NR high speed train scenario in FR1

#### 6.8.2 RRM core requirements

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**Email discussion: [101-bis-e][203] NR\_HST\_FR1\_enh\_RRM**

**R4-2202554 Email discussion summary: [101-bis-e][203] NR\_HST\_FR1\_enh\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202720 (from R4-2202554).**

**R4-2202720 Email discussion summary: [101-bis-e][203] NR\_HST\_FR1\_enh\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 21st)**

Issue 5-1-1: UE feature for RRM enhancement for FR1 HST

* Q1 whether Prerequisite feature groups is needed or not
  + Proposals
    - Option 1 (Intel): Yes, Prerequisite feature groups are Rel-16 RAN4 feature 10-1, 10-4 or 10-5
    - Option 2: No
  + Discussion:
    - CMCC: No strong preference. Single carrier and CA are different features.
    - Apple: we are open for X-1 and it may not be needed for X-2/3
    - Intel: we think that Rel-16 should be pre-requisite
    - Vivo: no strong preference. Better to allow some flexibility to allow different implementations
    - Huawei: 10-5 is for inter-RAT, while the enhancements do not consider inter-RAT
    - MTK: same view as Intel. Inter-frequency measurements also require support of Rel-16 features.
    - E///: No strong view
    - Intel: we can consider only “Rel-16 RAN4 feature 10-1 or 10-4”
* Q2: moderator notices that for inter-frequency measurement, only connected state and idle state are mentioned, inactive state is missing. It is suggested to update the feature group on inter-frequency measurement in idle mode to cover inactive mode, and companies are suggested to check whether following update is OK:

Agreements:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between Ues (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| x-1 | Enhanced RRM requirements specified for CA for FR1 HST | Support of the enhanced RRM for requirements CA to support FR1 high speed up to 500 km/h, as specified in TS 38.133 | Rel-16 RAN4 feature 10-1 or 10-4 | Yes | No | The performance of RRM for CA in FR1 HST scenario cannot be guaranteed | Per UE | NO | FR1 only | N/A |  | Optional with capability signalling |
| x-2 | Enhanced RRM requirements specified for inter-frequency measurement in connected mode for FR1 HST | Support of the enhanced RRM requirements for inter-frequency measurement in connected mode to support FR1 high speed up to 500 km/h, as specified in TS 38.133 | Rel-16 RAN4 feature 10-1 or 10-4 | Yes | No | The performance of RRM for inter-frequency measurement in connected mode for FR1 HST cannot be guaranteed | Per UE | NO | FR1 only | N/A |  | Optional with capability signalling |
| x-3 | Enhanced RRM requirements specified for inter-frequency measurement in Idle and Inactive mode for FR1 HST | Support of the enhanced RRM requirements for inter-frequency measurement in idle and Inactive mode to support FR1 high speed up to 500 km/h, as specified in TS 38.133 |  | No | No | The performance of RRM for inter-frequency measurement in idle and Inactive mode for FR1 HST cannot be guaranteed | Per UE | NO | FR1 only | N/A |  | Optional without capability signalling |

Issue 2-1-1: for DRX cycle > 320ms, PSS/SSS detection time requirement (TPSS/SSS\_sync\_inter) for inter-frequency measurement with MG in connected state for HST

* Candidate options after 1st round:
  + Option 1 (MTK, CATT, QC, HW, Apple, vivo):
    - 6 x DRX cycle x CSSFinter if SMTC periodicity > 40 ms
    - 5 x DRX cycle x CSSFinter if SMTC periodicity ≤ 40 ms
  + Option 2 (QC): 7 x DRX cycle x CSSFinter
  + Option 3 (CMCC, Apple, Ericsson, HW, Nokia): 4 x M2 x DRX cycle x CSSFinter, M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1
* Discussion
  + TBA
* Agreement
  + for DRX cycle > 320ms, PSS/SSS detection time requirement (TPSS/SSS\_sync\_inter) for inter-frequency measurement with MG in connected state for HST
    - 6 x DRX cycle x CSSFinter if SMTC periodicity > 40 ms
    - 5 x DRX cycle x CSSFinter if SMTC periodicity ≤ 40 ms

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202590 | WF on RRM requirements for NR FR1 HST | CMCC |  |
| R4-2202591 | LS on signalling for inter-frequency measurement enhancement in connected state for FR1 HST | CMCC | To: RAN2 |
| R4-2202593 | Draft Big CR on RRM requirements for NR FR1 HST enhancements | CMCC |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200626 | Draft CR on Draft CR on NSCC\_SSB for CSSFoutside\_gap,i | CMCC | Endorsed |  |
| R4-2201173 | Draft CR on inter-frequency measurements for FR1 HST | Huawei, Hisilicon | Revised |  |
| R4-2200247 | CR on L1-RSRP measurement in FR1 HST | Apple | Endorsed |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202590 WF on RRM requirements for NR FR1 HST**

*Type: other For: Approval  
 Source: CMCC*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202591 LS on signalling for inter-frequency measurement enhancement in connected state for NR FR1 HST**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2202593 Draft Big CR: RRM requirements for Rel-17 NR FR1 HST enhancements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: CMCC*

**Abstract:**

**Decision: For email approval.**

**R4-2200062 Discussion on Rel-17 HST in FR1**

*Type: discussion For: Discussion  
 Source: MediaTek (Shenzhen) Inc.*

**Decision: Noted.**

**R4-2200323 On NR FR1 HST RRM Requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

##### 6.8.2.1 Intra-frequency measurements

**R4-2200626 Draft CR on NSCC\_SSB for CSSFoutside\_gap,i**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CMCC*

**Decision: Endorsed.**

##### 6.8.2.2 Inter-frequency measurements

**R4-2200095 Discussion on remaining issues for inter-frequency measurement for FR1 HST**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200635 Discussion on NR HST RRM enhancement for inter-frequency measurement**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200670 On R17 FR1 HST inter-frequency measurement**

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

**Decision: Noted.**

**R4-2200876 Inter-frequency measurements enhancement for NR HST in FR1**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Inter-frequency measurements enhancement for NR HST in FR1

**Decision: Noted.**

**R4-2201172 Discussion on inter-frequency measurements for FR1 HST**

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

**Decision: Noted.**

**R4-2201173 Draft CR on inter-frequency measurements for FR1 HST**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202592 (from R4-2201173).**

**R4-2202592 Draft CR on inter-frequency measurements for FR1 HST**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

##### 6.8.2.3 L1-SINR measurements

**R4-2200096 Discussion on L1-SINR measurements for FR1 HST**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200596 Discussion on L1-SINR measurements in R17 FR1 HST**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200671 On R17 FR1 HST L1-SINR**

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

**Decision: Noted.**

**R4-2200875 L1-SINR measurements requirements enhancement for NR HST in FR1**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

L1-SINR measurements requirements enhancement for NR HST in FR1

**Decision: Noted.**

**R4-2201132 L1-SINR requirements for Rel17 FR1 HST**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201582 Further discussion on L1-SINR measurements for Rel-17 FR1 HST CA**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

We present simulation results of L1-SINR and our views.

**Decision: Noted.**

##### 6.8.2.4 Others

**R4-2200097 Discussion on other remaining issues for FR1 HST**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200246 On remaining issues for R17 FR1 HST**

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

**Decision: Noted.**

**R4-2200247 CR on L1-RSRP measurement in FR1 HST**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Endorsed.**

**R4-2200634 Discussion on general requirements for FR1 HST RRM**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200874 RRM requirements for NR HST in FR1**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Other requirments for NR HST in FR1

**Decision: Noted.**

**R4-2201133 Other RRM requirements for Rel17 FR1 HST**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201174 Discussion on remaining issues in FR1 HST**

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

**Decision: Noted.**

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

#### 6.9.4 RRM core requirements

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**Email discussion: [101-bis-e][204] NR\_HST\_FR2\_RRM\_1**

**R4-2202555 Email discussion summary: [101-bis-e][204] NR\_HST\_FR2\_RRM\_1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202721 (from R4-2202555).**

**R4-2202721 Email discussion summary: [101-bis-e][204] NR\_HST\_FR2\_RRM\_1**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 21st)**

Issue 1-2-2: Two-side RRM deployment in Scenario-B

* Proposals
  + Option 1 (Apple, Samsung, CATT, Intel, Nokia, E///): No special consideration for two-side RRH deployment
  + Option 2 (QC, ZTE): Use extra [1.5] scaling for DRX [<=80] ms for all SMTC periodicities
* Discussion
  + QC: one compromise is to get additional signalling
  + E///: Option 1
  + Intel: one of the reasons to consider 6 beams was to cover 2 side deployment. With respect to QC proposals some signalling is ok.
  + Nokia: is two-side RRH deployment typical?
    - QC: this is a necessary flexibility for deployment
  + Samsung: for Option 2 the implications are not clear if this is for set 1 or 2.
    - QC: for set 2
* Agreement
  + No special consideration for two-side RRH deployment for RRM requirements definition
  + Introduce network assistance to inform UE on the FR2 HST deployment type (uni-directional or bi-directional)

**Issue 1-1-4:** **Signaling of SSB configuration**

* Proposals
* Option 1 (Apple, Ericsson): Enable network assisted signaling of SSB index and order per RRH.
* Option 2 (Intel, ZTE, Samsung): The network assistance signaling of SSB configuration shall not be introduced in Rel-17.
* Discussion
  + Samsung: we have not seen details on how it can be implemented in RRC signalling. It may be complicated for bi-directional deployments. It cannot be cell-specific and shall be UE-specific. Timing issue happens only when TCI switch happens and it is not very often. It is questionable whether there will be benefits. Need to consider WI timelines.
  + QC: we propose another signalling in the other thread to address timing issue. False alarm will happen if signalling is not provided.
  + E///: Signalling is to identify inter-RRH information and it may benefit on multiple RRM aspects. We provided format of signalling in the 1st round.
  + Nokia: some lightweight network assistance should be considered.
  + Session chair: continue discussion

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202594 | WF on FR2 HST RRM requirements (part 1) | Nokia, Nokia Shanghai Bell |  |
| R4-2202595 | LS on network signaling for Rel-17 NR FR2 HST RRM | ZZZ |  |
|  |  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
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**2nd round email discussion conclusions**

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2201847 | TP to TR 38.854 on Mobility Performance in HST FR2 Deployment Scenarios | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2201848 | TP to TR 38.854 on the Number of Rx beams, Nokia, Nokia Shanghai Bell | Nokia, Nokia Shanghai Bell | Endorsed |  |
| R4-2201652 | CR to TS 38.133: intra-frequency measurements without gaps for for FR2 NR HST | Nokia, Nokia Shanghai Bell | Not Pursued |  |
| R4-2200877 | CR On RRC\_CONNECTED state mobility for HST FR2 RRM | Ericsson | Revised |  |
| R4-2200104 | Draft CR on RLM/BFD requirement for FR2 HST | CATT | Not Pursued |  |

**WF/LS for approval**

**R4-2202594 WF on FR2 HST RRM requirements (part 1)**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202595 LS on network signaling for Rel-17 NR FR2 HST RRM**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**Email discussion: [101-bis-e][205] NR\_HST\_FR2\_RRM\_2**

**R4-2202556 Email discussion summary: [101-bis-e][2054] NR\_HST\_FR2\_RRM\_2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202722 (from R4-2202556).**

**R4-2202722 Email discussion summary: [101-bis-e][2054] NR\_HST\_FR2\_RRM\_2**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 21st)**

Sub topic 2-1 Network signalling to enable/disable one shot large UL timing adjustment

* Proposal
  + Dedicated new RRC based network signalling flag will be specified to enable/disable one shot large UL timing adjustment on top of FR2 HST scenario flag
  + Such above RRC based network signalling is not limited to a particular FR2 HST deployment and/or scenarios, i.e., bi-directional scenario or uni-directional scenario
* Discussion
  + E///: not sure why network would enable/disable one shot large UL timing adjustment
  + Nokia: it should be statis (per-network signalling). The intention is to enable/disable. Operator can decide which mechanism will be used. Signalling can be defined in a deployment agnostic manner
  + Samsung: The proposal is based on the last meeting agreements to introduce two mechanisms.
  + Apple: We acknowledge that for bi-directional jumps may happen, but it is not a typical case.
  + QC: is the intention that when we disable, then do we make RACH?
    - Samsung: yes
* Agreement
  + Dedicated new RRC based network signalling flag will be specified to enable/disable one shot large UL timing adjustment
    - Such above RRC based network signalling is not limited to a particular FR2 HST deployment and/or scenarios, i.e., bi-directional scenario or uni-directional scenario

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202597 | WF on uplink timing for FR2 HST | Samsung |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2201768 | Timing Requirements for FR2 HST | Samsung | Revised |  |

**2nd round email discussion conclusions**

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202597 WF on uplink timing for FR2 HST**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2200328 On NR FR2 HST RRM Requirements**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

##### 6.9.4.1 General

**R4-2200098 Discussion on general issues for FR2 HST**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200259 Discussion on general aspects for FR2 HST**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200581 General RRM requirements for HST FR2**

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

**Decision: Noted.**

**R4-2200627 Discussion on general RRM requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200877 CR On RRC\_CONNECTED state mobility for HST FR2 RRM**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

CR On RRC\_CONNECTED state mobility for HST FR2 RRM

**Decision: Revised to R4-2202596 (from R4-2200877).**

**R4-2202596 CR On RRC\_CONNECTED state mobility for HST FR2 RRM**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

CR On RRC\_CONNECTED state mobility for HST FR2 RRM

**Decision: Return to.**

**R4-2200878 General requirements for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

General requirements for HST FR2

**Decision: Noted.**

**R4-2200883 LS on FR2 HST RRM**

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

**Abstract:**

LS on network signalling for Rel-17 NR HST RRM

**Decision: Noted.**

**R4-2201156 Discussion on general requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201175 General discussion on network signaling and UE capability in FR2 HST**

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

**Decision: Noted.**

**R4-2201666 LS on network signalling for Rel-17 FR2 NR HST RRM**

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

**Decision: Noted.**

**R4-2201667 Discussion on network signalling for FR2 HST RRM**

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

**Abstract:**

Addressing remaining open issues on network signalling.

**Decision: Noted.**

**R4-2201766 Discussion on network signaling and UE capability for FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2201767 LS on Network Signalling for Rel-17 NR FR2 HST RRM**

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

**Decision: Noted.**

**R4-2201847 TP to TR 38.854 on Mobility Performance in HST FR2 Deployment Scenarios**

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

**Decision: Endorsed.**

##### 6.9.4.2 Number of RX beams

**R4-2200099 Discussion on requirements on scenario-B with two-side RRH**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200260 Discussion on number of Rx beam for FR2 HST**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200582 Discussion on RX beam number for HST FR2**

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

**Decision: Noted.**

**R4-2200881 Number of RX beams for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discuss how to deal with requirments with different number of RX beams for HST FR2

**Decision: Noted.**

**R4-2201848 TP to TR 38.854 on the Number of Rx beams**

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

**Decision: Endorsed.**

##### 6.9.4.3 RRC Idle/Inactive and connected state mobility requirements

**R4-2200100 Further discussion on RRC Idle/Inactive and connected state mobility requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200261 Discussion on mobility requirement for FR2 HST**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200583 Discussion on RRC Idle Inactive and Connected state mobility requirements for HST FR2**

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

**Decision: Noted.**

**R4-2200628 Discussion on mobility requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200880 RRC Idle/Inactive and connected state mobility requirements for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

RRC Idle/Inactive and connected state mobility requirements for HST FR2

**Decision: Noted.**

**R4-2201176 Discussion on RRC Idle/Inactive and connected state mobility requirements for HST in FR2**

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

**Decision: Noted.**

**R4-2201651 On RRM measurement requirements for FR2 HST**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Intra-frequency measurement requirements in connected and cell reselection requirements in idle mode.

**Decision: Noted.**

**R4-2201652 CR to TS 38.133: intra-frequency measurements without gaps for for FR2 NR HST**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Enhancements on intra-frequency measurements for FR2 HST.

**Decision: Not pursued.**

##### 6.9.4.4 Timing requirements

**R4-2200101 Discussion on timing requirement for FR2 HST**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200262 Discussion on timing requirement for FR2 HST**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200584 Discussion on Timing Requirement for HST FR2**

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

**Decision: Noted.**

**R4-2200882 On Timing requirements for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Present our views on one shot timing adjustment

**Decision: Noted.**

**R4-2201768 Further Discussion on Timing Requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2202599 Further Discussion on Timing Requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Withdrawn.**

**R4-2201769 Draft CR to introduce one shot large UL timing adjustment for FR2 HST UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Samsung*

**Decision: Revised to R4-2202758 (from R4-2201769).**

**R4-2202758 Draft CR to introduce one shot large UL timing adjustment for FR2 HST UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Samsung*

**Decision: Return to.**

**R4-2201846 On UL Timing Adjustment in HST FR2 Deployments**

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

**Decision: Noted.**

##### 6.9.4.5 Signalling characteristics requirements

**R4-2200102 Discussion on RLM/BFD requirement for FR2 HST**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200104 Draft CR on RLM/BFD requirement for FR2 HST**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Not pursued.**

**R4-2200263 Discussion on signaling characteristic requirement for FR2 HST**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200585 Discussion on Signaling characteristics for HST FR2**

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

**Decision: Noted.**

**R4-2200884 Signalling characteristics requirements for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Signalling characteristics requirements for HST FR2

**Decision: Noted.**

**R4-2201177 Discussion on signaling characteristics requirements for high speed train scenario in FR2**

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

**Decision: Noted.**

**R4-2201178 Discussion on RRM requirements for high speed train scenario in FR2**

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

**Decision: Noted.**

**R4-2201770 Remaining Issues on signaling characteristics requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2201771 Draft CR to introduce active TCI state switching delay requirement for FR2 HST UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Samsung*

**Decision: Return to.**

##### 6.9.4.6 Measurement procedure requirements

**R4-2200103 Further discussion on measurement procedure requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200264 Discussion on measurement procedure requirement for FR2 HST**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200879 Measurement procedure requirements for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Measurement procedure requirements for HST FR2

**Decision: Noted.**

### 6.10 Further RRM enhancement for NR and MR-DC

#### 6.10.1 General

#### 6.10.2 RRM core requirements

**R4-2202751 Draft Big CR: RRM requirements for Rel-17 NR FeRRM**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: Apple*

**Abstract:**

**Decision: For email approval.**

##### 6.10.2.1 SRS antenna port switching

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**Email discussion: [101-bis-e][206] NR\_RRM\_enh2\_1**

**R4-2202557 Email discussion summary: [101-bis-e][206] NR\_RRM\_enh2\_1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202723 (from R4-2202557).**

**R4-2202723 Email discussion summary: [101-bis-e][206] NR\_RRM\_enh2\_1**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 21st)**

Issue 1-3-1: Whether and how to specify interruption requirement for sync case

* Proposals
  + Option 1 (CATT, Ericsson, Nokia, vivo(for scenario 1)): RAN4 to define different requirements between sync and async cases.
  + Option 2 (MTK, Apple, QC, Xiaomi, OPPO, LGE(with clarification for TDD sync), Intel): No need to further discuss a separate interruption requirement for sync cases.
* Discussion
  + Nokia: we found difference between sync/async. For Scenario 1 a few symbols will be affected and symbol-level interruption may apply.
  + QC: There will be impact from TA. DL/UL carriers will not be synced.
  + E///: Same view as Nokia.
  + Apple: Initially we support Option 2 due to MTTD impact. For 1-3-1 we can use a single requirement but for 1-4-1 we can consider symbol-level for scenario 1 case.
  + MTK: Option 2.
  + Huawei: compromised solution from Apple is fine. Need to discuss how to define symbol-level requirements for async case.
  + vivo: ok with compromise proposals from Apple
  + LGE: ok to compromise for symbol-level scenario 1 sync case
  + Intel: compromised solution is fine
* Agreement
  + Define the following interruption requirements
    - based on symbol-level for scenario 1 sync case
    - based on slot-level for scenario 1 async case
    - based on slot-level for scenario 2 async case

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202600 | WF on further RRM enhancement for NR and MR-DC - SRS antenna port switching | Apple |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| [R4-2200069](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200069.zip) | Interruption requirement to LTE serving cell, and impacts to other LTE RRM requirement | CATT | Postponed |  |
| [R4-2201379](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201379.zip) | Draft CR on Interruption requirement to NR serving cell, and impacts to other NR RRM requirement (if applicable) | Ericsson | Postponed |  |

**2nd round email discussion conclusions**

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202600 WF on further RRM enhancement for NR and MR-DC - SRS antenna port switching**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2200068 Further discussion on SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200069 Interruption requirement to LTE serving cell, and impacts to other LTE RRM requirement**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Postponed.**

**R4-2200179 Discussion on SRS antenna port switching**

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

**Decision: Noted.**

**R4-2200288 Discussion on SRS antenna port switching**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200322 On SRS antenna switching**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2200531 Discussion on SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200561 Discussion on interruption due to SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Decision: Noted.**

**R4-2200597 Discussion on RRM requirements for SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200640 Discussion on SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200684 Further discussion on RRM requirements for SRS antenna switching**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200739 Discussion on SRS antenna port switching**

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

**Decision: Noted.**

**R4-2200895 Interruption requirements at SRS antenna port switching**

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

**Decision: Noted.**

**R4-2201134 RRM requirements for SRS ant port switch**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201201 Discussion on RRM requirements for SRS antenna port switching**

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

**Decision: Noted.**

**R4-2201378 RRM requirements for SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we provide our views on the open issues of SRS antenna port switching

**Decision: Noted.**

**R4-2201379 Draft CR on Interruption requirement to NR serving cell, and impacts to other NR RRM requirement (if applicable)**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

We provide draft CR to introduce interruption requirements to NR serving cell

**Decision: Postponed.**

##### 6.10.2.2 HO with PSCell

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**Email discussion: [101-bis-e][207] NR\_RRM\_enh2\_2**

**R4-2202558 Email discussion summary: [101-bis-e][207] NR\_RRM\_enh2\_2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202724 (from R4-2202558).**

**R4-2202724 Email discussion summary: [101-bis-e][207] NR\_RRM\_enh2\_2**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 21st)**

Issue 2-2-3a: Timeline of Tprocessing (UE SW processing and RF warm-up(if needed) time) for HO with PSCell

* Proposals
* Option 1: (CMCC, Qualcomm, ZTE, Intel, Ericsson, vivo, Nokia, MTK, CATT)
  + For both parallel processing cases and sequential processing cases, UE SW processing and RF warm-up for PCell handover and PSCell addition/change are performed in parallel.
* Option 2: (Apple, Xiaomi, OPPO)
  + For parallel processing cases, UE SW processing and RF warm-up for PCell handover and PSCell addition/change are performed in parallel.
  + For sequential processing cases, UE SW processing and RF warm-up for PCell handover and PSCell addition/change are performed in sequential.
* Discussion
  + Apple: suggest compromise Tsequential = Tparallel + X, where X is a margin for RF adjustment (X = 10ms or 20ms)
  + Xiaomi/OPPO: Support Apple
  + Nokia: technical reasons are not clear
  + MTK: extra margin is not needed
  + Huawei: can accept compromise
* Agreement
  + Introduce extra margin Y ms for sequential processing case comparing to parallel processing case for UE SW processing and RF warm-up for [PCell handover] and PSCell addition/change
    - Y = [10] ms
    - Note: no extra interruption is required

Issue 2-5-1: Requirements for HO with PSCell for NR-U

* Proposals
  + Option 1 (CATT, MTK, Apple, Qualcomm, ZTE, Intel, vivo):
    - Postpone the requirement design of NR-U HO with PSCell until RAN4 completes the baseline requirement for HO with PSCell on licensed band.
  + Option 2 (Ericsson):
    - Requirements for HO with PSCell when PSCell is on NR-U shall be discussed in parallel with licensed carrier requirements and be specified in Rel-17
  + Option 3 (Apple, vivo):
    - Discuss requirements for NR-U in Rel-18.

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202598 | WF on further RRM enhancement for NR and MR-DC – HO with PSCell | vivo |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| [R4-2200290](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200290.zip) | Draft CR on HO with PSCell for NR SA to EN-DC\_R17 | Apple | Return to |  |
| [R4-2201203](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201203.zip) | Draft CR on requirements for HO with PSCell from EN-DC to EN-DC | Huawei, Hisilicon | Return to |  |
| [R4-2201381](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201381.zip) | Drfat CR on HO with PSCell requirements for NE DC to NE-DC | Ericsson | Return to |  |
| [R4-2201543](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201543.zip) | dratCR on HO with PSCell | Nokia, Nokia Shanghai Bell | Return to |  |
|  |  |  |  |  |

**2nd round email discussion conclusions**

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202598 WF on further RRM enhancement for NR and MR-DC – HO with PSCell**

*Type: other For: Approval  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2200070 Further discussion on HO with PSCell**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200289 Discussion on RRM requirement for handover with PSCell**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200290 Draft CR on HO with PSCell for NR SA to EN-DC\_R17**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Apple*

**Decision: Return to.**

**R4-2200416 HO with PSCell**

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

**Abstract:**

There are open issues from the last meeting. Therefore, we continue to share our views of the RRM requirements for HO with PSCell in this paper.

**Decision: Noted.**

**R4-2200532 Discussion on HO with PSCell**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200598 Discussion on RRM requirements for HO with PSCell**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200630 Discussion on HO with PSCell**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200673 Further discussion on RRM requirements for handover with PSCell**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200740 Discussion on RRM requirements for HO with PSCell**

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

**Decision: Noted.**

**R4-2201135 RRM requirements for HO with PSCell**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201202 Discussion on RRM requirements for HO with PSCell**

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

**Decision: Noted.**

**R4-2201203 Draft CR on requirements for HO with PSCell from EN-DC to EN-DC**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202752 (from R4-2201203).**

**R4-2202752 Draft CR on requirements for HO with PSCell from EN-DC to EN-DC**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201380 RRM requirements for handover with PSCell**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we provide our views on the open issues for HO with PSCell

**Decision: Noted.**

**R4-2201381 Drfat CR on HO with PSCell requirements for NE DC to NE-DC**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

We provide draft CR to introduce PSCell requirements for NE DC to NE-DC

**Decision: Return to.**

**R4-2201542 discussion on HO with PSCell**

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

**Abstract:**

discussion on HO with PSCell

**Decision: Noted.**

**R4-2201543 dratCR on HO with PSCell**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

DraftCR for HO with PSCell

**Decision: Return to.**

**R4-2201851 Discussion on HO with PSCell**

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

**Decision: Noted.**

##### 6.10.2.3 PUCCH SCell activation/deactivation

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**Email discussion: [101-bis-e][208] NR\_RRM\_enh2\_3**

**R4-2202559 Email discussion summary: [101-bis-e][208] NR\_RRM\_enh2\_3**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202725 (from R4-2202559).**

**R4-2202725 Email discussion summary: [101-bis-e][208] NR\_RRM\_enh2\_3**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 21st)**

Issue 1-3-5: The TCSI-RS\_reporting

* 1st round tentative agreements:
  + TCSI\_reporting is needed in the PUCCH SCell activation requirements for invalid TA case.
* Proposals
  + Option 1: (Nokia)
    - TCSI\_Reporting\_PUCCH is the time uncertainty in acquiring the first available CSI reporting resources after RACH completion.
  + Option 2: (QC)
    - TCSI\_reporting is the delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource after Tactivation\_time, UE processing time for CSI reporting and uncertainty in acquiring the first available CSI reporting resources after T3 as specified in TS 38.331
  + Option 3: (CATT)
    - TCSI\_reporting is defined as the uncertainty in acquiring the first available downlink CSI reference resource after Tactivation\_time, and uncertainty in acquiring the first available CSI reporting resources after T3.
* Discussion
  + Nokia: prefer to keep the last component only (uncertainty in acquiring the first available CSI reporting resources)
  + QC: Nokia position is unclear
  + MTK: UE needs to wait for 1 additional CSI-RS resource. Option 2.
  + E///: same understanding as Nokia. This is similar to SCell activation
  + Nokia: for this procedure UE will already have sufficient time already to measure CSI
  + QC: are we making an assumption on a small CSI periodicity?
* Tentative agreement
  + TCSI\_reporting is included in the PUCCH SCell activation requirements for invalid TA case
  + TCSI\_reporting is the delay (in ms) including
    - [uncertainty in acquiring the first available downlink CSI reference resource after Tactivation\_time]
    - [UE processing time for CSI reporting ]
    - uncertainty in acquiring the first available CSI reporting resources after T3 as specified in TS 38.331

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202601 | WF on further RRM enhancement for NR and MR-DC - PUCCH SCell activation/deactivation requirements | CATT |  |
| R4-2202602 | LS on the PL-RS configuration of PUCCH Scell to be activated | Apple |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200072 | draft CR for PUCCH Scell activation delay with multiple cell | CATT | Postponed |  |
| R4-2200181 | draft CR for PUCCH Scell deactivation delay | MTK | Return to | Note: There is no open issue related to this CR. Please check in the 2nd round, if no further comments, it will be endorsed. |
| R4-2200894 | draft CR for PUCCH Scell activation delay | Nokia | Postponed |  |
| R4-2201205 | Draft CR on interruption of PUCCH Scell activation in 38.133 | Huawei | Postponed |  |
| R4-2201383 | Draft CR on Interruption requirements to LTE serving cell in 36.133 | Ericsson | Postponed |  |

**WF/LS for approval**

**R4-2202601 WF on further RRM enhancement for NR and MR-DC - PUCCH SCell activation/deactivation requirements**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202602 LS on the PL-RS configuration of PUCCH Scell to be activated**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2200071 Further discussion on PUCCH SCell activation\_deactivation**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200072 PUCCH Scell activation delay requirements with multiple Scell**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Postponed.**

**R4-2200180 Discussion on PUCCH SCell activation and deactivation**

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

**Decision: Noted.**

**R4-2200181 Draft CR for PUCCH SCell deactivation delay requirements in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek Inc.*

**Decision: Revised to R4-2202749 (from R4-2200181).**

**R4-2202749 Draft CR for PUCCH SCell deactivation delay requirements in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek Inc.*

**Decision: Return to.**

**R4-2200291 Discussion on PUCCH SCell activation and deactivation**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200352 Discussions on PUCCH SCell Activation/Deactivation delay requirements**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2200390 Remaining issues for PUCCH SCell activation and deactivation**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200418 PUCCH SCell activation and deactivation**

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

**Decision: Noted.**

**R4-2200533 Discussion on PUCCH SCell activation**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200639 Discussion on PUCCH SCell activation/deactivation**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200674 Further discussion on SCell activation and deactication requirements for PUCCH SCell**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200741 Discussion on PUCCH SCell activation and deactivation**

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

**Decision: Noted.**

**R4-2200893 Discussion on the activation delay for deactivated PUCCH SCell**

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

**Decision: Noted.**

**R4-2200894 38.133 draft CR on PUCCH SCell activation delay requirements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Postponed.**

**R4-2201136 RRM requirements for PUCCH SCell Activation/Deactivation**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201204 Discussion on RRM requirements for PUCCH SCell activation**

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

**Decision: Noted.**

**R4-2201205 Draft CR on interruption of PUCCH SCell activation**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Postponed.**

**R4-2201382 RRM requirements for SCell activation/deactivation with PUCCH**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we provide our views on the RRM requirements for SCell (de)activation with PUCCH

**Decision: Noted.**

**R4-2201383 Draft CR on Interruption requirements to LTE serving cell**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

We provide draft CR to introduce Interruption requirements to LTE serving cell

**Decision: Postponed.**

### 6.11 NR and MR-DC measurement gap enhancements

#### 6.11.1 General

**R4-2200486 Discussion on UE features for measurement gap enhancement**

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

**Decision: Noted.**

**R4-2202753 Draft Big CR: RRM requirements Rel-17 NR MG enhancements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: Intel, MediaTek*

**Abstract:**

**Decision: For email approval.**

#### 6.11.2 RRM core requirements

##### 6.11.2.1 Pre-configured MG pattern(s)

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**Email discussion: [101-bis-e][210] NR\_MG\_enh\_2**

**R4-2202561 Email discussion summary: [101-bis-e][210] NR\_MG\_enh\_2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202727 (from R4-2202561).**

**R4-2202727 Email discussion summary: [101-bis-e][210] NR\_MG\_enh\_2**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 20th)**

Issue 2-1: Trigger events for the pre-MG activation/deactivation

* Background
  + RAN4 #100e agreements
    - The pre-configured MG activation/deactivation is triggered by the DCI/Timer based BWP switch
      * FFS if additional conditions for pre-configured MG activation/deactivation shall be considered
  + RAN4 #101e agreements
    - Conditions for pre-MG activation/deactivation
      * Additional activation/deactivation conditions are not considered in application to network-controlled pre-MG activation/deactivation.
      * Specific conditions can be further handled as a part of discussion on rules of UE autonomous activation/deactivation
    - Rules of for UE autonomous Pre-MG activation/deactivation shall be:
      * The trigger events that may change the activation status of pre-MG configured to UE include:
        + BWP switching,
        + adding/removing any measurement object(s): FFS
        + adding/releasing/changing SCell(s): FFS
        + activating/de-activating any Scell(s):FFS
        + LPP positioning request: FFS
* Proposals:
  + Option 1(Apple, MTK, Huawei, ZTE, xiaomi): pre-configured MG activation/deactivation can be triggered by:
    - BWP switching,
    - adding/removing any measurement object(s),
    - adding/releasing/changing a PSCell under CA
    - activating/de-activating any SCell(s) under CA
    - LPP positioning request
  + Option 2(Qualcomm):.
    - BWP switching,
    - adding/removing any measurement object(s) (when the autonomous rules are applied)
    - SCell activation/deactivation/release/change when the UE is in CA mode
    - LocationMeasurementIndication message to activated the pre-MG for PRS
  + Option 3a(Intel): The events below which can result in pre-configured MG activation/deactivation status changed are necessary to be studied in Rel17 WI. There is not any benefits especially on the measurement gap activation delay for pre-MG which is to be (de)activated by the trigger events via RRC reconfiguration messages (e.g. adding/removing any measurement object(s),e.t.c) .
    - BWP switching by DCI/Timer based,
    - activating/de-activating any SCell(s).
  + Option 3b (CATT, OPPO):
    - BWP switching by DCI/Timer based
  + Option 4(Nokia)
    - For RRC-based network-controlled Pre-MG activation/deactivation are the following ones:
      * DCI/Timer based BWP switching in single CC,
      * adding/removing any measurement object(s) for intra-frequency SSB measurements with gap and for inter-frequency SSB measurements,
      * adding/releasing/changing a PSCell (to be removed in case MR-DC is deprioritized),
      * activating/de-activating any SCell(s) and
      * LPP positioning request
    - For UE autonomous Pre-MG activation/deactivation, following criteria / trigger events may change the activation status of pre-MG configured to UE:
      * DCI/Timer based BWP switching in single CC
      * LPP positioning request
* Tentative agreements
  + For UE to autonomous pre-MG activation/deactivation the following trigger events may change the pre-MG activation status
    - BWP switching by DCI/Timer based
    - activation/de-activation of SCell(s)
    - [adding/removing any measurement object(s)]
  + When there are any events below triggered by NW’s RRC message~~, NW can update the pre-MG configuration simultaneously by RRC message~~ ~~and~~ UE shall check the status of pre-MG. ~~Then UE can know the pre-MG status autonomously based on the same rules to check the pre-MG initial status when being configured~~:
    - [adding/removing any measurement object(s)]
    - adding/releasing/changing a PSCell under CA
    - BWP switching by RRC
    - LPP positioning request
* Agreements
  + For UE to autonomous pre-MG activation/deactivation the following trigger events may change the pre-MG activation status
    - BWP switching by DCI/Timer based
    - activation/de-activation of SCell(s)
  + FFS how to handle other cases in terms of UE and NW behavior
    - addition/removal of any measurement object(s)
    - addition/release/change of a SCell under CA
    - BWP switching by RRC
    - LPP positioning request

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202614 | WF on R17 NR MG enhancements – Pre-configured MG | Intel |  |
| R4-2202615 | LS on R17 NR MG enhancements – Pre-configured MG | Intel |  |
| R4-2202616 | Reply RAN2 LS on Pre-configured MG | CATT |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200112 | Draft CR on measurement delay requirements with Pre-MG | CATT | Revised |  |
| R4-2200241 | CR on Pre-MG activation/deactivation delay | Apple | Revised |  |
| R4-2200488 | Draft CR on 38.133 for L1 measurement impact of preconfigured gap | MediaTek | Revised |  |
| R4-2200676 | DraftCR on inter-RAT measurement delay requirements with pre-configured gaps | Xiaomi | Revised |  |
| R4-2200693 | DraftCR on inter-frequency measurement requirements with pre-MG in NR | Intel | Revised |  |
| R4-2201138 | Draft CR to 38133 on gap interruption for Pre-MG | Oppo | Revised |  |
| R4-2201622 | CR on pre-MG applicability | Huawei | Revised |  |
| R4-2202010 | Measurement requirements for Pre-MG in TS 38.133 | Ericsson | Revised |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202614 WF on R17 NR MG enhancements – Pre-configured MG**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202615 LS on R17 NR MG enhancements – Pre-configured MG**

*Type: LS Out For: Approval  
 to RAN2  
 Source: Intel Corporation*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202616 Reply RAN2 LS on Pre-configured MG**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2200110 Further discussion on pre-configured MG pattern**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200111 Reply LS on R17 NR MG enhancements – Pre-configured MG**

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

**Decision: Noted.**

**R4-2200112 Draft CR on measurement delay requirements with Pre-MG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Revised to R4-2202617 (from R4-2200112).**

**R4-2202617 Draft CR on measurement delay requirements with Pre-MG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Return to.**

**R4-2200240 On Pre-MG pattern**

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

**Decision: Noted.**

**R4-2200241 CR on Pre-MG activation/deactivation delay**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Revised to R4-2202618 (from R4-2200241).**

**R4-2202618 CR on Pre-MG activation/deactivation delay**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Return to.**

**R4-2200387 Remaining issues on pre configured MG patterns**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200487 Discussion on pre-configured gap**

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

**Decision: Noted.**

**R4-2200488 Draft CR on 38.133 for L1 measurement impact of preconfigured gap**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2202619 (from R4-2200488).**

**R4-2202619 Draft CR on 38.133 for L1 measurement impact of preconfigured gap**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2200537 Discussion on pre-configured measurement gap**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200586 Views on pre-configured MG patterns**

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

**Decision: Noted.**

**R4-2200638 Discussion on pre-configured MG pattern(s)**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200675 Further discussion on pre-configured MG pattern for NR**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200676 DraftCR on inter-RAT measurement delay requirements with pre-configured gaps**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Revised to R4-2202620 (from R4-2200676).**

**R4-2202620 DraftCR on inter-RAT measurement delay requirements with pre-configured gaps**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Return to.**

**R4-2200693 DraftCR on inter-frequency measurement requirements with pre-MG in NR**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2202621 (from R4-2200693).**

**R4-2202621 DraftCR on inter-frequency measurement requirements with pre-MG in NR**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2200761 On pre-configured measurement gaps**

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

**Decision: Noted.**

**R4-2201137 On pre-configured MG pattern(s) for NR\_MG\_enh**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201138 Draft CR to 38133 on gap interruption for Pre-MG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Revised to R4-2202622 (from R4-2201138).**

**R4-2202622 Draft CR to 38133 on gap interruption for Pre-MG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Return to.**

**R4-2201621 Discussion on pre-configured MG**

*Type: LS out For: Approval  
 to RAN2  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201622 CR on pre-MG applicability**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202623 (from R4-2201622).**

**R4-2202623 CR on pre-MG applicability**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201977 Discussion on Pre-configured MG patterns**

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

**Abstract:**

Discussion on remaining issues for pre-configured NR MG patterns

**Decision: Noted.**

**R4-2202009 Further analysis of pre-configured measurement gap pattern**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

This document further analyzes RRM requirements for pre-configured MG in NR and MR-DC

**Decision: Noted.**

**R4-2202010 Measurement requirements for Pre-MG in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR defines RRM requirements for pre-configured MG in NR and MR-DC

**Decision: Revised to R4-2202624 (from R4-2202010).**

**R4-2202624 Measurement requirements for Pre-MG in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR defines RRM requirements for pre-configured MG in NR and MR-DC

**Decision: Return to.**

**R4-2200595 Draft Reply LS to Reply LS onViews on Concurrent MG**

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

**Session chair: moved from AI 6.11.1 to AI 6.11.2.1. Correct title should be “Reply LS to Reply LS on Pre-configured MG”**

**Decision: Noted.**

##### 6.11.2.2 Multiple concurrent and independent MG patterns

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**Email discussion: [101-bis-e][209] NR\_MG\_enh\_1**

**R4-2202560 Email discussion summary: [101-bis-e][209] NR\_MG\_enh\_1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202726 (from R4-2202560).**

**R4-2202726 Email discussion summary: [101-bis-e][209] NR\_MG\_enh\_1**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 20th)**

Issue 2-2-1: Simultaneous configuration of per-UE gap and per-FR gap

* Proposals
  + Option 1: LGE, OPPO
    - No
  + Option 2: CATT, [CMCC], Ericsson, ~~Nokia~~, ZTE
    - Yes
  + Option 2a: Apple, QC, MTK, vivo, Xiaomi, Huawei, Nokia, CMCC
    - Yes, but only when the per-UE gap is associated to PRS measurements
* Tentative agreements
  + UE can be configured with per-UE gap and per-FR gap simultaneously when
    - 1) UE is capable of per-FR gap and concurrent gaps, and
    - 2) per-UE gap is associated with PRS measurements
      * Note: Additional gaps incl. new types of gaps introduced in Rel-17 MUSIM and Rel-17 NR NTN WIs are not precluded to be included in future releases.
* Discussion
  + E///: can compromise to tentative agreements. There will be other gaps in Rel-17. Extra condition – add a note to RAN2 LS that RAN4 discussed only Rel-16 gaps.
  + vivo: same view as E///.
  + OPPO: we can agree 2 per-UE gap. Can accept 2a.
  + Intel: we can include Rel-17 gap.
* Agreement
  + UE can be configured with per-UE gap and per-FR gap simultaneously when
    - 1) UE is capable of per-FR gap and concurrent gaps, and
    - 2) per-UE gap is associated with PRS measurements
      * Note: Additional use cases incl. Rel-17 MUSIM and Rel-17 NR NTN WIs are not precluded to be included in future releases.

Issue 2-2-2: Max number of concurrent gap across all FRs for per-FR gap capable UEs (without considering other WIs)

* Proposals
  + Option 1: Apple, QC, Xiaomi, Intel, Huawei, LGE, E///
    - 3
  + Option 2: CATT, CMCC, vivo, OPPO, Ericsson, Nokia, ZTE
    - 4
  + Option 3: Apple, MTK, Xiaomi
    - Up to UE capability
* Tentative agreements
  + The maximum number of concurrent gaps across all FRs for per-FR gap capable UEs is up to UE capability
    - The maximum number of gaps is equal to {3,4}
    - The UE should be able to signal, which concurrent MG configurations across Per-FR1, Per-FR2 and Per-UE it supports.
* Agreement
  + The maximum number of concurrent gaps across all FRs for per-FR gap capable UEs is
    - 3 for SA case
    - FFS for MR-DC case if it is supported

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202603 | WF on R17 NR MG enhancements – multiple concurrent MGs | MediaTek inc. |  |
| R4-2202604 | Further reply LS on R17 NR MG enhancements – Concurrent MG | MediaTek inc. | To: RAN\_2; Cc: RAN\_1 |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200115 | Draft CR on measurement delay requirements for concurrent MG patterns | CATT | Revised |  |
| R4-2200243 | CR on CSSF for concurrent gaps | Apple | Revised |  |
| R4-2200404 | Draft CR on inter-RAT measurement requirements with concurrent gaps | vivo | Revised |  |
| R4-2200490 | Draft CR on 38.133 for L1 measurement impact of concurrent gaps | MediaTek inc. | Revised |  |
| R4-2200678 | DraftCR on inter-frequency measurement delay requirements with concurrent gaps | Xiaomi | Revised |  |
| R4-2200694 | DraftCR on positioning measurement requirements due to concurrent gap in NR | Intel Corporation | Revised |  |
| R4-2201140 | Draft CR to 38133 on CSI-RS based L3 measurement requirements with concurrent gap | OPPO | Revised |  |
| R4-2201214 | draftCR on concurrent gaps (9.1.2B) | Ericsson | Revised |  |
| R4-2201624 | CR on collision handling and MG related requirements for concurrent MGs | Huawei, Hisilicon | Revised |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202603 WF on R17 NR MG enhancements – multiple concurrent MGs**

*Type: other For: Approval  
 Source: MediaTek inc.*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202604 Further reply LS on R17 NR MG enhancements – Concurrent MG**

*Type: LS Out For: Approval  
 To: RAN2 Cc: RAN1  
 Source: MediaTek inc.*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2200113 Further discussion on multiple concurrent and independent MG patterns**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200114 Reply LS on R17 NR MG enhancements – Concurrent MG**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: CATT*

**Decision: Noted.**

**R4-2200115 Draft CR on measurement delay requirements for concurrent MG patterns**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Revised to R4-2202613 (from R4-2200115).**

**R4-2202613 Draft CR on measurement delay requirements for concurrent MG patterns**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Return to.**

**R4-2200242 On multiple concurrent and independent MG patterns**

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

**Decision: Noted.**

**R4-2200243 CR on CSSF for concurrent gaps**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Revised to R4-2202605 (from R4-2200243).**

**R4-2202605 CR on CSSF for concurrent gaps**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Return to.**

**R4-2200388 Remaining issues on multiple concurrent and independent MG patterns**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200404 Draft CR on inter-RAT measurement requirements with concurrent gaps**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Revised to R4-2202606 (from R4-2200404).**

**R4-2202606 Draft CR on inter-RAT measurement requirements with concurrent gaps**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Return to.**

**R4-2200489 Discussion on concurrent gaps**

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

**Decision: Noted.**

**R4-2200490 Draft CR on 38.133 for L1 measurement impact of concurrent gaps**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2202607 (from R4-2200490).**

**R4-2202607 Draft CR on 38.133 for L1 measurement impact of concurrent gaps**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2200538 Discussion on multiple and independent concurrent measurement gaps in NR**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200560 Discussion on multiple concurrent and independent MG patterns**

*Type: discussion For: (not specified)  
 Source: LG Electronics*

**Abstract:**

It discusses multiple concurrent and independent MG patterns.

**Decision: Noted.**

**R4-2200587 Views on multiple concurrent and independent MGs**

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

**Decision: Noted.**

**R4-2200631 Discussion on multiple concurrent and independent MG patterns**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200677 Further discussion on multiple concurrent and independent MG patterns for NR**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200678 DraftCR on inter-frequency measurement delay requirements with concurrent gaps**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Revised to R4-2202608 (from R4-2200678).**

**R4-2202608 DraftCR on inter-frequency measurement delay requirements with concurrent gaps**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Return to.**

**R4-2200694 DraftCR on positioning measurement requirements due to concurrent gap in NR**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2202609 (from R4-2200694).**

**R4-2202609 DraftCR on positioning measurement requirements due to concurrent gap in NR**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2200762 On multiple concurrent measurement gaps**

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

**Decision: Noted.**

**R4-2201139 On multiple concurrent and independent MG patterns for NR\_MG\_enh**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201140 Draft CR to 38133 on CSI-RS based L3 measurement requirements with concurrent gap**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Revised to R4-2202610 (from R4-2201140).**

**R4-2202610 Draft CR to 38133 on CSI-RS based L3 measurement requirements with concurrent gap**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Return to.**

**R4-2201213 Discussion on multiple concurrent MG patterns**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses concurrent gaps

**Decision: Noted.**

**R4-2201214 draftCR on concurrent gaps (9.1.2B)**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This draft CR introduce the measurement requirement skeleton for concurrent gaps

**Decision: Revised to R4-2202611 (from R4-2201214).**

**R4-2202611 draftCR on concurrent gaps (9.1.2B)**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This draft CR introduce the measurement requirement skeleton for concurrent gaps

**Decision: Return to.**

**R4-2201623 Discussion on multiple concurrent MGs**

*Type: LS out For: Approval  
 to RAN2  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201624 CR on collision handling and MG related requirements for concurrent MGs**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202612 (from R4-2201624).**

**R4-2202612 CR on collision handling and MG related requirements for concurrent MGs**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201694 Discussion on concurrent measurement gap enhancements**

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

**Decision: Noted.**

**R4-2201695 Discussion on LS on R17 NR Concurrent MG enhancements**

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

**Decision: Noted.**

##### 6.11.2.3 Network Controlled Small Gap

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**Email discussion: [101-bis-e][211] NR\_MG\_enh\_3**

**R4-2202562 Email discussion summary: [101-bis-e][211] NR\_MG\_enh\_3**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202728 (from R4-2202562).**

**R4-2202728 Email discussion summary: [101-bis-e][211] NR\_MG\_enh\_3**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 20th)**

Issue 1-4: conditions for NCSG in FR2

* Proposals
  + Option 1: No additional conditions are required (CATT, HW, E///)
  + Option 2: with the following conditions (Apple, MTK, Intel, OPPO)
    - The serving cell(s) and the target cell are on different bands.
    - UE is performing IBM on the serving cell band(s) and the target cell band.
  + Option 2a: with the following conditions (ZTE, Nokia)
    - The serving cell(s) and the target cell are on different bands.
    - UE is performing IBM on the serving cell band and the target cell band.
    - UE has a spared chain for target cell measurement
    - FFS for additional conditions
  + Option 3: Introduce new signaling to indicate whether the UE can utilize the serving cell timing to derive the SSB indexes of target cell(s) on a frequency different than serving cell frequency, and which serving cell timing UE can utilize, in order to utilize the symbols in between SSBs for serving cell communication. (QC, OPPO)
* Discussion
  + TBA
* Agreements
  + NCSG in FR2
    - NCSG can be applied without scheduling restrictions under the following conditions
      * The serving cell(s) and the target cell are on different bands.
      * UE is capable of IBM on the serving cell band and the target cell band.
      * UE is capable of simultaneous Tx/Rx on the serving cell band and the target cell band
    - For other cases NCSG can be applied with scheduling restrictions

Issue 4-1-2: scheduling restriction for intra-band inter-frequency measurement

* Proposals
  + Option 1: existing scheduling restriction requirements apply except that all symbols in SMTC windows are restricted. (vivo, HW, MTK, E///)
  + Option 2: If deriveSSB-IndexFromCell-inter is true, only UL on the SSB symbols indicated by SSB-ToMeasure (and one symbol before and after) are restricted. Otherwise, all symbols in SMTC windows are restricted. (QC, Apple, ZTE)
  + Option 3: If UE is informed that inter-frequency carriers are timing aligned with the serving cell (UE can utilize serving cell timing to derive the index of SS block transmitted by neighbour cell with different carrier), only the SSB symbols indicated by SSB-ToMeasure are restricted. Otherwise, all symbols in SMTC windows are restricted. (CMCC, ZTE)
  + Option 4: if SFN and frame boundary across serving cell and inter-frequency neighbor cells is aligned, and the timing of SSBs across serving cell and inter-frequency neighbor cells are aligned, only the SSB symbols indicated by SSB-ToMeasure are restricted. Otherwise, all symbols in SMTC windows are restricted. (ZTE)
* Discussion
  + Session chair: Option 2 can be used as a baseline but details need further discussion in the 2nd round

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202625 | WF on R17 NR MG enhancements – NCSG | Apple |  |
| R4-2202626 | LS on R17 MG enhancement - NCSG | Apple | To: RAN2; CC: RAN1 |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200117 | Draft CR on measurement delay requirements with NCSG | CATT | Revised |  |
| R4-2200245 | CR on NCSG applicability | Apple | Revised |  |
| R4-2200405 | Draft CR for interruption for de-activated SCell measurement due to NCSG | vivo | Revised |  |
| R4-2200492 | Draft CR on 38.133 for L1 measurement impact of NCSG | MediaTek inc. | Revised |  |
| R4-2200695 | DraftCR on interruption of NCSG in NR | Intel Corporation | Revised |  |
| R4-2201157 | Draft CR to UE behaviour to group the frequency layers with NCSG | OPPO | Revised |  |
| R4-2201232 | Draft CR for UE behavior after the interruptions of NCSG | ZTE Corporation | Revised |  |
| R4-2201626 | CR on use cases and CSSF for NCSG | Huawei, Hisilicon | Revised |  |
| R4-2201976 | CR: NCSG scheduling restriction | Qualcomm communications-France | Revised |  |
| R4-2202012 | Measurement requirements for NCSG in TS 38.133 | Ericsson | Revised |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202625 WF on R17 NR MG enhancements – NCSG**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202626 LS on R17 MG enhancement - NCSG**

*Type: LS Out For: Approval  
 To: RAN2 Cc: RAN1  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2200116 Further discussion on Network Controlled Small Gap (NCSG)**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200117 Draft CR on measurement delay requirements with NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Revised to R4-2202627 (from R4-2200117).**

**R4-2202627 Draft CR on measurement delay requirements with NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Return to.**

**R4-2200244 On network controlled small gap**

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

**Decision: Noted.**

**R4-2200245 CR on NCSG applicability**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Revised to R4-2202628 (from R4-2200245).**

**R4-2202628 CR on NCSG applicability**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Return to.**

**R4-2200329 On NCSG requirement**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2200389 Remaining issues for NCSG**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200405 Draft CR for interruption for de-activated SCell measurement due to NCSG**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Revised to R4-2202629 (from R4-2200405).**

**R4-2202629 Draft CR for interruption for de-activated SCell measurement due to NCSG**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Return to.**

**R4-2200491 Discussion on NCSG**

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

**Decision: Noted.**

**R4-2200492 Draft CR on 38.133 for L1 measurement impact of NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2202630 (from R4-2200492).**

**R4-2202630 Draft CR on 38.133 for L1 measurement impact of NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2200539 Discussion on NCSG in NR**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200588 Views on NCSG**

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

**Decision: Noted.**

**R4-2200632 Further discussion on Network Controlled Small Gap**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200695 DraftCR on interruption of NCSG in NR**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2202631 (from R4-2200695).**

**R4-2202631 DraftCR on interruption of NCSG in NR**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2201157 Draft CR to UE behaviour to group the frequency layers with NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Revised to R4-2202632 (from R4-2201157).**

**R4-2202632 Draft CR to UE behaviour to group the frequency layers with NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Return to.**

**R4-2201158 Discussion on NCSG for NR\_MG\_enh**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201232 Draft CR for UE behavior after the interruptions of NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: ZTE Corporation*

**Decision: Revised to R4-2202633 (from R4-2201232).**

**R4-2202633 Draft CR for UE behavior after the interruptions of NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: ZTE Corporation*

**Decision: Return to.**

**R4-2201625 Discussion on NCSG**

*Type: LS out For: Approval  
 to RAN2  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201626 CR on use cases and CSSF for NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202634 (from R4-2201626).**

**R4-2202634 CR on use cases and CSSF for NCSG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201976 CR: NCSG scheduling restriction**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Qualcomm communications-France*

**Decision: Revised to R4-2202635 (from R4-2201976).**

**R4-2202635 CR: NCSG scheduling restriction**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Qualcomm communications-France*

**Decision: Return to.**

**R4-2201978 Discussion on Network Controlled Small Gaps for NR**

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

**Abstract:**

Discussion on remaining issues for NR NCSG

**Decision: Noted.**

**R4-2202011 Further analysis of network controlled small gap**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

This document further analyzes RRM requirements for NCSG in NR and MR-DC

**Decision: Noted.**

**R4-2202012 Measurement requirements for NCSG in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR defines RRM requirements for NCSG in NR and MR-DC

**Decision: Revised to R4-2202636 (from R4-2202012).**

**R4-2202636 Measurement requirements for NCSG in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

The CR defines RRM requirements for NCSG in NR and MR-DC

**Decision: Return to.**

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

#### 6.13.5 RRM core requirements

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

**Email discussion: [101-bis-e][212] NR\_NTN\_solutions\_RRM\_1**

**R4-2202563 Email discussion summary: [101-bis-e][212] NR\_NTN\_solutions\_RRM\_1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202729 (from R4-2202563).**

**R4-2202729 Email discussion summary: [101-bis-e][212] NR\_NTN\_solutions\_RRM\_1**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 19, 2022)**

**CR work split & Issue 1-7: RRM Spec Documentation**

Session chair: Rapporteur (Thales) and moderator are asked to prepare a draft of CR split and provide initial version of the list the affected specification clauses. It will be discussed in the 2nd round.

**Issue 1-4-2: Applicability of Legacy DRX Cycles for Earth-moving Cell**

* Proposals:
  + Proposal 1: (CATT, OPPO, Apple, Xiaomi)
    - No RRM requirements for 2.56s DRX cycle for earth-moving LEO deployment
  + Proposal 2: (LGE)
    - postpone RRM requirements for moving cell in the next release.
  + Proposal 3: (ZTE, Ericsson, HW)
    - All Rel-16 DRX cycle lengths are applicable
* Agreements
  + Define RRM requirements for all legacy DRX cycles
    - FFS on applicability of 2.56s DRX cycle for earth-moving LEO deployment

**Issue 2-1-3: Cell Selection/Reselection delay requirements**

* Proposals:
  + Proposal 1: (Xiaomi)
    - For timing and S/R criteria based cell reselection, when the legacy Srxlev/Squal conditions are not met before the time when serving cell stops covering the current area, UE starts to perform the neighbour cell measurements at the time when the legacy Srxlev/Squal conditions are not met.
    - For timing and S/R criteria based cell reselection, when the legacy Srxlev/Squal conditions are not met after the time when serving cell stops covering the current area, the UE starts to perform the neighbour cell measurements at the time when serving cell stops covering the current area regardless of legacy Srxlev/Squal condition are met or not.
  + Proposal 2: (QC)
    - RAN4 to introduce a scaling factor lesser than equal to 1 for UE Idle/Inactive mode measurement and mobility period. And the scaling factor can be configured by NW. FFS on the details on the scaling factor design for respective requirements, e.g. whether one scaling factor can be applied to all Idle/Inactive mode search, measurement, and evaluation periods for all DRX cycles, whether the same scaling factor can be applied to intra- and inter-frequency NR cells, whether any differentiation is needed between satellite type, etc.
  + Proposal 3: (HW)
    - Measurement delay requirements for Idle mode should be defined in the same way as Connected mode, e.g. taking into account multiple SMTC, different Doppler shift, etc.
  + Moderator WF
    - Introduce a scaling factor ≤ 1 for UE Idle/Inactive mode measurement and mobility period. The scaling factor can be configured by NW.
      * FFS on the details on the scaling factor design for respective requirements, e.g. whether one scaling factor can be applied to all Idle/Inactive mode search, measurement, and evaluation periods for all DRX cycles, whether the same scaling factor can be applied to intra- and inter-frequency NR cells, whether any differentiation is needed between satellite type, etc.
* Discussion
  + E///: scaling factor can be > 1
  + MTK: NW configuration is questionable since in IDLE mode NW may not be able to configure all UEs
  + Xiaomi: agree with E///
  + Huawei: does it mean we’ll have multiple sets of requirements? We may need separate UE capabilities.
  + QC: We assume that scaling factor will be broadcasted. Exact values can be discussed and we can keep it configurable
  + Intel: we may need to consider fixed values instead of configurable
  + Apple: share Intel’s view that fixed values are needed. For configurable values UE needs to monitor SIB.
  + CATT: same view as Apple/Intel. Can consider different scaling factors for different scenarios.
  + QC: ok with fixed numbers
* Agreements
  + Same cell Selection/Reselection delay requirements will apply for UE Idle/Inactive mode for LEO and GEO scenarios
    - The requirements shall be based on LEO scenario assumptions

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202637 | WF on NR NTN RRM requirements | Qualcomm |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2201628 | CR on general issues for NTN | Huawei, Hisilicon | Postponed |  |
| R4-2201630 | CR on mobility requirements for NTN | Huawei, Hisilicon | Postponed |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202637 WF on NR NTN RRM requirements**

*Type: other For: Approval  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**Email discussion: [101-bis-e][213] NR\_NTN\_solutions\_RRM\_2**

**R4-2202564 Email discussion summary: [101-bis-e][213] NR\_NTN\_solutions\_RRM\_2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202730 (from R4-2202564).**

**R4-2202730 Email discussion summary: [101-bis-e][213] NR\_NTN\_solutions\_RRM\_2**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 19, 2022) – not handled**

Issue 2-3-1: Double correction issue related to combination of open and closed loop TA control.

* Proposals
  + Option 1: (Apple, Intel, Xiaomi)
    - RAN4 to define a requirement to address double-correction issue based on the framework of gradual timing adjustment accuracy requirement, e.g., the requirement regulates the maximum amount of UE specific TA change of shot adjustment due to UE position change, the minimum and maximum aggregate adjustment rates.
    - Such requirement could be under the framework of legacy NTN gradual timing adjustment requirement with some additional clarification.
  + Option 1a: (Apple)
    - RAN4 to define a requirement to address double-correction issue based on the framework of gradual timing adjustment accuracy requirement, e.g., the requirement regulates the maximum amount of UE specific TA change of shot adjustment due to UE position change, the minimum and maximum aggregate adjustment rates.
    - Such requirement could be under the framework of legacy NTN gradual timing adjustment requirement with some additional clarification.
    - The gradual timing requirement to address the double correction issue could be based on either of the following options:
      * Option 1: when open-loop TA is updated, UE to reset the close-loop TA for Tx timing reference point, or
      * Option 2: when open-loop TA is updated, UE to slow down the gradual timing adjustment but retain the previous close-loop TA for Tx timing reference point
  + Option 2: (Qualcomm)
    - RAN4 to down select one between the following two options.
      * Option 1) replace gradual timing adjustment requirement with NTN UE initial timing accuracy requirement, i.e. NTN UE initial timing accuracy requirement applies to all UL transmissions. And add a margin to the NTN UE initial timing accuracy requirement for UL transmissions not the first transmission in a DRX cycle or DRX is not in use. The margin can be, e.g. [10]% of the effective UE position estimation error that is assumed for the derivation of UE initial transmission timing error (50m).
      * Option 2) introduce the following requirement and values of x1, x2, x3, x4, T1 and T2 are FFS:
        + In connected mode , when UE specific TA calculated based on the UE location corresponds to the last applied UE specific TA differs from the UE specific TA calculated based on most recent GNSS fix by more than x1 , i.e., |TA\_ue(GNSS\_f, sat\_current)-TA\_ue(GNSS\_c, sat\_current)|>x1, where GNSS\_f is the most recent GNSS fix, GNSS\_c is the UE location corresponding to the last applied UE specific TA, and sat\_current is the current satellite location, UE is required to adjust the UE location when calculating the UE specific TA such that the applied UE-specific TA is closer to the TA calculated using the most recent GNSS fix than using GNSS\_c. The adjustment made to UE specific TA due to UE location adjustments shall satisfy the following conditions:
        + the maximum amount of UE specific TA change of one adjustment due to UE location update shall be y, i.e, |TA\_ue\_applied-TA\_ue(GNSS\_c, sat\_current)|<x2.
        + the minimum aggregate adjustment rate shall be x3 per T1 seconds.
        + the maximum aggregate adjustment rate shall be x4 per T2 seconds.
  + Option 3: (LGE)
    - RAN4 to replace gradual timing adjustment requirement with NTN UE initial timing accuracy requirement for double correction issue as Option 1.
    - RAN4 to define the following UE behavior for UE specific TA updating to avoid double correction issue.
      * The UE specific TA or open loop TA should be updated at least before uplink transmission (applying TA command) slot.
  + Option 4: (CMCC)
    - There are two alternatives for defining gradual timing adjustment requirement and addressing the “double correction issue”:
      * Alt 1: Relax the requirement accordingly to accommodate the timing change/drift, i.e. updating Tq, Tp, and/or the rate.
      * Alt 2: Replace the gradual timing adjustment requirement by UE specific TA requirement, limiting the error between the subsequent UL transmissions and reference timing within Te\_NTN.
  + Option 5: (Nokia)
    - The solutions to resolve the issue on combination of open and closed loop TA control should not be left up to the UE implementation only and further study and specification of solutions involving the gNB is needed.
    - RAN4 sends an LS to RAN1 to clarify that stability of the TA control mechanism cannot be guaranteed by RAN4 specifications and dedicated solutions must be specified in RAN1.
    - RAN4 evaluates whether the existing UL timing requirements are sufficient or need to be refined.
* Discussion
  + TBA
* Agreements
  + TBA

Issue 2-4-1: The principle for gradual timing adjustment.

* Proposals
  + Option 1: (Apple)
    - Relax the requirement accordingly to accommodate the timing change/drift, i.e. updating Tq, Tp, and/or the rate
    - NTN UE is required to adjust its UL timing towards updated UE specific TA and DL timing gradually, according to minimum and maximum aggregate adjustment rate requirements
    - the design principle for Tq/Tp is:
    - ,
    - Where, Tq\_NTN= Tp\_NTN
  + Option 2: (Xiaomi)
    - RAN4 is to define one single set of gradual timing adjustment requirements to incorporate the legacy downlink timing drift and UE specific TA change.
    - Option 3: (Intel)
    - RAN4 is to define a requirement based on the framework of gradual timing adjustment accuracy requirement, e.g. the requirement regulates the maximum amount of UE specific TA change of shot adjustment due to UE position change, the minimum and maximum aggregate adjustment rates.
    - Specify a set of stand-alone requirements where an NTN UE is required to adjust its UL timing towards updated UE specific TA gradually, according to minimum and maximum aggregate adjustment rate requirements.
  + Option 4: (Huawei)
    - It is suggested to define the gradual timing adjustment requirements according to the propagation delay drift rate, i.e. the maximum aggregate adjustment rate need to be aligned with the propagation delay drift rate.
    - For GEO, the propagation delay drift rate equals to the serving link delay drift rate.
    - For LEO, the propagation delay drift rate includes the feeder link delay drift rate and the serving link delay drift rate.
  + Option 5: (Ericsson)
    - Keep existing gradual timing adjustment requirements for the closed loop terms NTA+NTA,offset.
    - The best we can do is to put limits based on the characteristics of at least the UE GNSS positioning accuracy part, for NTA,UE-specific.
    - All adjustments made to the UE uplink timing, for shall follow these rules:
    - The UE GNSS position accuracy is 50 meters from true position.
    - The maximum amount UE GNSS position update rate corresponds to a UE speed < 500 km/h.
    - The maximum amount of deviation from true displacement between UE GNSS position updates < , where is time between UE GNSS position updates.
    - The values of k1 and k2 are FFS.
  + Option 6: (Qualcomm)
    - Replace gradual timing adjustment requirement with NTN UE initial timing accuracy requirement, i.e. NTN UE initial timing accuracy requirement applies to all UL transmissions. And add a margin to the NTN UE initial timing accuracy requirement for UL transmissions not the first transmission in a DRX cycle or DRX is not in use. The margin can be, e.g. [10]% of the effective UE position estimation error that is assumed for the derivation of UE initial transmission timing error (50m).
  + Option 7: (MTK)
    - For NTN gradual timing adjustment requirement, the timing reference should account for the UE autonomous TA adjustment, i.e. reuse the timing reference as used in Te\_NTN requirement.

Issue 2-4-6: The gradual timing adjustment requirement

* Discussion
  + TBA
* Agreements
  + TBA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency Range | SCS of uplink signals (kHz) | Tq\_NTN for LEO | Tp\_NTN for LEO |
| 1 | 15 | X1\*64\*Tc | T1\*64\*Tc |
|  | 30 | X2\*64\*Tc | Y2\*64\*Tc |
|  | 60 | X3\*64\*Tc | Y3\*64\*Tc |
| NOTE: Tc is the basic timing unit defined in TS 38.211 | | | |

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202638 | WF on GNSS-related and timing requirements for NR NTN | Xiaomi |  |
| R4-2202639 | Reply LS on combination of open and closed loop TA control in NTN | Qualcomm | To：RAN1 |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200681 | DraftCR on timing requirements for NR NTN | Xiaomi | Postponed |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202638 WF on GNSS-related and timing requirements for NR NTN**

*Type: other For: Approval  
 Source: Xiaomi*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202639 Reply LS on combination of open and closed loop TA control in NTN**

*Type: LS Out For: Approval  
 To: RAN1   
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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##### 6.13.5.1 General

**R4-2200075 Further discussion on RRM requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200419 General and RRM requirements impacts**

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

**Decision: Noted.**

**R4-2200564 Discussion on NTN general requirements**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Decision: Noted.**

**R4-2200737 Discussion on General RRM Requirements for NTN UE**

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

**Decision: Noted.**

**R4-2200890 General requirements for NTN**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

General requirements for NTN

**Decision: Noted.**

**R4-2200930 Discussion on general RRM requirements in NTN**

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

**Decision: Noted.**

**R4-2201141 Discussion on general RRM requirements for NTN**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201520 On the SMTC windows**

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

**Abstract:**

We present our views on measurement gaps.

**Decision: Noted.**

**R4-2201587 Reply LS to RAN1: LS on open loop closed loop dual correction of timing**

*Type: LS out For: Approval  
 to RAN1  
 Source: Ericsson*

**Abstract:**

Draft Reply LS to RAN1 regarding open loop closed loop dual correction of timing.

**Decision: Noted.**

**R4-2201627 Discussion on general issues for NTN RRM**

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

**Decision: Noted.**

**R4-2201628 CR on general issues for NTN**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Postponed.**

##### 6.13.5.2 GNSS-related requirements

**R4-2200076 Further discussion on GNSS-related requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200804 Discussion on NTN GNSS related issues**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2201142 Discussion on GNSS-related requirements for NTN**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201631 Discussion on GNSS related issue for NTN**

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

**Decision: Noted.**

##### 6.13.5.3 Mobility requirements

**R4-2200077 Further discussion on mobility requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200420 Mobility requirements**

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

**Decision: Noted.**

**R4-2200523 Discussion on the mobility aspects for NR NTN UE**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200679 Further discussion on mobility requirements for NR NTN**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200864 Discussion on mobility requirement for NR NTN**

*Type: discussion For: Discussion  
 Source: LG Electronics UK*

**Decision: Noted.**

**R4-2200892 Mobility requirements for NTN**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Mobility requirements for NTN

**Decision: Noted.**

**R4-2201159 Discussion on mobility requirements for NTN**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201629 Discussion on mobility requirements for NTN RRM**

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

**Decision: Noted.**

**R4-2201630 CR on mobility requirements for NTN**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Postponed.**

##### 6.13.5.4 Timing requirements

**R4-2200078 Further discussion on timing requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200297 Discussion on timing requirements for NR NTN**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200421 Timing requirements**

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

**Decision: Noted.**

**R4-2200525 Discussion on the remaining issues for NTN timing requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200565 Discussion on NTN timing requirements**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Decision: Noted.**

**R4-2200680 Further discussion on timing requirements for NR NTN**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200681 DraftCR on timing requirements for NR NTN**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Postponed.**

**R4-2200738 Discussion on timing requirements for NTN UE**

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

**Decision: Noted.**

**R4-2200805 Discussion on NTN timing requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200931 Discussion on timing requirements in NTN**

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

**Decision: Noted.**

**R4-2201160 Discussion on UL timing requirements for NTN**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201445 On timing advance control**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we describe the problem of the combination of open and closed loop TA control and propose a way forward

**Decision: Noted.**

**R4-2201493 LS on Timing Advance control for Rel-17 NTN RRM**

*Type: LS out For: Approval  
 to RAN1  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2201585 UE Timing requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Analysis of remaining NTN timing requirements.

**Decision: Noted.**

**R4-2201586 Reply LS to RAN1: LS on NTN UL time and frequency synchronization requirements (Timing)**

*Type: LS out For: Approval  
 to RAN1  
 Source: Ericsson*

**Abstract:**

Draft Reply LS to RAN1 regarding UE timing requirements.

**Decision: Noted.**

**R4-2201610 Discussion on UE timing related requirements for NR NTN**

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

**Decision: Noted.**

##### 6.13.5.5 Measurement procedure requirements

**R4-2200079 Further discussion on measurement procedure requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200298 Discussion on measurement procedure requirements for NTN**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200422 Measurement procedure requirements**

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

**Decision: Noted.**

**R4-2200524 Discussion on multiple SMTC and measurement gaps for NTN UE**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200682 Further discussion on measurement requirements for NR NTN**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200865 Discussion on NTN measurement requirements**

*Type: discussion For: Discussion  
 Source: LG Electronics UK*

**Decision: Noted.**

**R4-2200891 Measurement requirements for NTN**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Measurement requirements for NTN

**Decision: Noted.**

**R4-2201161 Discussion on measurement procedure requirements for NTN**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201632 Discussion on measurement requirements for NTN**

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

**Decision: Noted.**

### 6.14 UE Power Saving Enhancements for NR

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**Email discussion: [101-bis-e][214] NR\_UE\_pow\_sav\_enh**

**R4-2202565 Email discussion summary: [101-bis-e][214] NR\_UE\_pow\_sav\_enh**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202731 (from R4-2202565).**

**R4-2202731 Email discussion summary: [101-bis-e][214] NR\_UE\_pow\_sav\_enh**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 24th)**

**Issue 3-1: Good serving cell quality criteria for RLM**

Issue 3-1-3: The offsets (i.e. X dB, Y dB) should be predefined or configurable?

* Proposals:
  + Option 1: predefined
  + Option 2: configurable
  + Option 3: The offset can be configured from a set of N values, wherein one value is used for evaluation if the offset is not configured. N is FFS
* Discussion
  + QC: We can accept for Option 3 with configurable Qin value
  + vivo: Option 2/3
  + Nokia: network may not configure proper offset as it depends on UE implementation.
  + Huawei: Can accept Option 3.
  + Apple: Option 1 will have RRC impact as well. For Option 3 – does it mean we have 2 RRC configurations 1/ for enable/disable and 2/ for value configuration?
  + CATT: Option 3.
  + Intel: Option2/3 are ok.
  + CMCC: Option 3 is ok
  + MTK: to Nokia – we can include 0 dB as one value
* Agreement
  + The good serving cell quality criteria for RLM/BFD is based on an offset X dB and Qx, while Qx is derived from PDCCH transmission parameters.
    - Qx = Qin for RLM
    - Qx = [Qin] for BFD
      * Note: definition of Qin for BFD needs to be clarified
    - The offset X can be configured from a set of 4 values
      * Exact values are FFS
    - One pre-defined value is used for evaluation if the offset is not configured
      * Pre-defined value X = [0] dB
    - Signalling details are up to RAN2

Issue 3-1-B: as the reference of link quality threshold for RLM/BFD,

* Proposals:
  + Option 1: Qin for both RLM and BFD
  + Option 2: Qout for RLM and Qout\_LR for BFD.
* Discussion
  + TBA
* Agreement
  + TBA

Issue 3-1-A: For RLM, can the link quality threshold be higher than Qin (or Qout+8.5dB) ?

* Proposals:
  + Option 1: Yes.
  + Option 2: No. The link quality threshold is always set as Qin (or Qout+8.5dB).
* Discussion
  + TBA
* Agreement
  + TBA

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202640 | WF on RLM/BFD relaxation for UE Power Saving enhancements | MediaTek Inc. |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200599 | LS on signalings for enabling RLM and BFD relaxation in R17 UE power saving | Vivo, Mediatek | Revised |  |
| R4-2201963 | CR on TS38.133 for applicability of RLM measurement relaxation | MediaTek inc. | Revised |  |
| R4-2201612 | DraftCR on SSB based relaxed RLM requirements | Huawei, Hisilicon | Revised |  |
| R4-2200601 | draft CR on CSI-RS RLM requirements relaxation for R17 UE power saving | vivo | Revised |  |
| R4-2200897 | 38.133 draft CR on RLM relaxation criteria | Nokia, Nokia Shanghai Bell | Revised |  |
| R4-2201868 | Draft CR: Applicability rule for relaxed BFD requirements | Ericsson | Revised |  |
| R4-2200797 | Draft CR for TS 38.133 Minimum requirement for SSB based BFD for UE configured with relaxed measurement criterion | CMCC | Revised |  |
| R4-2200686 | Draft CR Minimum requirement for CSI-RS based beam failure detection for UE configured with relaxed measurement criterion | Xiaomi | Revised |  |
| R4-2200106 | Draft CR on relaxed measurement criteria for BFD | CATT | Revised |  |
|  |  |  |  |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202640 WF on RLM/BFD relaxation for UE Power Saving enhancements**

*Type: other For: Approval  
 Source: MediaTek Inc.*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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#### 6.14.1 General

**R4-2200599 LS on signalings for enabling RLM and BFD relaxation in R17 UE power saving**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: vivo*

**Decision: Revised to R4-2202641 (from R4-2200599).**

**R4-2202641 LS on signaling for enabling RLM and BFD relaxation in R17 UE power saving**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: vivo*

**Decision: Return to.**

**R4-2202759 Draft Big CR: RRM requirements Rel-17 NR UE Power Saving Enhancements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: MediaTek*

**Abstract:**

**Decision: For email approval.**

#### 6.14.2 RRM core requirements

**R4-2200325 On Power Saving RRM Requirement**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2200530 Discussion on NR UE power saving for RLM and BM**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

##### 6.14.2.1 UE measurements relaxation for RLM and/or BFD

**R4-2200105 Further discussion on RLM/BFD relaxation for UE power saving enhancement**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200106 Draft CR on relaxed measurement criteria for BFD**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Revised to R4-2202649 (from R4-2200106).**

**R4-2202649 Draft CR on relaxed measurement criteria for BFD**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Return to.**

**R4-2200258 UE measurements relaxation for RLM and/or BFD**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200600 Discussion on RLM and BFD relaxation for NR UE power saving**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200601 draft CR on CSI-RS RLM requirements relaxation for R17 UE power saving**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Revised to R4-2202644 (from R4-2200601).**

**R4-2202644 draft CR on CSI-RS RLM requirements relaxation for R17 UE power saving**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Return to.**

**R4-2200685 Further discussion on UE measurements relaxation for RLM and/or BFD**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200686 Draft CR Minimum requirement for CSI-RS based beam failure detection for UE configured with relaxed measurement criterion**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Revised to R4-2202648 (from R4-2200686).**

**R4-2202648 Draft CR Minimum requirement for CSI-RS based beam failure detection for UE configured with relaxed measurement criterion**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Return to.**

**R4-2200797 Draft CR for TS 38.133 Minimum requirement for SSB based BFD for UE configured with relaxed measurement criterion**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CMCC*

**Decision: Revised to R4-2202647 (from R4-2200797).**

**R4-2202647 Draft CR for TS 38.133 Minimum requirement for SSB based BFD for UE configured with relaxed measurement criterion**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CMCC*

**Decision: Return to.**

**R4-2200806 Discussion on RLM/BFD relaxation for NR power saving enhancement**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200896 Discussion about RLM/BFD measurement relaxation**

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

**Decision: Noted.**

**R4-2200897 38.133 draft CR on RLM relaxation criteria**

*Type: draftCR For: Discussion  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Revised to R4-2202645 (from R4-2200897).**

**R4-2202645 38.133 draft CR on RLM relaxation criteria**

*Type: draftCR For: Discussion  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Return to.**

**R4-2201143 Discussion on RRM requirements for R17 RLM/BFD relaxation**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201406 RLM and RLF relaxation for UE power saving**

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

**Decision: Noted.**

**R4-2201611 Discussion on UE measurement relaxation for RLM/BFD**

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

**Decision: Noted.**

**R4-2201612 DraftCR on SSB based relaxed RLM requirements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202643 (from R4-2201612).**

**R4-2202643 DraftCR on SSB based relaxed RLM requirements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201867 Discussions on UE power saving for RLM and BFD**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss the remaining issues of Rel-17 UE power saving.

**Decision: Noted.**

**R4-2201868 Draft CR: Applicability rule for relaxed BFD requirements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Draft CR: Applicability rules for relaxed BFD requirements

**Decision: Revised to R4-2202646 (from R4-2201868).**

**R4-2202646 Draft CR: Applicability rule for relaxed BFD requirements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

Draft CR: Applicability rules for relaxed BFD requirements

**Decision: Return to.**

**R4-2201962 Discussion on Rel-17 RLM/BFD measurement relaxation**

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

**Decision: Noted.**

**R4-2201963 CR on TS38.133 for applicability of RLM measurement relaxation**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Revised to R4-2202642 (from R4-2201963).**

**R4-2202642 CR on TS38.133 for applicability of RLM measurement relaxation**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

### 6.15 NR Sidelink enhancement

#### 6.15.5 RRM core requirements

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**Email discussion: [101-bis-e][215] NR\_SL\_enh\_RRM**

**R4-2202566 Email discussion summary: [101-bis-e][215] NR\_SL\_enh\_RRM**

*Type: other For: Information  
 Source: Moderator (LG Electronics)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202732 (from R4-2202566).**

**R4-2202732 Email discussion summary: [101-bis-e][215] NR\_SL\_enh\_RRM**

*Type: other For: Information  
 Source: Moderator (LG Electronics)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 24th)**

Issue 2.3.1 Whether to define interruption to WAN due to SL-DRX

* Proposals:
  + Option 1: (CATT, Qualcomm, vivo, LGE, Oppo)
    - Define interruption requirements on NR transmission if configured due to NR SL transitions between active and non-active in SL DRX when NR SL is in SL-DRX but NR is in non-DRX
      * EN-DC can be used as baseline
    - When NR is in DRX and SL is in SL-DRX, no interruption is allowed
  + Option 2: (Ericsson, ZTE, Oppo)
    - Define interruption requirements on NR transmission if configured due to NR SL transitions between active and non-active in SL DRX when NR SL is in SL-DRX but NR is in non-DRX except during:
      * reception of paging, (Ericsson, ZTE, Oppo)
      * reception of system information, (Ericsson, Oppo)
      * while onDurationTimer is running (Ericsson, ZTE, Oppo)
    - For transition from DRX ON to DRX OFF on SL (Ericsson)
      * Interruptions are avoided while RLF timer is running or while UE is performing CBD.
    - Transition from DRX OFF to DRX ON on SL (Ericsson)
      * Interruptions are limited by a certain number (N) while RLF timer is running or while UE is performing CBD, N=TBD
* Tentative agreement
  + Define interruption requirements on NR transmission if configured due to NR SL transitions between active and non-active in SL DRX when NR SL is in SL-DRX but NR is in non-DRX
    - EN-DC can be used as baseline
    - FFS for specific conditions when interruptions are not applicable, e.g.
      * reception of paging
      * reception of system information
      * while onDurationTimer is running
      * while RLF timer is running
      * while UE is performing CBD
  + FFS on interruptions for the case when NR is in DRX and SL is in SL-DRX~~, no interruption is allowed~~
* Discussion
  + E///: tentative agreements looks fine
  + Nokia: for EN-DC we have limit on DRX cycle. What are the assumptions for this case?
    - LGE: RAN2 agreed to reuse long DRX for SL DRX and we can reuse respective EN-DC requirements. SL DRX is applicable for long DRX only.
    - QC: to Nokia – what do you mean by limitation on DRX cycle? There is a limitation on 640ms DRX? The WF includes such constraint already
      * Nokia: Yes this is the limitation mentioned by QC.
  + vivo: For the last bullet – should we say “no requirements apply” instead of “no interruption is allowed”?
    - QC: we can keep it as FFS
  + QC: for the exception conditions – we do not agree to deprioritize SL, since it can be relevant to Public Safety use case.
    - E///: we have PS requirements in LTE and same conditions apply. In our view WAN performance shall not sacrifice for the purpose of SL power saving. UE needs to stay active if it cannot cause interruption to critical WAN functions.
    - LGE: in LTE the exceptions apply for ProSe Discovery and not for Communication.
    - ZTE: same view as E///
* Agreement
  + Define interruption requirements on NR transmission if configured due to NR SL transitions between active and non-active in SL DRX when NR SL is in SL-DRX but NR is in non-DRX
    - EN-DC can be used as baseline
    - FFS whether interruptions are applicable for the following WAN conditions and impact on SL transitions between active and non-active SL DRX if interruptions are not applicable:
      * reception of paging
      * reception of system information
      * while onDurationTimer is running
      * while RLF timer is running
      * while UE is performing CBD
  + FFS on interruptions for the case when NR is in DRX and SL is in SL-DRX

Issue 2.2.3 UE Rx(Data) drop rate requirements for Asynchronized SLSS measurement & search

* Proposals
  + Moderator’s suggestion based on 2nd round
    - Up to 24 slots (or 5%) of V2X data reception during maximum aggregated drop window of 480ms is allowed to be dropped for PSBCH monitoring
* Discussion
  + QC: we have agreed on detection time. Need to have further time to study.
  + LGE: ok to come back in the next meeting.
  + OPPO: not clear why 24 slots are used? Should it be doubled for 30kHz SCS.

Issue 2.2.4 Conditional SyncRef UE detection requirements for Asynchronized SLSS measurement & search

* Proposals
  + Option 1: Define conditional SyncRef UE detection requirements (QC, LGE, vivo)
  + Option 2: Do not define conditional SyncRef UE detection requirements for asynchronized SLSS measurement & search in R17 (Huawei, Xiaomi)
* Discussion
  + QC: This has a big power impact.
  + Huawei: Option 2. For Option 1 there will be a big impact on performance. Power saving gains may not be big
    - QC: disagree with Huawei analysis
  + vivo: Option 1 is beneficial in terms of power saving. Detailed conditions can be FFS.
  + Xiaomi: Same view as Huawei. Based on Rel-16 UE is required to make asynch detection under certain conditions. We have decided to reuse the Rel-16 sync case requirements and it is not clear why we should use another approach for async case.

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202650 | WF on NR SL enhancements RRM requirements | LG Electronics |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| [R4-2200107](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200107.zip) | Draft CR on UE transmit timing requirements for sidelink enhancement | CATT | Revised |  |
| [R4-2200558](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200558.zip) | draft CR on interruption requirement for SL | LG Electronics | Revised |  |
| [R4-2200689](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200689.zip) | Draft CR on requirements for InitiationCease of SLSS Transmissions impact by SL-DRX | Xiaomi | Revised |  |
| [R4-2201367](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201367.zip) | Draft CR on Selection Reselction of V2X Synchronization Reference Source for sidelink enhancement | vivo | Revised |  |
| [R4-2201615](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201615.zip) | DraftCR on scheduling availability requirements for NR eV2X | Huawei, Hisilicon | Revised |  |
| [R4-2202021](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2202021.zip) | CR: SL autonomous resource allocation requirements (draft CR) | Qualcomm communications-France | Revised |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202650 WF on NR SL enhancements RRM requirements**

*Type: other For: Approval  
 Source: LG Electronics*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202747 Draft Big CR: RRM requirements for Rel-17 NR SL enhancement**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: LG Electronics*

**Abstract:**

**Decision: For email approval.**

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**R4-2200326 On NR SL RRM Requirement**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

##### 6.15.5.1 Intra-band con-current V2X operation

**R4-2200107 Draft CR on UE transmit timing requirements for sidelink enhancement**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Revised to R4-2202651 (from R4-2200107).**

**R4-2202651 Draft CR on UE transmit timing requirements for sidelink enhancement**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: CATT*

**Decision: Return to.**

**R4-2200687 Further discussion on RRM requirements for intra-band con-current V2X operation**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2201144 Discussion on RRM impact of intra-band concurrent V2X operation**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201365 Further discussion on Intra-band con-current V2X operation RRM requirements**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201404 RRM requirements for FDM based intra-band con-current SL operation**

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

**Decision: Noted.**

**R4-2201613 Discussion on RRM requirements related to intra-band con-current V2X operation**

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

**Decision: Noted.**

##### 6.15.5.2 SL-DRX

**R4-2200108 Further discussion on RRM requirements related to SL-DRX**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200557 RRM requirements for SL-DRX**

*Type: discussion For: (not specified)  
 Source: LG Electronics*

**Abstract:**

It discusses RRM core requirements related to SL-DRX.

**Decision: Noted.**

**R4-2200688 Further discussion on RRM requirements related to SL-DRX**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2201162 Discussion on SL-DRX**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201366 Further discussion on SL-DRX RRM requirements**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201367 Draft CR on Selection Reselction of V2X Synchronization Reference Source for sidelink enhancement**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Revised to R4-2202654 (from R4-2201367).**

**R4-2202654 Draft CR on Selection Reselction of V2X Synchronization Reference Source for sidelink enhancement**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Return to.**

**R4-2201403 Discussions on DRX in NR SL enhancement**

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

**Decision: Noted.**

**R4-2201614 Discussion on RRM requirements related to SL DRX**

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

**Decision: Noted.**

**R4-2201871 Discussions on SL DRX for Rel-17 SL operation**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Sidelink DRX was discussed at previous meeting and a number of open issues were identified in [1]. In this contribution, we discuss and provide our view on those.

**Decision: Noted.**

##### 6.15.5.3 Others

**R4-2200109 Discussion on L1-RSRP measurement for sidelink enhancement**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Withdrawn.**

**R4-2200558 draft CR on interruption requirement for SL**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: LG Electronics*

**Abstract:**

It is draftCR to introduce interrutption requirement for NR SL enh.

**Decision: Revised to R4-2202652 (from R4-2200558).**

**R4-2202652 draft CR on interruption requirement for SL**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: LG Electronics*

**Abstract:**

It is draftCR to introduce interrutption requirement for NR SL enh.

**Decision: Return to.**

**R4-2200689 Draft CR on requirements for InitiationCease of SLSS Transmissions impact by SL-DRX**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Revised to R4-2202653 (from R4-2200689).**

**R4-2202653 Draft CR on requirements for InitiationCease of SLSS Transmissions impact by SL-DRX**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Xiaomi*

**Decision: Return to.**

**R4-2201615 DraftCR on scheduling availability requirements for NR eV2X**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202655 (from R4-2201615).**

**R4-2202655 DraftCR on scheduling availability requirements for NR eV2X**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2202021 CR: SL autonomous resource allocation requirements**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Qualcomm communications-France*

**Decision: Revised to R4-2202656 (from R4-2202021).**

**R4-2202656 CR: SL autonomous resource allocation requirements**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Qualcomm communications-France*

**Decision: Return to.**

### 6.16 Extending current NR operation to 71GHz

#### 6.16.7 RRM core requirements

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**Email discussion: [101-bis-e][216] NR\_ext\_to\_71GHz\_RRM\_1**

**R4-2202567 Email discussion summary: [101-bis-e][216] NR\_ext\_to\_71GHz\_RRM\_1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202733 (from R4-2202567).**

**R4-2202733 Email discussion summary: [101-bis-e][216] NR\_ext\_to\_71GHz\_RRM\_1**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 18, 2022)**

**Sub-topic 2-2: Synchronization aspects**

Issue 2-2-1: Assumption on deriveSSB-IndexFromCell

* Proposals
  + Proposal 1: *deriveSSB-IndexFromCell* is always enabled for the following in FR2-2:
    - Option 1a (Vivo, Nokia, Ericsson, QC): 480 kHz SCS
    - Option 1b (Ericsson):960 kHz SCS
  + Proposal 2: *deriveSSB-IndexFromCell* may be either enabled or not enabled and up to network configuration for the following in FR2-2:
    - Option 2a (CATT, Intel, LGE, Huawei): 480 kHz SCS
    - Option 2b (CATT, Vivo, Intel, LGE, Huawei, Nokia): 960 kHz SCS
    - Option 2c (CATT): It is suggested to add additional judgment conditions for *deriveSSB-IndexFromCell*, and whether it is feasible is related to RAN2
* Tentative agreements
  + deriveSSB-IndexFromCell configuration
    - 480 kHz [DL] SCS
      * **Option 1A: deriveSSB-IndexFromCell is always enabled (vivo, Nokia, E///, QC)**
      * Option 1B: deriveSSB-IndexFromCell is up to NW configuration (CATT, Intel, LGE, HW)
    - 960 kHz [DL] SCS
      * Option 2A: deriveSSB-IndexFromCell is always enabled (E///, QC, Apple)
      * **Option 2B: deriveSSB-IndexFromCell is up to NW configuration (CATT, vivo, Intel, LGE, HW, Nokia, E///)**
* Discussion
  + Apple: We mean SSB SCS. Option 1A is fine. Option 2B is also fine since 960kHz is not for initial access.
  + E///: Support 1A. For 960kHz the intention of deriveSSB-IndexFromCell was to avoid decoding SI. We can compromise to Option 2B.
  + QC: We agree with 1A. For 960kHz – we prefer to keep signalling always enabled and relax the number of symbols uncertainty.
  + LGE: For 1A some companies commented that FR2-2 cell coverage is 1km and it can be always enabled, but we don’t have any consensus. What to do in case of mixed SCS?
  + vivo: Support 1A and 2B. For 1A there may be additional conditions. Suggest 3 SSB symbols tolerance.
  + Intel: Ok with 1A. Agree with vivo comment on 3SSB symbols tolerance. Cell radius = ISD/2. We would like to discuss if we should capture our assumptions on possible deployment constraints.
  + Nokia: We are fine 1A and 2B. SCS is the SSB SCS.
  + CATT: 1B and 2B.
* Agreement
  + deriveSSB-IndexFromCell configuration
    - For 480 kHz SSB SCS
      * deriveSSB-IndexFromCell is always enabled by the network
    - For 960 kHz SSB SCS
      * FFS: deriveSSB-IndexFromCell is up to network configuration (i.e. can be enabled or disabled)
    - The agreement applies at least for the case of same SCS in the serving and neighbor cell. FFS whether and how to handle the cases with mixed SCS in the serving and neighbor cells
    - FFS whether to relax tolerance for UE assumptions on frame boundary alignment

**Sub-topic 3-1: UE transmit timing error**

Issue 3-1-4: Percentage of UL CP length Te can occupy for UL SCS of 480/960 kHz

* Proposals
  + Option 1 (Apple): 50%
  + Option 2 (CATT, ZTE, Intel, E///): 30%
  + Option 3 (Huawei): For SSB SCS ≥ UL SCS, and SSB periodicity: 80ms – 40%, 20ms – 30%,
  + Option 4 (Ericsson): 28%
  + Option 5 (Qualcomm): For SSB periodicity of 20ms – 38%.
    - FFS: 120kHz SSB SCS and 960kHz UL SCS
* Tentative agreements
  + Te can occupy [35%] of UL CP length for 480/960 kHz UL SCS
* Discussion
  + QC: need to discuss 480 and 960 separately. Also need to agree on SSB periodicity
  + E///: Option 2 is ok. In case we have wide SSB then we can go below 30% if this is technically feasible. For SSB periodicity – prefer 160ms similar to legacy requirements. We can be ok with 80ms as well.
  + Nokia: Based on our simulation results 30% leads to big degradation performance in UL. For SSB periodicity we suggest 80ms and our calculations of clock drift show it is fine.
  + Apple: Effective delay spread in FR2-2 will be smaller than nominal delay spread due to narrow beamforming. So, we cannot reuse RAN1 model directly. We cannot go anything below 38%. We suggest to discuss testing jointly with Core requirements as another way to help UE to meet the requirements. UE capability is another approach.
  + Huawei: we do not think a single value can apply to different scenarios. Prefer several set of requirements
  + vivo: agree with Huawei that we can exclude some scenarios in terms of SCS
* Agreements
  + UE transmit timing error requirements for UL SCS of 480/960 kHz are defined under the following assumptions
    - SCS:
      * SSB SCS ≥ UL SCS
      * FFS if other SCS combinations shall be considered
    - At least one SSB is available at the UE during the last: 20ms, 40ms, 80ms
      * Note: If multiple set of requirements are defined, then the requirements will be defined for at most for 2 periodicities
    - Max delay spread:
      * [30ns] for 480kHz
      * [20ns] for 960kHz
  + FFS if a single set or multiple sets of requirements need to be defined
  + FFS how to design test case for UE transmit timing error requirements

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202657 | WF on NR extension to 71 GHz RRM requirements (Part 1) | Qualcomm |  |
| R4-2202658 | LS on UE transmit timings | Nokia | To: RAN1; Cc: RAN2 |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200655 | Draft CR to 38.133 Introducing applicability of requirements for FR2 | Vivo | Return to |  |
| R4-2200916 | Draft CR to 38.133 Timing requirements for FR2-2 | Nokia | Return to |  |
| R4-2200933 | Draft CR to 38.133 Introduction of scheduling restriction for FR2-2 | Mediatek | Return to |  |
| R4-2202048 | Draft CR to 38.133 Draft CR for timing requirements for FR2-2 – MRTD, MTTD | Qualcomm | Return to |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202657 WF on NR extension to 71 GHz RRM requirements (Part 1)**

*Type: other For: Approval  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202658 LS on UE transmit timings**

*Type: LS out For: Approval  
 To RAN1, Cc RAN2  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**Email discussion: [101-bis-e][217] NR\_ext\_to\_71GHz\_RRM\_2**

**R4-2202568 Email discussion summary: [101-bis-e][217] NR\_ext\_to\_71GHz\_RRM\_2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202734 (from R4-2202568).**

**R4-2202734 Email discussion summary: [101-bis-e][217] NR\_ext\_to\_71GHz\_RRM\_2**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 18, 2022)**

Issue 4-1-3: Baseline for RRM requirements with LBT in FR2-2

* Proposals
  + Proposal 1 (Nokia): Use the FR2 RRM requirements as baseline for the RRM requirements with LBT in FR2-2, considering that the probability of failure of LBT in FR2-2 is nearly zero.
  + Proposal 2 (Huawei): Requirements defined for Rel-16 NR-U should be taken as starting point for evaluating LBT impacts for operation in FR2
    - Proposal 2a (Intel, ZTE Corporation): Adopt the relaxation methods used in NR-U (core requirements are extended by the missed samples) as a baseline.
* Agreements
  + Adopt the relaxation methods used in NR-U (core requirements are extended to compensate the missed samples) as a baseline

Issue 4-2-1: Impact of FR2-2 LBT on the TS 38.133 specification

* Proposals
  + Proposal: RAN4 to consider Table below for the discussion of the impact of FR2-2 for requirements with CCA, taking into account the timeline of Rel-17 work

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Requirements and clauses** | | **Comments** | | |
| **Nokia** | **Intel** | **vivo** |
| Cell reselection | **4.2A.2.2**  **Measurement of serving cell** | Table 4.2A.2.2-1 to be revisited.  FR2 scaling factor N1 to be considered for requirements with CCA | *Nserv\_CCA, Tdetect,NR\_Intra\_CCA, Tmeasure,NR\_Intra\_CCA, Tevaluate,NR\_Intra\_CCA, Tdetect,NR\_Inter\_CCA, Tmeasure,NR\_Inter\_CCA, Tevaluate,NR\_Inter\_CCA* need to consider Rx beam sweeping scaling factor  FFS whether to scale *Mm,max, Md,max,Me,max* | - |
| **4.2A.2.3**  **Intra-frequency** | Table 4.2A.2.3-1 to be revisited.  FR2 scaling factor N1 to be considered for requirements with CCA | New requirements are defined |
| **4.2A.2.4**  **Inter-frequency** | Table 4.2A.2.4-1 to be revisited.  FR2 scaling factor N1 to be considered for requirements with CCA |
| 4.2A.2.5  Inter-RAT | No impact for FR2-2  This requirement is band agnostic. | FFS |
| 4.2A.2.6  Maximum interruption on paging reception when CCA is used in Target Cell | No impact for FR2-2  This requirement is band agnostic. | - |
| Handover | **6.1B Handover to target cell using CCA** | Discuss for which scenarios the requirements with CCA are to be defined for:   * FR2-FR2 handover * FR2-FR1 handover * FR1-FR2 handover * E-UTRAN - NR FR2 handover: if possible, there is need to assess the impact on TS 36.133 as well | Add requirements for FR2-FR2 and FR1-FR2 using requirements from 6.1.1 as a baseline and modifying them in the same way as it is done for FR1-FR1 case | New requirements are defined |
| RRC Connection Mobility Control | **6.2.1A**  **RRC re-establishment with CCA** | Time to identify target NR cell to be defined for FR2 requirements with CCA  Revisit Table 6.2.1.2.1-2: | *Tidentify\_intra\_NR\_CCA, Tidentify\_inter\_NR\_CCA,i*need to be defined for FR2-2. Consider using requirements from 6.2.1 as a baseline and modifying them in the same way as it is done for FR1 | New requirements are defined |
| 6.2.2A Random access when CCA is used | No impact for FR2-2  Existing requirements with CCA are also applicable for FR2-2 | - | Current requirements for CCA may be applicable |
| **6.2.3.2.3**  **RRC release with redirection to NR carrier subject to CCA** | Time to identify target NR cell needs to be defined for FR2 requirements with CCA  Revisit Table 6.2.3.2.3-1: | *Tidentify-NR\_CCA* needs to be defined for FR2-2  FFS whether to scale *L1,max* | New requirements are defined |
| UE timing | 7.1  UE transmit timing | Subject to agreements on UE transmit timing in FR2-2.  FFS number of SSB candidate positions | - | Current requirements for CCA may be applicable |
| 7.2 UE timer accuracy | No impact for FR2-2  Reuse FR2 or FR2-2 requirements | - | - |
| 7.3 Timing advance | No impact for FR2-2  Reuse FR2 or FR2-2 requirements | - | - |
| 7.5 UE maximum receive timing difference | No impact for FR2-2  Reuse FR2 or FR2-2 requirements | - | - |
| 7.6 UE maximum transmission timing difference | No impact for FR2-2  Reuse FR2 or FR2-2 requirements | - | - |
| Signalling characteristics | **8.3A SCell activation and deactivation delay** | Clarify that the current requirements in this clause are applicable only to FR1  FR2-2 specific requirements to be defined, like the Tactivation\_time\_withCCA, | Identify the set of cases for which the FR2-2 requirements are needed.  Define *Tactivation\_time\_withCCA* for FR2-2 for all identified cases. | New requirements are defined |
| Interruption | FFS if impact on interruptions due to Active BWP switching Requirement | - | New requirements are defined |
| PSCell addition and release delay | No impact for FR2-2 | - | New requirements are defined |
| **8.10A Active TCI state switching delay** | Clarify that the current requirements in this clause are applicable only to FR1  Requirements with CCA should include FR2-2 specific timing TL1-RSRP for MAC-CE based TCI state switch delay | *TL1-RSRP* need to be added to the delay of MAC-CE based TCI state switch and RRC based TCI state switch for the case of unknown target TCI state | New requirements are defined |
| 8.6 Active BWP switching delay | No impact for FR2-2  Impact is generic and covered with FR2-2 requirements without CCA | - | Current requirements for CCA may be applicable |
| PSCell change | No impact for FR2-2 | - | New requirements are defined |
| Conditional PSCell change | No impact for FR2-2 | - | New requirements are defined |
| **8.1A Radio link monitoring** | The following needs to be defined for FR2-2 with CCA:   * Maximum number of RLM resources, in Table 8.1A.1-2 * Include a table with the evaluation period TEvaluate\_out\_SSB,CCA and TEvaluate\_in\_SSB,CCA, in FR2-2 * Measurement restrictions * Scheduling availability of UE during radio link monitoring fir FR2-2 * Discuss whether to define CSI-RS requirements for RLM in FR2-2, since there are no CSI-RS RLM requirements for unlicensed spectrum in FR1. | *NRLM* , *TEvaluate\_out\_SSB,CCA TEvaluate\_in\_SSB,CCA* need to be defined for FR2-2.  Measurement restrictions need to be defined for FR2-2  The following sections should be added:   * 8.1A.6.3 Scheduling availability of UE performing radio link monitoring on FR2-2 * 8.1A.6.4 Scheduling availability of UE performing radio link monitoring on FR1 or FR2-2 in case of FR1-FR2-2 inter-band CA and NR-DC | New requirements are defined |
| **8.5A Link recovery procedures** | Clarify that the current requirements in this clause are applicable only to FR1  Define TEvaluate\_BFD\_SSB\_CCA, TEvaluate\_CBD\_SSB\_CCA for FR2-2 (Clause 8.5A.2.2)  Measurement restriction for FR2-2 in clause 8.5A.2.3  Define requirements for scheduling availability of UE performing beam failure detection on FR2-2 with CCA  Discuss whether to define CSI-RS requirements for BFD in FR2-2, since there are no CSI-RS RLM requirements for unlicensed spectrum in FR1. | *TEvaluate\_BFD\_SSB\_CCA, TEvaluate\_CBD\_SSB\_CCA* need to be defined for FR2-2  Measurement restrictions need to be defined for FR2-2  The following sections should be added:   * 8.5A.7.3 Scheduling availability of UE performing beam failure detection on FR2-2 * 8.5A.7.3 Scheduling availability of UE performing beam failure detection on FR1 or FR2-2 in case of FR1-FR2-2 inter-band CA and NR-DC * 8.5A.8.3 Scheduling availability of UE performing L1-RSRP measurements on FR2-2 * 8.5A.8.3 Scheduling availability of UE performing L1-RSRP measurements on FR1 or FR2-2 in case of FR1-FR2-2 inter-band CA and NR-DC | New requirements are defined |
| Uplink spatial relation switch delay | No impact for FR2-2 | - | - |
| UE specific CBW change | No impact for FR2-2 | - | - |
| Pathloss reference signal switch delay | No impact for FR2-2 | - | - |
| Measurement requirements | Measurement gap | No impact for FR2-2 | - | - |
| UE measurement capability | No impact for FR2-2 | - | - |
| **9.2A Intra-frequency** | Switching time for FR2  SS-RSRP, SS-RSRQ, SS-SINR side conditions for FR2  Number of Cell and SSBs for FR2  Include tables with the requirements for: TPSS/SSS\_sync\_intra\_CCA,T SSB\_measurement\_period\_intra\_CCA and  TSSB\_time\_index\_intra\_CCA in FR2, with and without gaps  FFS: RSSI measurement details depend on RAN1 decision. | SS-RSRP, SS-RSRQ, SS-SINR side conditions need to be defined for FR2-2  *TPSS/SSS\_sync\_intra\_CCA, TSSB\_time\_index\_intra\_CCA, TSSB\_measurement\_period\_intra\_CCA* need to be defined for FR2-2  The following sections should be added:   * 9.2A.5.3.3 Scheduling availability of UE performing measurements on FR2-2 * 9.2A.5.3.4 Scheduling availability of UE performing measurements on FR1 or FR2-2 in case of FR1-FR2-2 inter-band CA and NR-DC   FFS whether Intra-frequency RSSI and Channel occupancy measurements need to be defined for RF2-2 | New requirements are defined |
| **9.3A Inter-frequency** | Switching time for FR2  SS-RSRP, SS-RSRQ, SS-SINR side conditions for FR2  Number of Cell and SSBs for FR2  Include tables with the requirements for: TPSS/SSS\_sync\_inter\_CCA,T SSB\_measurement\_period\_inter\_CCA and  TSSB\_time\_index\_inter\_CCA in FR2.  FFS: RSSI measurement details depend on RAN1 decision. | SS-RSRP, SS-RSRQ, SS-SINR side conditions need to be defined for FR2-2  *TPSS/SSS\_sync\_inter\_CCA, TSSB\_time\_index\_inter\_CCA, TSSB\_measurement\_period\_inter\_CCA* need to be defined for FR2-2 | New requirements are defined |
| Inter-RAT | No impact for FR2-2 |  | FFS |
| **9.5A L1-RSRP measurements for reporting** | Side conditions  *nrofReportedRS* must be defined for FR2  The measurement period of TL1-RSRP\_Measurement\_Period\_SSB\_CCA must be defined for FR2-2 | TL1-RSRP\_Measurement\_Period\_SSB\_CCA needs to be defined for FR2-2  Measurement restrictions need to be defined for FR2-2 | New requirements are defined |
| L1-SINR measurements for reporting | No impact for FR2-2 | - | - |
| Cross link interference measurements | No impact for FR2-2 | - | - |
| CSI-RS based measurement | No impact, if RAN4 uses NR-U requirements in FR1 as baseline | - | - |
| Measurement accuracy requirements | Intra-frequency SS-RSRP/SS-RSRQ/SS-SINR  Intra-frequency CSI-RSRP/CSI-RSRQ/CSI-SINR | - | - | Current intra-frequency measurement accuracy requirements for FR2 apply. |
| Inter-frequency SS-RSRP/SS-RSRQ/SS-SINR  Inter-frequency CSI-RSRP/CSI-RSRQ/CSI-SINR | - | - | Current inter-frequency measurement accuracy requirements for FR2 apply. |
| L1-RSRP accuracy (SSB based and CSI-RS based) | - | - | Current L1-RSRP accuracy measurement accuracy requirements for FR2 apply. |

* Agreement
  + RAN4 will define FR2-2 RRM requirements with CCA in Rel-17
  + The set of requirements is FFS
* Tentative agreements

|  |  |
| --- | --- |
| **Requirements and clauses** | |
| Cell reselection | 4.2A.2.2 Measurement of serving cell |
| **4.2A.2.3 Intra-frequency** |
| **4.2A.2.4 Inter-frequency** |
| 4.2A.2.5 Inter-RAT |
| 4.2A.2.6 Maximum interruption on paging reception when CCA is used in Target Cell |
| Handover | **6.1B Handover to target cell using CCA** |
| RRC Connection Mobility Control | **6.2.1A RRC re-establishment with CCA** |
| 6.2.2A Random access when CCA is used |
| **6.2.3.2.3 RRC release with redirection to NR carrier subject to CCA** |
| UE timing | 7.1 UE transmit timing |
| 7.2 UE timer accuracy |
| 7.3 Timing advance |
| 7.5 UE maximum receive timing difference |
| 7.6 UE maximum transmission timing difference |
| Signalling characteristics | **8.3A SCell activation and deactivation delay** |
| Interruption |
| PSCell addition and release delay |
| **8.10A Active TCI state switching delay** |
| 8.6 Active BWP switching delay |
| PSCell change |
| Conditional PSCell change |
| **8.1A Radio link monitoring** |
| **8.5A Link recovery procedures** |
| Uplink spatial relation switch delay |
| UE specific CBW change |
| Pathloss reference signal switch delay |
| Measurement requirements | Measurement gap |
| UE measurement capability |
| **9.2A Intra-frequency** |
| **9.3A Inter-frequency** |
| Inter-RAT |
| **9.5A L1-RSRP measurements for reporting** |
| L1-SINR measurements for reporting |
| Cross link interference measurements |
| CSI-RS based measurement |

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202659 | WF on NR extension to 71 GHz RRM requirements (Part 2) | Intel |  |
| R4-2202660 | Reply LS on the minimum time gap for wake-up and Scell dormancy indication for NR operation in 52.6 to 71GHz | vivo |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200657 | Draft CR to 38.133 Introducing interruption requirements of FR2-2 to cover 52.6-71GHz | vivo | Revised |  |
| R4-2201198 | Draft CR on BWP switching requirements for extending NR operation to 71GHz | Huawei, Hisilicon | Revised |  |
| R4-2201791 | DraftCR on LBT impacts on RRM requirements for NR 52.6 – 71 GHz | Intel | Postponed |  |
| R4-2200889 | DraftCR on general measurement requriement for extending NR operation to 71GHz | Ericsson | Revised |  |

**2nd round email discussion conclusions**

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202659 WF on NR extension to 71 GHz RRM requirements (Part 2)**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202660 Reply LS on the minimum time gap for wake-up and Scell dormancy indication for NR operation in 52.6 to 71GHz**

*Type: LS out For: Approval  
 to RAN1  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2202754 Draft Big CR: RRM requirements for Rel-17 NR extension to 71GHz**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: Qualcomm, Intel*

**Abstract:**

**Decision: For email approval.**

**R4-2200660 Reply LS on the minimum time gap for wake-up and Scell dormancy indication for NR operation in 52.6 to 71GHz**

*Type: LS out For: Approval  
 to RAN1  
 Source: vivo*

**Decision: Noted.**

##### 6.16.7.1 General

**R4-2200125 Further discussion on General RRM requirements for extension to 71GHz**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200562 Discussion on general RRM measurement requirements for extension to 71GHz**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Decision: Noted.**

**R4-2200654 Further discussion on RRM impacts for extending NR operation to 71GHz**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200655 Draft CR to 38.133 Introducing applicability of requirements for FR2**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Revised to R4-2202755 (from R4-2200655).**

**R4-2202755 Draft CR to 38.133 Introducing applicability of requirements for FR2**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Return to.**

**R4-2200888 General RRM requirements for extending NR operation to 71GHz**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

General RRM requirements for extending NR operation to 71GHz

**Decision: Noted.**

**R4-2200889 On general measurement requriement for extending NR operation to 71GHz**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

On general measurement requriement for extending NR operation to 71GHz

**Decision: Revised to R4-2202663 (from R4-2200889).**

**R4-2202663 On general measurement requriement for extending NR operation to 71GHz**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

On general measurement requriement for extending NR operation to 71GHz

**Decision: Return to.**

**R4-2200914 Discussion on general RRM requirements for extension to 71 GHz**

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

**Abstract:**

Discussion on general scenarios for FR2-2 and deriveSSB-IndexFromCell for RRM requriements

**Decision: Noted.**

**R4-2200932 Discussion on RRM requirements in FR2-2**

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

**Decision: Noted.**

**R4-2200933 Introduction of scheduling restriction for FR2-2**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: MediaTek inc.*

**Decision: Return to.**

**R4-2201194 Discussion on general RRM requirements for FR2-2**

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

**Decision: Noted.**

##### 6.16.7.2 Timing requirements

**R4-2200126 Further discussion on RRM timing requirements for higher SCS**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200283 UE transmit timing for NR operation in 52.6GHz - 71GHz**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200563 Discussion on MTTD/MRTD for extension to 71GHz**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Decision: Noted.**

**R4-2200661 Further discussion on timing for 52.6-71GHz**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200915 Discussion on RRM timing requirements for extension to 71 GHz**

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

**Abstract:**

Discussion on Te values, including proposals for boundaries and values to be applied when operating on FR2-2

**Decision: Noted.**

**R4-2200916 Draft CR adding timing requirements for FR2-2**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The following additions are included by this CR:

-Placeholder for Te values for new SCSs

-Modified SSB availability for new SCSs in FR2-2

-Timing advance accuracy requirements as per agreements in the last meetings

**Decision: Revised to R4-2202756 (from R4-2200916).**

**R4-2202756 Draft CR adding timing requirements for FR2-2**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The following additions are included by this CR:

-Placeholder for Te values for new SCSs

-Modified SSB availability for new SCSs in FR2-2

-Timing advance accuracy requirements as per agreements in the last meetings

**Decision: Return to.**

**R4-2200934 Discussion on timing requirements in FR2-2**

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

**Decision: Noted.**

**R4-2201195 Discussion on timing requirements for extending NR operation to 71GHz**

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

**Decision: Noted.**

**R4-2201407 On Te requirements for NR systems extended to 71 GHz**

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

**Decision: Noted.**

**R4-2201583 UE Timing requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Analysis of timing requirements.

**Decision: Noted.**

**R4-2201787 Discussion on timing requirements for NR 52.6 – 71 GHz**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2202033 Timing requirements in FR2-2**

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

**Abstract:**

In this paper, we discuss the UL timing error related issues

**Decision: Noted.**

**R4-2202048 Draft CR for timing requirements for FR2-2 – MRTD, MTTD**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

The draftCR updates clause 7.5 and 7.6 based on agreements related to MRTD and MTTD

**Decision: Return to.**

##### 6.16.7.3 Interruption requirements

**R4-2200656 Furthr discussion on interruption for 52.6-71GHz**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200657 Draft CR to 38.133 Introducing interruption requirements of FR2-2 to cover 52.6-71GHz**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Revised to R4-2202661 (from R4-2200657).**

**R4-2202661 Draft CR to 38.133 Introducing interruption requirements of FR2-2 to cover 52.6-71GHz**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Return to.**

**R4-2200885 Interruption requirements for extending NR operation to 71GHz**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Interruption requirements for extending NR operation to 71GHz

**Decision: Noted.**

**R4-2200917 Discussion on interruption requirements for FR2-2**

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

**Abstract:**

Proposals to updated agreements reached for CA in previous meetings and apply them also for the DC cases that were missing.

**Decision: Noted.**

**R4-2201196 Discussion on interruption requirements for extending NR operation to 71GHz**

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

**Decision: Noted.**

**R4-2201788 Discussion on interruption requirements for NR 52.6 – 71 GHz**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

##### 6.16.7.4 Active BWP switching delay requirements

**R4-2200127 Discussion on cross-carrier active BWP switching for extension to 71GHz**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200284 Active BWP switch delay for NR operation in 52.6GHz - 71GHz**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200658 Further discussion on active BWP switching delay for 52.6-71GHz**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200872 On cross-carrier BWP switch delay for extension to 71 GHz**

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

**Decision: Noted.**

**R4-2200887 Active BWP switching delay requirements for extending NR operation to 71GHz**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Active BWP switching delay requirements for extending NR operation to 71GHz

**Decision: Noted.**

**R4-2201197 Discussion on BWP switching requirements for extending NR operation to 71GHz**

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

**Decision: Noted.**

**R4-2201198 Draft CR on BWP switching requirements for extending NR operation to 71GHz**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202662 (from R4-2201198).**

**R4-2202662 Draft CR on BWP switching requirements for extending NR operation to 71GHz**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201409 Active BWP switching delay requirements for NR systems extended to 71 GHz**

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

**Decision: Noted.**

**R4-2201789 Discussion on BWP switching delay for NR 52.6 – 71 GHz**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

##### 6.16.7.5 Measurement gap interruption requirements

**R4-2200659 Further discussion on measurement gap interruption for 52.6-71GHz**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200886 Measurement gap interruption requirements for extending NR operation to 71GHz**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Measurement gap interruption requirements for extending NR operation to 71GHz

**Decision: Noted.**

**R4-2201199 Discussion on measurement gap interruption requirements for extending NR operation to 71GHz**

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

**Decision: Noted.**

##### 6.16.7.6 LBT impacts on RRM requirements

**R4-2200285 LBT impacts on RRM requirements for NR operation in 52.6GHz - 71GHz**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200873 LBT impacts on NR RRM requirements for extension to 71GHz**

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

**Decision: Noted.**

**R4-2201200 Discussion on LBT impacts on RRM requirements for extending NR operation to 71GHz**

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

**Decision: Noted.**

**R4-2201371 Discussion on LBT requirements for FR2-2**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201408 On LBT impacts on RRM for NR systems extended to 71 GHz**

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

**Decision: Noted.**

**R4-2201790 Discussion on LBT impacts on RRM requirements for NR 52.6 – 71 GHz**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2201791 DraftCR on LBT impacts on RRM requirements for NR 52.6 – 71 GHz**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Postponed.**

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

#### 6.17.3 RRM core requirements

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

**Email discussion: [101-bis-e][218] NR\_IAB\_enh\_RRM**

**R4-2202569 Email discussion summary: [101-bis-e][218] NR\_IAB\_enh\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202735 (from R4-2202569).**

**R4-2202735 Email discussion summary: [101-bis-e][218] NR\_IAB\_enh\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (TBA)**

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202664 | WF on RRM requirements for IAB enhancement | ZTE Corporation |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| [R4-2201207](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201207.zip) | Draft CR on timing requirements for Rel-17 IAB | Huawei, Hisilicon | Revised |  |
| [R4-2201850](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201850.zip) | TP to TS 38.174 on RRM Timing Requirements | Nokia, Nokia Shanghai Bell | Merged |  |
| [R4-2203353](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2203353.zip) |  | Qualcomm | Marked as late and not treated. |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202664 WF on RRM requirements for IAB enhancement**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2201405 On RRM for eIAB**

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

**Decision: Noted.**

**R4-2201849 On IAB Enhanced RRM Requirements**

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

**Decision: Noted.**

**R4-2201850 TP to TS 38.174 on RRM Timing Requirements**

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

**Decision: Merged.**

**R4-2202019 Further analysis of RRM requirements for enhanced IAB**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper further analyzes the impact of RRM on IAB enhancement

**Decision: Noted.**

**R4-2202052 CLI measurement requirement for R17 NR eIAB RRM**

*Type: discussion For: Discussion  
 Source: Qualcomm CDMA Technologies*

**Decision: Withdrawn.**

**R4-2201206 Discussion on RRM requirements for eIAB**

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

**Session chair: moved from AI 6.13.3**

**Decision: Noted.**

**R4-2201207 Draft CR on timing requirements for Rel-17 IAB**

*Type: draftCR For: Endorsement  
 38.174 v16.5.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Session chair: moved from AI 6.13.3**

**Decision: Revised to R4-2202665 (from R4-2201207).**

**R4-2202665 Draft CR on timing requirements for Rel-17 IAB**

*Type: draftCR For: Endorsement  
 38.174 v16.5.0 CR- rev Cat: B (Rel-17)   
  
 Source: Huawei, Hisilicon, Nokia*

**Session chair: added Nokia as a co-sourcing compamny**

**Decision: Return to.**

#### 6.17.4 Others

### 6.19 Further enhancements on MIMO for NR

#### 6.19.3 RRM core requirements

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**Email discussion: [101-bis-e][219] NR\_feMIMO\_RRM**

**R4-2202570 Email discussion summary: [101-bis-e][219] NR\_feMIMO\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202736 (from R4-2202570).**

**R4-2202736 Email discussion summary: [101-bis-e][219] NR\_feMIMO\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 20th)**

**Topic #1: Unified TCI**

Issue 1-2-2: MAC-CE based UL TCI state switching delay in separate UL/DL mode

* Proposals
  + Option 1: for UL TCI state associated with DL-RS as following for both known and unknown TCI state and associated PL-RS is maintained (Apple, Intel):
    - THARQ + 3ms + NM\*(Tfirst\_target-PL-RS + 4\*Ttarget\_PL-RS + 2ms) for known TCI
    - THARQ + 3ms + TL1-RSRP + (Tfirst\_target-PL-RS + 4\*Ttarget\_PL-RS + 2ms) for unknown TCI
  + Option 2: Reuse the existing MAC-CE based uplink spatial relation switching delay requirements for known and unknown case (ZTE, vivo, Samsung, Huawei, Nokia, QC)
  + Option 3: Additional delay proponent for PL-RS update for known case. For unknown case, i.e., PL-RS or associated RS with spatial relation is unknown, no requirement is applied.(MTK)
  + Option 4: For known case, if PL-RS is included in UL TCI state, reuse the existing MAC-CE based pathloss reference signal switch delay requirements; If PL-RS is associated with UL or joint TCI, UL TCI switching delay requirements and pathloss reference signal switching delay requirements are specified separately, and existing requirements on UL spatial relation switching and existing requirements on PL-RS can be reused respectively. (CMCC)
* Discussion
  + CMCC: ok with Option 2. Need to differentiate cases when PL-RS is included in UL TCI state – R16 requirements can be reused. Cases 2 is when PL-RS is associated with UL TCI state.
  + Apple: UL TCI state is different from UL spatial relationship. PL-RS is included in UL TCI. We think it is appropriate to include PL-RS into delays.
  + MTK: Option 2 is unclear. For known case we need to consider PL-RS.
  + E///: Need to decide on the ending point first
  + Intel: For unknown case – we already have Rel-16 requirements and prefer to define it.
  + Samsung: For known case the question whether NM can be equal to 1. For unknown case – the question whether additional delay shall be allowed to allow UE to find PL-RS.
  + Apple: NM = 1if PL-RS is not maintained. UE is supposed to maintain up to 4 PL-RS.
  + MTK: we can compromise to define requirements for unknown case under condition of beam alignment (i.e. PL-RS and associated RS with spatial relation are QCL’ed).
  + Intel: we are fine with MTK proposal
  + Samsung: if we consider beam alignment then we can go with Option 1.
  + Session chair: add a clear definition of beam alignment in the final WF
* Agreements
  + MAC-CE based UL TCI state switching delay in separate UL/DL mode
    - Known TCI case:
      * THARQ + 3ms + NM\*(Tfirst\_target-PL-RS + 4\*Ttarget\_PL-RS + 2ms)
      * NM is equal to 1 if PL-RS is not maintained, and equal to 0 otherwise
      * FFS whether NM is allowed to be equal to 1 in Rel-17 specification
    - Unknown TCI case:
      * THARQ + 3ms + TL1-RSRP + (Tfirst\_target-PL-RS + 4\*Ttarget\_PL-RS + 2ms)
      * Requirements will be defined for beam alignment case

Issue 1-2-3: MAC-CE based joint UL and DL TCI state switching delay

* Proposals
  + Option 1: No extra requirement needed for Joint TCI mode, DL and UL requirements can be applicable independently. (Samsung, CMCC, Intel, Huawei, Nokia)
  + Option 2: Define a total switching delay for joint TCI state switching requirements and define the requirement from the slot switching command is received until UE can receive DL channel or transmit UL channel with target TCI state, whichever is later. (Apple, vivo, MTK)
* Discussion
  + vivo / Apple / MTK: Strongly prefer Option 2. New requirements are required
  + E///: For Option 1 – does it mean that switching is performed in parallel?
  + Nokia: The difference between Option 1 and Option 2 is the ending point. DL/UL have different ending points and the intention of Option 2 is to use the longest one. What is the motivation?
  + Samsung: in case of independent processing the ending points can be different. For test case we are open to consider how to address issues raised by Option 2 proponents.
  + Huawei: Option 1.
  + MTK: UL timing is based on DL timing. If we want to switch DL/UL TCI states jointly, then it is better to switch timings jointly.
  + vivo: To Nokia – we see issues in terms of testing (e.g. DL TCI state will require some UL transmission as well)
* Agreements
  + No extra requirement needed for Joint TCI mode, DL and UL requirements can be applicable independently
    - Note: it is not expected that UE will be required to make DL reception or UL transmission before UE completes the DL or UL TCI state switching, respectively
    - FFS for test procedure for Joint TCI mode

Issue 1-1-1: The Spec structures of Unified TCI State Switching Delay

* Proposals
  + Option 1: Separate section and take following structure as a baseline (Samsung)

|  |
| --- |
| 8.15 Active downlink TCI state switching delay for unified TCI  8.15.1 Introduction  8.15.2 Known condition for downlink TCI state  8.15.3 MAC-CE based downlink TCI state switch delay  8.15.4 DCI based downlink TCI state switch delay  8.15.5 Active downlink TCI state list update delay  8.16 Active uplink TCI state switching delay for unified TCI  8.16.1 Introduction  8.16.2 Known condition for uplink TCI state  8.16.3 MAC-CE based uplink TCI state switch delay  8.16.4 DCI based uplink TCI state switch delay  8.16.5 Active uplink TCI state list update delay |

* + Option 2: No need for downlink TCI, adding joint TCI section, and reuse 8.10.X (Apple)

|  |
| --- |
| 8.10.X Active uplink TCI state switching delay for unified TCI  8.10.Y Active joint TCI state switching delay for unified TCI |

* + Option 3: separate TCI state list update section (vivo)

|  |
| --- |
| 8.10.Z.5 Active joint TCI state list update delay  8.10.Z.6 Active separate TCI state list update delay comprising downlink and uplink TCIs |

* + Option 4: Also consider new section for DCI-based requirement (Nokia)
* Discussion
  + TBA
* Agreements
  + TBA

**Topic #2: Inter-cell beam management**

Issue 2-3-2: Where to perform inter-cell L1-RSRP measurement from NSC in FR2

* Proposals
  + Option 1: Outside SMTC only (MTK, CMCC, Huawei)
    - Option 1a: and introduce scheduling availability.
  + Option 2: Both within and outside SMTC (Apple, Intel, Nokia, Ericsson, ZTE)
    - Proposal 2a: and determine the sharing factor for SC and NSC measurement within SMTC.
* Discussion
  + Huawei: for 2a – does sharing factor mean existing sharing factor?
  + MTK: Option 2 complicates UE design
  + vivo: it is related to RX beam assumptions. Need to align assumptions on UE measurement behavior
  + Intel: for 2a – we already agreed on no impact on L3 measurements. Does sharing factor apply withing or outside SMTC?
  + CMCC: Option 1 follows existing approach. Can accept Option 2.
  + E///: Rx beam assumptions need to be discussed first.
  + Nokia: we do not need to restrict UE measurements to be done outside SMTC only. Agree with vivo and E///.
  + Samsung: Given a limited time it may be difficult to agree on UE assumptions first. Option 1 will put network scheduling restriction.
  + Apple: Rx beam assumption need to be identified.
  + QC: not clear what is the new point
  + ZTE: Option 2 is required for sufficient flexibility
  + Session chair: return to in final round.

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202666 | WF on RRM impact on unified TCI in FeMIMO | Samsung |  |
| R4-2202667 | WF on FeMIMO RRM requirements for inter-cell beam management | Samsung |  |
| R4-2202668 | WF on other RRM requirements for FeMIMO | Huawei |  |
| R4-2202669 | Reply LS on L1-RSRP measurement behaviour when SSBs associated with different PCIs overlap | vivo | To: RAN1; CC: RAN2 |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200536 | DraftCR on TCI chain update for Rel-17 FeMIMO | Intel | Return to |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202666 WF on RRM impact on unified TCI in FeMIMO**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202667 WF on FeMIMO RRM requirements for inter-cell beam management**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202668 WF on other RRM requirements for FeMIMO**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202669 Reply LS on L1-RSRP measurement behaviour when SSBs associated with different PCIs overlap**

*Type: LS out For: Approval  
 To RAN1, Cc RAN2  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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##### 6.19.3.1 Unified TCI for DL and UL

**R4-2200182 Discussion on unified TCI for DL and UL in R17 feMIMO**

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

**Decision: Noted.**

**R4-2200277 Discussion on RRM requirements for Unified TCI**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200593 Discussion on Unified TCI for DL and UL**

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

**Decision: Noted.**

**R4-2200602 Discussion on RRM requirements for unified TCI in R17 feMIMO**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200642 Discussion on unified TCI**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200649 Discussion on requirements of unified TCI for DL and UL**

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

**Abstract:**

This paper discusses TCI switching delay requirements under Rel-17 unified TCI framework

**Decision: Noted.**

**R4-2200787 Discussion on Unified TCI state in NR FeMIMO**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2201363 Unified TCI in FeMIMO**

*Type: discussion For: Approval  
 Source: Samsung*

**Abstract:**

Overall specfication structure for unified TCI and proposals for open issues of unified TCI

**Decision: Noted.**

**R4-2201384 RRM requirements of unified TCI state for FeMIMO**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution, we discuss RRM requirements for unified TCI state design requirements.

**Decision: Noted.**

**R4-2201616 Discussion on RRM requirements related to unified TCI framework for NR FeMIMO**

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

**Decision: Noted.**

##### 6.19.3.2 Inter-cell beam management

**R4-2200183 Discussion on inter cell beam management in R17 feMIMO**

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

**Decision: Noted.**

**R4-2200278 Discussion on RRM requirements for inter-cell beam management**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200594 Discussion on RRM requirements for inter-cell beam management**

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

**Decision: Noted.**

**R4-2200603 Discussion on RRM requirements for inter-cell L1 beam measurements in R17 feMIMO**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200643 Discussion on inter-cell beam management**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200650 Discussion on requirements of inter-cell beam management**

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

**Abstract:**

This paper discusses Rel-17 feMIMO beam management and L1-RSRP measurements

**Decision: Noted.**

**R4-2200788 Discussion on inter-cell beam management in NR FeMIMO**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2201385 RRM requirements of inter-cell BM in FeMIMO**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution, we discuss RRM requirements of inter-cell BM in FeMIMO

**Decision: Noted.**

**R4-2201617 Discussion on inter-cell beam management requirements for NR FeMIMO**

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

**Decision: Noted.**

**R4-2201960 Inter-cell beam management in FeMIMO**

*Type: discussion For: Approval  
 Source: Samsung*

**Decision: Noted.**

##### 6.19.3.3 Others

**R4-2200184 Discussion on general and RRM requirements impacts in R17 feMIMO**

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

**Decision: Noted.**

**R4-2200279 Discussion on other RRM requirements for FeMIMO**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2200535 Discussion on remaining issues in FeMIMO**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200536 DraftCR on TCI chain update for Rel-17 NR FeMIMO**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2202750 (from R4-2200536).**

**R4-2202750 DraftCR on TCI chain update for Rel-17 NR FeMIMO**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2200604 Discussion on other RRM impacts in R17 feMIMO**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200651 Discussion on other items of Rel-17 feMIMO RRM requirements**

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

**Abstract:**

This paper discusses Rel-17 feMIMO BFD/CBD/BFRQ and UE capability and requirements on simultaneous reception

**Decision: Noted.**

**R4-2201387 Discussion on FeMIMO other open issues**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribtuion, we discuss QCL definition update, and link recovery procedures for inter-cell beam management operation

**Decision: Noted.**

**R4-2201618 Discussion on other RRM requirements for NR FeMIMO**

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

**Decision: Noted.**

### 6.20 Support of reduced capability NR devices

#### 6.20.3 RRM core requirements

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**Email discussion: [101-bis-e][220] NR\_redcap\_RRM\_1**

**R4-2202571 Email discussion summary: [101-bis-e][220] NR\_redcap\_RRM\_1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202737 (from R4-2202571).**

**R4-2202737 Email discussion summary: [101-bis-e][220] NR\_redcap\_RRM\_1**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 17, 2022)**

**Sub-topic 2-4 Random access**

Issue 2-4-2: Impact on 1 Rx RSRP accuracy in RSRP threshold

* Proposals
  + Option 1 (E///, CMCC, Nokia): Inform RAN2 about the need to introduce separate RSRP thresholds for RedCap UE with 1 Rx in procedures that depend on RSRP based thresholds such as RA.
  + Option 2 (Xiaomi, Apple, vivo): No need to define separate threshold for 1 Rx RedCap UE
* Discussion
  + Apple: the difference is only in accuracy. NW does not know the UE conditions.
  + E///: Due to worse accuracy for 1RX UE we would like to avoid UE to make wrong decisions.
  + CMCC: Option 1
  + vivo: Same view as Apple. For legacy UEs we have different number of antennas (2/4), but we did not use such approach.
  + Nokia: Option 1.

**Sub-topic 1-1: Measurement capability**

Issue 1-1-1: Measurement capability in IDLE/INACTIVE state

* Proposals
  + Option 1 (vivo, Xiaomi, ZTE, MTK): Measurement capability of RedCap UE in IDLE/INACTIVE states is reduced.
    - Option 1a (MTK): The RedCap UE shall be capable of monitoring at least:
      * Intra-frequency carrier, and
      * Depending on UE capability, 5 NR inter-frequency carriers, and
      * Depending on UE capability, 5 FDD E-UTRA inter-RAT carriers, and
      * Depending on UE capability, 5 TDD E-UTRA inter-RAT carriers.
      * A total of 10 carrier frequency layers, which includes serving layer, comprising of any above defined combinations of E-UTRA FDD, E-UTRA TDD and NR layers.
  + Option 2 (CMCC, E///, Apple, Nokia, ZTE): Reuse existing measurement capability for Rel-17 RedCap UE
  + Option 3: The RedCap UE shall be capable of monitoring at least: (MTK, Apple, vivo, OPPO, E///, ZTE)
    - Intra-frequency carrier, and
    - Depending on UE capability, 6 NR inter-frequency carriers, and
    - Depending on UE capability, 6 FDD E-UTRA inter-RAT carriers, and
    - Depending on UE capability, 6 TDD E-UTRA inter-RAT carriers.
    - A total of 12 carrier frequency layers, which includes serving layer, comprising of any above defined combinations of E-UTRA FDD, E-UTRA TDD and NR layers.
  + Option 4: The RedCap UE shall be capable of monitoring at least: (QC)
    - Intra-frequency carrier, and
    - Depending on UE capability, 4 NR inter-frequency carriers, and
    - Depending on UE capability, 4 FDD E-UTRA inter-RAT carriers, and
    - Depending on UE capability, 4 TDD E-UTRA inter-RAT carriers.
    - A total of 8 carrier frequency layers, which includes serving layer, comprising of any above defined combinations of E-UTRA FDD, E-UTRA TDD and NR layers.
* Discussion
  + CMCC: mobility is important for RedCap UEs and it is not clear why we need to reduce the number of layers
  + QC: We discuss minimum requirements. RedCap addresses different segments. It makes sense to reduce the capabilities.
  + ZTE: Can support Option 3 as well.
  + CMCC, QC: can compromise
* Agreements
  + Measurement capability in IDLE/INACTIVE state
    - The RedCap UE shall be capable of monitoring at least
      * Intra-frequency carrier, and
      * Depending on UE capability, 6 NR inter-frequency carriers, and
      * Depending on UE capability, 6 FDD E-UTRA inter-RAT carriers, and
      * Depending on UE capability, 6 TDD E-UTRA inter-RAT carriers.
      * A total of 11 carrier frequency layers, which includes serving layer, comprising of any above defined combinations of E-UTRA FDD, E-UTRA TDD and NR layers.
  + Measurement capability in CONNECTED state
    - The RedCap UE shall be capable of monitoring at least:
      * Depending on UE capability, 6 NR SSB inter-frequency carriers configured by PCell, and
      * Depending on UE capability, 7 NR inter-frequency carriers including SSB and CSI-RS in total configured by PCell, and
      * Depending on UE capability, 6 E-UTRA TDD inter-RAT carriers configured by PCell, and
      * Depending on UE capability, 6 E-UTRA FDD inter-RAT carriers configured by PCell, and
      * In addition to the requirements defined above, the UE shall be capable of monitoring a total of at least 10 effective carrier frequency layers comprising of any above defined combination of NR, E-UTRA FDD, and E-UTRA TDD.

**Topic #4: Signalling characteristics**

Issue 4-5-1: New BWP switching delay when only center-frequency is changed in Rel-17

* Proposals
  + Option 1 (CMCC, E///, Huawei, Nokia):  Define new BWP switching delay involving only changing of the center-frequency of the BWP without changing its BW, SCS or any other parameter for RF retuning as follows:

|  |  |  |
| --- | --- | --- |
| Frequency Range | Type 1 Delay (us) | Type 2 Delay (us) |
| 1 | 200 | 1050 |
| 2 | 200 | 1050 |

* + Option 2 (Xiaomi, vivo, Oppo, ZTE, MTK, QC, Apple): RAN4 to reuse the legacy BWP switching delay for RedCap UE in Rel-17.
* Discussion
  + ZTE: we are fine to reuse legacy requirements.
  + E///: for RedCap the switching may happen more often and only LO changes.
  + CMCC: Option 1
  + Huawei: Option 1. Only center frequency change reduces the UE processing time.
  + QC: this is not a common scenario. BWP switching is not applicable to SSB reading use case
  + Apple / vivo / MTK: Option 2.
  + Nokia: Option 1.
  + Session chair: continue the discussion

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202670 | WF on RedCap RRM requirements | Ericsson |  |
| R4-2202671 | LS on RSRP based thresholds for RedCap UE with 1 Rx | Ericsson |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2201857 | Updated WI work plan for RedCap for RRM | Ericsson | Revised |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202670 WF on RedCap RRM requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202671 LS on RSRP based thresholds for RedCap UE with 1 Rx**

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

**Abstract:**

**Decision: Return to.**

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**Email discussion: [101-bis-e][221] NR\_redcap\_RRM\_2**

**R4-2202572 Email discussion summary: [101-bis-e][221] NR\_redcap\_RRM\_2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202738 (from R4-2202572).**

**R4-2202738 Email discussion summary: [101-bis-e][221] NR\_redcap\_RRM\_2**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 17, 2022)**

**Topic #2: RRM measurement relaxations**

Issue 2-2-1: Relaxation when Rel-17 stationarity criterion is configured and fulfilled, or if both Rel-17stationarity criterion and Rel-17 not-at-cell-edge criterion are configured however UE meets only the R17 stationarity criterion:

* Proposals
  + Option 1: using single scaling factor (Apple, vivo, Huawei, xiaomi, CMCC, oppo, MTK, Ericsson)
  + Option 2: using multiple scaling factor and only one is broadcast at a time (Nokia Qualcomm)
* Recommended WF
  + RAN2’s signalling impact need be considered when considering whether to use option 1 or option 2.
* Discussion
  + Nokia: We prefer a single scaling factor, but prefer to keep it configurable
  + QC: RedCap use cases are different (mobile and stationary UEs). So, different scaling factors are required.
  + E///: we have an agreement that we’ll use Rel-16 relaxation as baseline. Both Rel-16 and Rel-17 relaxations can be configured jointly and we can have 2 factors.
  + MTK: this is more RAN2 discussion. Prefer Option 1.
  + Apple: Option 1. Not clear how network can decide the value to configure in IDLE state
  + CMCC: for this specific issue the assumption is that UE meets the Rel-17 stationary criteria
  + Session chair: continue discuss and make decision in this meeting.

**Topic #1: Extended DRX enhancements**

Issue 1-1-1: eDRX requirements for FR2

* Proposals
  + Option 1: Define requirements for FR2 (Ericsson, vivo, Huawei, Nokia, Apple, CMCC, Xiaomi, OPPO)
  + Option 2: de-prioritizing FR2 requirements (ZTE, MTK)
* Discussion
  + MTK: eDRX benefits for FR2 are not justified
    - E///: the mentioned example is a corner case and does not preclude definition of requirements for other cases.
* Agreements
  + Define eDRX requirements for FR2
  + Further assess the benefits and feasibility of eDRX cycle length of 20.48 [s]

**Sub-topic 3-2 Reply to RAN1 LS R1-2112802 on use of NCD-SSB or CSI-RS in DL BWPs for RedCap UE**

Issue 3-2-2: CSI-RS based method

* Proposals
  + Option 1a: A RedCap UE can indicate not need NCD-SSB: a RedCap UE can in addition optionally support relevant operation based on CSI-RS and FG 6-1a by reporting optional capabilities (Huawei Ericsson)
  + Option 1b: A RedCap UE can in addition optionally support relevant operation based on CSI-RS and FG 6-1a by reporting optional capabilities and No new UE capabilities are needed. (CMCC)
  + Option 2: A RedCap UE that supports FG 6-1a operates in a BWP that does not include the CD-SSB or an NCD-SSB, the UE can support RLM/BFD based CSI-RS but cannot support RRM based CSI-RS’ (MTK)
  + Option 3: Do not consider CSI-RS as an alternative to NCD-SSB for separate initial DL BWP and reply accordingly to RAN1 (Nokia)
  + Option 3a: due to the incapability of CSI-RS for neighbor cell RRM measurement, serving cell timing requirement and TCI state switch requirements, feasibility issue is identified regarding this working assumption (Not need NCD-SSB: A RedCap UE can in addition optionally support relevant operation based on CSI-RS (working assumption) and/or FG 6-1a by reporting optional capabilities) (vivo)
* Discussion
  + CMCC: We can confirm RAN1 working assumption
  + Intel: Agree with CMCC and send reply to RAN1
  + Huawei: Option 1a
  + ZTE: ok with 1a or 1b
  + Apple: L3 CSI-RS measurements capability needs to be supported as well. Agree with Option 2
  + vivo: RAN1 working assumption is unclear. It means that UE needs to support L1/L3 measurements, etc based on CSI-RS. There are no requirements
  + MTK: It is not feasible to support measurements and we need to inform RAN1.
  + Nokia: We are not supporting confirming working assumption. Further study is required.
  + Session chair:
    - Continue the discussion.
    - Possible compromise agreement is to confirm the working assumption and do not define the requirements in Rel-17
    - Separate WF shall be discussed in the 2nd round.

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202672 | WF on eDRX and RRM measurement relaxations requirements for Redcap UE | vivo |  |
| R4-2202673 | WF on the use of NCD-SSB or CSI-RS for RedCap UE | CMCC |  |
| R4-2202674 | Reply LS on use of NCD-SSB for RedCap UE | ZTE | To: RAN1  CC: RAN2 |
| R4-2202675 | LS on RRM relaxation for Redcap | vivo | To: RAN2 |
| R4-2202676 | Reply LS on UE capabilities for RedCap from RRM perspective | Ericsson | To: RAN2  CC: RAN1 |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202672 WF on eDRX and RRM measurement relaxations requirements for Redcap UE**

*Type: other For: Approval  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202673 WF on the use of NCD-SSB or CSI-RS for RedCap UE**

*Type: other For: Approval  
 Source: CMCC*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202674 Reply LS on use of NCD-SSB for RedCap UE**

*Type: LS out For: Approval  
 to RAN1, cc RAN2  
 Source: ZTE Corporation*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202761 Reply LS on use of NCD-SSB or CSI-RS in DL BWPs for RedCap UE**

*Type: LS out For: Approval  
 to RAN1, cc RAN2  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202675 LS on RRM relaxation for Redcap**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202676 Reply LS on UE capabilities for RedCap from RRM perspective**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**R4-2201857 Updated WI work plan for RedCap for RRM**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Updated work plan and work split.

**Decision: Revised to R4-2202718 (from R4-2201857).**

**R4-2202718 Updated WI work plan for RedCap for RRM**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Updated work plan and work split.

**Decision: Return to.**

**R4-2202762 Draft Big CR: RRM requirements for Rel-17 NR RedCap**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: Ericsson*

**Abstract:**

**Decision: Return to.**

**R4-2202763 Draft Big CR: RRM requirements for Rel-17 NR RedCap**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 6.20.3.1 Impacts from UE complexity reduction

###### 6.20.3.1.1 General

**R4-2200392 On general aspects on complexity reduction of Redcap**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200692 Further discussion on general requirements on Redcap UE**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200808 On general requirements for RedCap UE**

*Type: discussion For: Decision  
 Source: CMCC*

**Decision: Noted.**

**R4-2201183 Discussion on general RRM requirements impacts for RedCap UE**

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

**Decision: Noted.**

**R4-2201394 reply LS on capability related assumptions for RedCap**

*Type: LS out For: Approval  
 to RAN2, cc RAN1  
 Source: ZTE Corporation*

**Abstract:**

We provide a draft LS reply to RAN2 LS R2-2109218 on UE capability assumptions.

**Decision: Noted.**

**R4-2201397 Discussions on general RRM aspects for RedCap UEs**

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

**Decision: Noted.**

**R4-2201773 General discussion UE capability and scheduling availability**

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

**Decision: Noted.**

**R4-2201858 Discussions on general requirements for RedCap**

*Type: LS out For: Approval  
 to RAN1  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss general requirements that apply in all RRC states for RedCap.

**Decision: Noted.**

**R4-2201979 Discussion on PBCH simulation assumptions for RedCap**

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

**Abstract:**

Discussion on PBCH simulation assumptions for NR\_redcap

**Decision: Noted.**

###### 6.20.3.1.2 Mobility requirements

**R4-2200292 Discussion on mobility requirement for RedCap**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200393 On mobility requirements for Redcap**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200809 On mobility requirements for RedCap UE**

*Type: discussion For: Decision  
 Source: CMCC*

**Decision: Noted.**

**R4-2200871 Discussion on mobility requirements for RedCap**

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

**Decision: Noted.**

**R4-2201184 Discussion on UE mobility requirements due to UE complexity reduction**

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

**Decision: Noted.**

**R4-2201388 Requirements under RRC Connected mode for RedCap UEs**

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

**Decision: Noted.**

**R4-2201774 Discussion on mobility requirements**

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

**Decision: Noted.**

**R4-2201859 Discussions on RedCap mobility requirements**

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

**Abstract:**

In this contribution we discuss the mobility requirements for RedCap, HO, RRC re-establishment, RA and RRC connection release with redirection.

**Decision: Noted.**

###### 6.20.3.1.3 Timing requirements

**R4-2200810 On timings requirements for RedCap UE**

*Type: discussion For: Decision  
 Source: CMCC*

**Decision: Noted.**

**R4-2201185 Discussion on UE timing requirements due to UE complexity reduction**

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

**Decision: Noted.**

**R4-2201389 Timing requirements for RedCap UEs**

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

**Decision: Noted.**

**R4-2201775 UE complexity reduction impact on timing requirements**

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

**Decision: Noted.**

**R4-2201860 On UE transmit timing requirements in Redcap**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss the UE transmit timing requirements based on last WF.

**Decision: Noted.**

###### 6.20.3.1.4 Signalling characteristics

**R4-2200293 Discussion on signalling characteristics for RedCap**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200394 On signalling characteristics for Redcap**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200399 Simulation results for RLM and BFD**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200400 Simulation results for PDCCH RLM and BFD**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200811 On Signalling characteristics requirements for RedCap UE**

*Type: discussion For: Decision  
 Source: CMCC*

**Decision: Noted.**

**R4-2200867 Simulation Results: RLM for RedCap**

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

**Decision: Noted.**

**R4-2200868 Discussion on hypothetical PDCCH parameters for RedCap**

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

**Decision: Noted.**

**R4-2201145 RRM impact from UE complexity reduction for Redcap UE - signaling characteristics**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201186 Discussion on signaling characteristics due to UE complexity reduction**

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

**Decision: Noted.**

**R4-2201187 Simulation results for RLM and BFD due to complexity reduction for RedCap UE**

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

**Decision: Noted.**

**R4-2201390 On Signalling characteristics of RedCap UEs**

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

**Decision: Noted.**

**R4-2201776 Discussion on RLM and BFD in RedCap**

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

**Decision: Noted.**

**R4-2201861 Discussions on RedCap signaling characteristics**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss signaling characteristics for RedCap, e.g. RLM, link recovery etc.

**Decision: Noted.**

**R4-2202030 Impact of UE complexity reduction impact on signalling characteristics**

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

**Abstract:**

In this paper, we discuss the simulation results for RLM

**Decision: Noted.**

###### 6.20.3.1.5 Measurement procedure

**R4-2200294 Discussion on cell identification and measurement for RedCap**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200395 On measurement procedure for Redcap**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200401 Simulation results for cell detection, PBCH detection, SSB measurement and L1 RSRP measurement**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200812 On Measurement procedure for RedCap UE**

*Type: discussion For: Decision  
 Source: CMCC*

**Decision: Noted.**

**R4-2200869 Discussion on measurement procedures for RedCap**

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

**Decision: Noted.**

**R4-2200870 Simulation Results: cell detection performance for RedCap**

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

**Decision: Noted.**

**R4-2201146 RRM impact from UE complexity reduction for Redcap UE - measurement requirements**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201188 Discussion on measurement requirements due to UE complexity reduction**

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

**Decision: Noted.**

**R4-2201189 Simulation results for cell detection, L3 measurement and L1 RSRP measurement**

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

**Decision: Noted.**

**R4-2201391 Measurement procedure of RedCap UEs**

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

**Decision: Noted.**

**R4-2201777 Simulation performance results for RedCap**

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

**Decision: Noted.**

**R4-2201862 Discussions on RedCap measurement procedure**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss CONNECTED mode measurement procedure for RedCap.

**Decision: Noted.**

**R4-2202031 Impact of UE complexity reduction on measurement procedures**

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

**Abstract:**

In this paper, we discuss the simulation results for cell detection and PBCH decoding

**Decision: Noted.**

##### 6.20.3.2 Extended DRX enhancements

**R4-2200295 Discussion on RRM requirement with eDRX for RedCap**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200396 On Redcap eDRX enhancement**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200690 Further discussion on RRM requirements for extended DRX enhancements for RedCap**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200813 On Extended DRX cycle for RedCap UE**

*Type: discussion For: Decision  
 Source: CMCC*

**Decision: Noted.**

**R4-2200866 Discussion on eDRX enhancements for RedCap**

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

**Decision: Noted.**

**R4-2201147 Extended DRX enhancements for Redcap UE**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201190 Discussion on Extended DRX enhancements for RedCap UE**

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

**Decision: Noted.**

**R4-2201392 On extended DRX enhancements for RedCap**

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

**Decision: Noted.**

**R4-2201778 Extended DRX in IDLE mode and INACTIVE mode**

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

**Decision: Noted.**

**R4-2201863 Discussions on eDRX requirements for RedCap**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss eDRX requirements for RedCap

**Decision: Noted.**

##### 6.20.3.3 RRM measurement relaxations

**R4-2200296 Discussion on RRM relaxation requirement for RedCap**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200397 On Redcap RRM relaxation**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200691 Further discussion on RRM measurement relaxations for RedCap UE**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2200814 On RRM measurement relaxation for RedCap UE**

*Type: discussion For: Decision  
 Source: CMCC*

**Decision: Noted.**

**R4-2201148 RRM measurement relaxations for RedCap UE**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201191 Discussion on RRM measurement relaxations for RedCap UE**

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

**Decision: Noted.**

**R4-2201393 Discussions on RRM measurement relaxations for RedCap UEs**

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

**Decision: Noted.**

**R4-2201779 RRM measurements relaxation for stationary criterion**

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

**Decision: Noted.**

**R4-2201864 Discussions on RRM measurement relaxations**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss RRM measurement relaxation for RedCap.

**Decision: Noted.**

**R4-2201980 On RRM measurement relaxation for neighbouring cells**

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

**Abstract:**

Discussion on RRM relaxation for NR\_redcap

**Decision: Noted.**

**R4-2202032 RRM relaxations enhancements for RedCap UE**

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

**Abstract:**

In this paper we discuss RRM relaxations enhancements for RedCap UE

**Decision: Noted.**

##### 6.20.3.4 Others

**R4-2200398 On NCD-SSB or CSI-RS in DL BWPs for RedCap UE**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200815 Reply LS on use of NCD-SSB or CSI-RS in DL BWPs for RedCap UE**

*Type: discussion For: Decision  
 Source: CMCC*

**Decision: Noted.**

**R4-2201192 Discussion on NCD-SSB and CSI-RS**

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

**Decision: Noted.**

**R4-2201395 Reply LS on use of NCD-SSB for RedCap UE**

*Type: LS out For: Approval  
 to RAN1, cc RAN2  
 Source: ZTE Corporation*

**Abstract:**

We provide a draft LS reply to RAN1 LS R1-2110600 (R4-2117599). RAN4 provided some answers for part of the questions asked, and we propose to provide answers for all questions with another LS.

**Decision: Noted.**

**R4-2201396 reply LS on use of NCD-SSB or CSI-RS in DL BWPs for RedCap UE**

*Type: LS out For: Approval  
 to RAN1, cc RAN2  
 Source: ZTE Corporation*

**Abstract:**

We provide a draft LS reply to RAN1 LS R1-2112802 (R4-2200044) on use of NCD-SSB or CSI-RS in DL BWPs for RedCap UE.

**Decision: Noted.**

**R4-2201760 On capability and NCD-SSB design for RedCap RRM**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2201780 Discussion on the use of NCD-SSB**

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

**Decision: Noted.**

**R4-2201865 RRM Discussions on RedCap UE capabilities**

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

**Abstract:**

In this contribution we discuss the RRM aspects of this LS on UE capability and provide our view, and a draft response LS is provided in the Annex.

**Decision: Noted.**

**R4-2201981 Discussion on use of NCD-SSB or CSI-RS in DL BWPs for RedCap UE**

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

**Abstract:**

Discussion based on incoming RAN1 LS

**Decision: Noted.**

### 6.21 Positioning enhancements for NR

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**Email discussion: [101-bis-e][222] NR\_pos\_enh\_1**

**R4-2202573 Email discussion summary: [101-bis-e][222] NR\_pos\_enh\_1**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202739 (from R4-2202573).**

**R4-2202739 Email discussion summary: [101-bis-e][222] NR\_pos\_enh\_1**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 19, 2022)**

**CR split**

E///: triggerred discussion and aim to have a the plan ready by the end of the meeting

**Issue 1-1-2: AGC conditions for PRS measurements (One or more conditions under which samples for AGC is reduced or not required for PRS measurements)**

* RAN4 #101e agreement
  + Additional samples for AGC for PRS measurements are not required in case at least one of the following conditions is met
    - Condition #1:
      * 1A) PRS bandwidth is within the active BWP and
      * FFS: 1B) Certain power difference between serving and neighbor cell signal power is maintained
        + Option 1: Target PRS Es/Iot side condition is ≥ -6dB
        + Option 2: Difference between serving and neighboring cell Es/Iot is within X dB
* Proposals
  + Condition 2: QC
    - The UE has a valid Rx AGC for the serving cell and Condition 1 (WF in R4-2120419)
  + Condition 3: PRS Es/Iot for condition 1B in WF in R4-2120419
    - Condition 3a: CMCC, Vivo, HW, E///, CATT
      * When target cell PRS Es/Iot ≥ -6dB
    - Condition 3b: Nokia, ZTE, OPPO, E///, CATT
      * When magnitude difference between serving and target cells’ PRS Es/Iot≤ [6] dB
  + Condition 4: QCL
    - Condition 4a: Intel, Vivo, CMCC, QC, Nokia
      * When UE is provided with the QCL information of the PRS (dl-PRS-QCL-Info)
    - Condition 4b: E///
      * If PRS QCL information is provided with SSB as reference with QCL Type A, Type D and average gain
    - Condition 4c: QC
      * If PRS QCL information is provided with SSB as reference with QCL Type A, Type D and average gain, and
      * the UE was previously configured to measure the reference SSB and measured the reference SSB within X ms (FFS) of the start of the PRS measurement period.
  + Condition 5: PRS configuration parameters:
    - Condition 5a: CATT, Nokia
      * PRS resource repetitions (in different slots) within one PRS instance. Number of repetitions is FFS
    - Condition 5b: CATT
      * For the PRS measurement with small periodicity
* Summary
  + Condition #1B
    - Option 1: Target PRS Es/Iot side condition is ≥ -6dB (CMCC, Vivo, HW, E///, CATT, Nokia)
    - Option 2: Difference between serving and neighboring cell Es/Iot is within [6] dB (Nokia, ZTE, OPPO, E///, CATT, vivo, Intel)
    - Option 2a: Difference between the serving and neighboring cell [total] RX power is within [6] dB.
      * FFS on the detailed RX power definition
  + Condition 2
  + Condition 4: QCL
  + Condition 5: PRS configuration parameters
* Discussion (Condition #1B)
  + vivo: Option 1 and 2 are quite similar. Option 2 is more relaxed. Both are ok
  + E///: Both are ok.
  + Nokia: Both are ok.
  + Intel / ZTE: Option 2
  + QC: Option 1 anyway needs to be added. Option 2 seem reasonable. For Option 2 – serving cell may not transmit PRS. Not sure if this condition is sufficient. Also, do we assume Iot is constant?
  + Huawei: QC’s comments on Rx power are valid. Rx power is more relevant than Es/Iot for AGC. We are ok to update option 2 to Rx power. We are ok with both Option 1 and 2
* Agreements
  + Additional samples for AGC for PRS measurements are not required in case at least one of the following conditions is met
    - Condition #1:
      * 1A) PRS bandwidth is within the active BWP and
      * 1B) Difference between the serving and neighboring cell [total] RX power is within [6] dB.
        + FFS on the detailed RX power definition.

**Issue 1-1-3: Applicability conditions for reduced Rx beam sweeping factor (<8) capability**

* Proposals
  + Option 1: CATT, Vivo, OPPO, ~~E///,~~ HW, Nokia, CMCC, Intel
    - UE capability is applicable without any condition.
  + Option 2:
    - Option 2a: CMCC, Nokia, E///
      * Applicable if UE is provided with QCL info of PRS (dl-PRS-QCL-Info)
    - Option 2b: QC
      * Applicable under following conditions:
        + At least Type-D QCL information (dl-PRS-QCL-Info) is provided for PRS with SSB as QCL reference, and
        + the UE was previously configured to measure the reference SSBs and measured the reference SSBs within X ms (FFS) of the start of the PRS measurement period, and
        + the LMF requests the UE to use a reduced Rx beam sweeping factor in the location request.
* Discussion
  + Nokia: both Option 1 and 2 are fine. Option 2 allows larger reduction of the sweeping factor.
  + E///: We support Option 2a
  + CATT: Option 1. For 2a – in Rel-16 we have agreed that in case QCL info is provided, then no beam sweeping is used. Why do we need to repeat the discussion?
  + vivo: Same view as CATT.
  + Huawei: Option 1. 2a alone is not sufficient. 2nd bullet of 2b will be required. In the field it may happen that multiple PRS are multiplexed on the same symbol and Option 2 may not work.
  + QC: UE needs to understand that it is requested to perform measurements with reduced number of beams.
* Agreements
  + Reduced Rx beam sweeping factor (<8) capability can be applicable without any additional conditions
    - No impact on positioning measurement accuracy requirements for UEs supporting the capability
    - Positioning measurement period requirements will be reduced for UEs supporting the capability
  + FFS whether UE needs to be configured by LMF to perform measurements with a reduced Rx beam sweeping factor

**Issue 1-1-4: Rx beam sweep numbers for reduced Rx beam sweeping factor (<8) capability**

* Proposals
  + Option 1: Vivo, OPPO, Intel, E///?
    - 4
  + Option 2: CATT
    - 1, 2, 4
  + Option 3: Huawei
    - 4, 6
* Discussion
  + TBA
* Agreements
  + The following Rx beam sweep numbers are supported for reduced Rx beam sweeping factor (<8) UE capability: {1, 2, 4, 6}

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202677 | WF on NR Positioning Enhancements (Part 1) | Ericsson |  |
| R4-2202678 | LS reply on lower Rx beam sweeping factor for latency improvement | CATT | To: RAN1  Reply to RAN1 LS in R1-2112767 |
| R4-2202679 | LS reply on condition of PRS measurement outside the MG | Vivo | To: RAN1  Reply to RAN1 LS in R4-2200051/R1-2112883 |
| R4-2202680 | LS on SRS for multi-RTT positioning | Huawei, HiSilicon | To: RAN1: Cc: RAN2, RAN3 |
| R4-2202681 | LS reply on definition of DL PRS path RSRP | Nokia | To: RAN1  Reply to RAN1 LS in R4-2119414/ R1-2110627 |
| R4-2202682 | LS reply on UL SRS-RSRPP definition | Ericsson | To: RAN1  Reply to RAN1 LS in R1-2112744 |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2202015 | Work split on RRM core requirements for positioning | Ericsson | Noted |  |
| R4-2202016 | Big DraftCR on Positioning Enhancement | Ericsson | Revised |  |
| R4-2201370 | Draft CR to 38.133 Introducing requirements for latency reduction of positioning measurement | Vivo | Postpone |  |
| R4-2201639 | CR on latency reduction of positioning measurements | Huawei, Hisilicon | Postpone |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202677 WF on NR Positioning Enhancements (Part 1)**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202678 LS reply on lower Rx beam sweeping factor for latency improvement**

*Type: LS out For: Approval  
 to RAN1   
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202679 LS reply on condition of PRS measurement outside the MG**

*Type: LS out For: Approval  
 to RAN1   
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202680 LS on SRS for multi-RTT positioning**

*Type: LS out For: Approval  
 to RAN1, cc RAN2, RAN3  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202681 LS reply on definition of DL PRS path RSRP**

*Type: LS out For: Approval  
 to RAN1  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202682 LS reply on UL SRS-RSRPP definition**

*Type: LS out For: Approval  
 to RAN1  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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**Email discussion: [101-bis-e][223] NR\_pos\_enh\_2**

**R4-2202574 Email discussion summary: [101-bis-e][223] NR\_pos\_enh\_2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202740 (from R4-2202574).**

**R4-2202740 Email discussion summary: [101-bis-e][223] NR\_pos\_enh\_2**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 19, 2022)**

**Issue 1-1-1: Timing error margins associated with Rx TEGs for UE/TRP**

* Proposals
  + Option 1a: (CATT, ZTE)
    - Define multiple margin values (M1, M2, …) associated with TEGs per UE/TRP.
    - The association between TEG ID and margin value is decided and reported by UE/TRP itself. The margins for different TEGs can be same or different.
  + Option 1b: (Nokia)
    - Multiple timing error margins per UE/TRP are defined based on the maximum single-sided timing error achieved after calibration.
  + Option 1c: (OPPO)
    - The number of timing error margins N is determined by UE/TRP itself, FFS the value of N.
      * Considering hierarchical TEG reporting framework to further divide TEG sub-group with a small error margin.
  + Option 2a: (Intel)
    - RAN4 shall define a static timing error margin (e.g. ≤2 fixed margin) associated with all TEGs per UE/TRP.
  + Option 2b: (Ericsson)
    - Define two margin values for the UE Rx TEG for different time scopes:
      * Value 1: X, valid for all measurements in the same measurement report
      * Value 2: Y (< X), valid for measurements associated with same time stamp
      * The value of X and Y may be dependent on PRS BW and FR.
  + Option 2c: (Huawei)
    - Define a single margin value (X) for the UE Rx TEG for the time scope of “same time stamp”, i.e. LMF assumes timing error difference between two measurements is smaller than X if they are associated with same TEG ID and same time stamp.
  + Option 3a: (vivo)
    - A single timing error margin associated with one TEG is defined for a UE/TRP.
    - There is no need to define multiple timing error margins for multiple TEGs, which is up to UE/TRP implementation.
  + Option 3b: (Qualcomm)
    - A single timing error margin is associated with each TEG, and its value is configured by the UE/TRP.
    - RAN4 should finalize margins for RSTD and UE Rx-Tx measurement accuracy in Rel-16 before deciding on timing error margins for TEGs.
* Questions
  + #1 Number of timing error margins associated with each TEG
    - Option 1: 1
    - Option 2: 2
    - Option 3: multiple
  + #2: if UE/TRP has multiple TEGs, whether the margin is the same or not for all Rx TEGs.
  + #3: whether the margin is a constant or a configurable value.
  + #4: the exact value of margin
* Discussion
  + #1 Number of timing error margins associated with each TEG
    - CATT: Majority view “A single timing error margin is associated with each TEG”
    - QC: CATT proposal is ok
    - Huawei: need to discuss jointly with time scope. For a single time stamp a single margin is applied
    - Nokia: single margin is fine. No differentiation for time stamps is needed.
    - CATT: to Huawei – the current issue is relevant for single time stamp
  + #2: if UE/TRP has multiple TEGs, whether the margin is the same or not for all Rx TEGs.
    - QC: we support different TEGs. UE reports the error margin for Rx TEG.
    - vivo: NW does not use the exact margin. NW combines measurements corresponding to the same TEG.
  + Session chair: come back in the final round
* Agreements
  + A single timing error margin is associated with each Rx TEG
    - FFS if same or different margins are used for measurements with different time stamps
  + FFS: whether the timing error margin is the same or not for all Rx TEGs if UE/TRP has multiple TEGs

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202684 | WF on NR Positioning Enhancements (Part 2) | CATT |  |
| R4-2202685 | Reply LS on reporting of the Tx TEG association information | Huawei | To: RAN1, RAN2; CC: RAN3 |
| R4-2202686 | LS on DRX cycle used in PRS measurement in RRC\_INACTIVE state | Qualcomm | To: RAN2, RAN3; CC: SA2 |
| R4-2202687 | LS on the applicability of PRS processing window in RRC\_INACTIVE state | CATT | To: RAN1 |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2201641 | CR on positioning measurements in RRC Inactive state | Huawei | Postponed |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202684 WF on NR Positioning Enhancements (Part 2)**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202685 Reply LS on reporting of the Tx TEG association information**

*Type: LS out For: Approval  
 to RAN1, RAN2 cc RAN3  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202686 LS on DRX cycle used in PRS measurement in RRC\_INACTIVE state**

*Type: LS out For: Approval  
 to RAN3, RAN4 cc SA2  
 Source:* Qualcomm

**Abstract:**

**Discussion:**

**Session chair: Please clarify why SA2 should be included in CC.**

**Decision: Return to.**

**R4-2202687 LS on the applicability of PRS processing window in RRC\_INACTIVE state**

*Type: LS out For: Approval  
 to RAN1   
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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#### 6.21.1 General

**R4-2202015 Work split on RRM core requirements for postioning**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

The paper provides structure of requirements and work split for CRs

**Session chair: moved from AI 6.21.2.1 to 6.26.1**

**Decision: Noted.**

**R4-2202016 Big DraftCR on Positioning Enhancement**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This is Big Draft CR provided by rapporteur providing skeleton structure

**Session chair: moved from AI 6.21.2.1 to 6.26.1**

**Decision: Revised to R4-2202683 (from R4-2202016).**

**R4-2202683 Draft Big CR: RRM requirements for Rel-17 NR Positioning enhancements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This is Big Draft CR provided by rapporteur providing skeleton structure

**Session chair: moved from AI 6.21.2.1 to 6.26.1**

**Decision: Return to.**

#### 6.21.2 RRM core requirements

##### 6.21.2.1 UE Rx/Tx and/or gNB Rx/Tx timing delay mitigation

**R4-2200118 Discussion on UE Rx/Tx and/or gNB Rx/Tx timing delay mitigation**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200119 Reply LS on the reporting of the Tx TEG association information**

*Type: LS out For: Approval  
 to RAN1, cc RAN2/RAN3  
 Source: CATT*

**Decision: Noted.**

**R4-2200540 Discussion on timing mitigating for NR positioning enhancement**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200668 Further discussion on timing delay error mitigation**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200757 On UE Rx/Tx timing error mitigation**

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

**Decision: Noted.**

**R4-2201163 Discussion on UE Rx/Tx and/or gNB Rx/Tx timing delay mitigation**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201293 Impact of RX/TX TEG on UE requirements**

*Type: discussion For: (not specified)  
 Source: Ericsson Inc.*

**Decision: Withdrawn.**

**R4-2201398 UE RxTx and gNB RxTx timing delay mitigation**

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

**Decision: Noted.**

**R4-2201636 Discussion on timing error mitigation for positioning**

*Type: LS out For: Approval  
 to RAN1, RAN2, cc RAN3  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201668 Impact of RX/TX TEG on UE requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution addresses open issues on TEG

**Decision: Noted.**

**R4-2201982 Discussion on timing error mitigation for NR positioning**

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

**Abstract:**

Discussion on timing error mitigation for NR positioning

**Decision: Noted.**

##### 6.21.2.2 Latency reduction of positioning measurement

**R4-2200120 Discussion on latency reduction of positioning measurement**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200541 Discussion on latency reduction for NR positioning enhancement**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200542 Simulation results summary for conditions with less PRS measurement samples**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200637 Discussion on latency reduction of positioning measurement**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200645 Discussion on latency reduction of positioning measurement**

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

**Abstract:**

Discussion on latency reduction of Rel-17 positioning measurement

**Decision: Noted.**

**R4-2200646 Discussion on PRS measurement performance with reduced sample**

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

**Abstract:**

Discussion on simulation results of PRS measurements with reduced sample

**Decision: Noted.**

**R4-2200664 Simulation results for PRS measurement with reduced sample**

*Type: other For: Information  
 Source: vivo*

**Decision: Noted.**

**R4-2200665 Further discussion on latency reduction of positioning measurement**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200667 Reply LS on the condition of PRS measurement outside the MG**

*Type: LS out For: Approval  
 to RAN1  
 Source: vivo*

**Decision: Noted.**

**R4-2200758 Simulation results with reduced number of PRS samples**

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

**Decision: Noted.**

**R4-2200759 On latency reduction of NR positioning measurements**

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

**Decision: Noted.**

**R4-2201164 Discussion on latency reduction of positioning measurements**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201294 Link level simulation results for latency reduction for UE measurements**

*Type: discussion For: (not specified)  
 Source: Ericsson Inc.*

**Decision: Withdrawn.**

**R4-2201306 On latency reduction for positioning measurement**

*Type: discussion For: (not specified)  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Ericsson Inc.*

**Decision: Withdrawn.**

**R4-2201370 Draft CR to 38.133 Introducing requirements for latency reduction of positioning measurement**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Postponed.**

**R4-2201399 Discussions on latency reduction of positioning measurement**

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

**Decision: Noted.**

**R4-2201637 Simulation results for reduced sample number for PRS measurement**

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

**Decision: Noted.**

**R4-2201638 On latency reduction for positioning measurement**

*Type: LS out For: Approval  
 to RAN1  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201639 CR on latency reduction of positioning measurements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Postponed.**

**R4-2201669 Link level simulation results for latency reduction for UE measurements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses simulation results for latency reduction

**Decision: Noted.**

**R4-2201670 On latency reduction for positioning measurement**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discussess impact of sample reduction on positioning accuracy

**Decision: Noted.**

##### 6.21.2.3 Measurement in RRC\_INACTIVE state

**R4-2200121 Discussion on measurement in RRC\_INACTIVE state**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200543 Discussion on measurements in RRC\_INACTIVE for NR positioning enhancement**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200636 Discussion on positioning measurement in RRC\_INACTIVE state**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2200760 On NR positioning measurements in RRC\_INACTIVE**

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

**Decision: Noted.**

**R4-2201165 Discussion on PRS measurements in RRC\_INACTIVE state**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201364 Further discussion on measurement in RRC\_INACTIVE state**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201400 Positioning measurements in RRC\_INACTIVE state**

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

**Decision: Noted.**

**R4-2201640 Discussion on PRS measurement in RRC\_INACTIVE**

*Type: LS out For: Approval  
 to RAN1, RAN2  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201641 CR on positioning measurements in RRC Inactive state**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201983 Discussion on measurement in RRC\_INACTIVE state**

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

**Abstract:**

Discussion on positioning measurements in RRC\_Inactive

**Decision: Noted.**

**R4-2202017 Analysis PRS measurement requirements in RRC inactive state**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper further analyzes the positioning requirements in RRC inactive state

**Decision: Noted.**

##### 6.21.2.4 Impact on existing UE positioning and RRM requirements

**R4-2200122 Discussion on impact on existing UE positioning and RRM requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2200647 Discussion on Impact on NR positioning RRM requirements**

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

**Abstract:**

Discussion on Impact on existing UE positioning and RRM requirements including SRS antenna port switching

**Decision: Noted.**

**R4-2200663 Further discussion on impact to existing UE positioning and RRM requirements**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201166 Impacts of SRS antenna port switching on positioning**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201307 Impact of enhanced positioning on existing RRM**

*Type: discussion For: (not specified)  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Ericsson Inc.*

**Decision: Withdrawn.**

**R4-2201401 Impact on existing UE positioning and RRM requirements**

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

**Decision: Noted.**

**R4-2201642 Discussion on RAN4 specific enhancements for positioning**

*Type: LS out For: Approval  
 to RAN1, RAN2  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201671 Impact of enhanced positioning on existing RRM**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discsses impact of enhanced positioning procedures on RRM procedures.

**Decision: Noted.**

**R4-2202018 Impact of RRM on positioning requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper further analyzes the impact of RRM on positioning requirements

**Decision: Noted.**

##### 6.21.2.5 Enhancements of A-GNSS positioning

##### 6.21.2.6 Others

**R4-2200123 Reply LS on the condition of PRS measurement outside the MG**

*Type: LS out For: Approval  
 to RAN1  
 Source: CATT*

**Decision: Noted.**

**R4-2200124 Reply LS on lower Rx beam sweeping factor for latency improvement**

*Type: LS out For: Approval  
 to RAN1  
 Source: CATT*

**Decision: Noted.**

**R4-2200648 Discussion on other items of NR ePos requirements**

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

**Abstract:**

Discussion on DL PRS path RSRP, UL SRS path RSRP and RSTD reporting enhancement

**Decision: Noted.**

**R4-2200662 Further discussion on First path PRS-RSRP requirments**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200666 Link level simulation assumption for first path PRS-RSRP measurement**

*Type: discussion For: Approval  
 Source: vivo*

**Decision: Noted.**

**R4-2201167 Other issues of positioning enhancements for NR**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201309 LS response on SRS on UL SRS-RSRPP definition**

*Type: LS out For: (not specified)  
 to RAN1  
 Source: Ericsson Inc.*

**Decision: Withdrawn.**

**R4-2201402 on PRS measurement outside the measurement gap**

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

**Abstract:**

This paper discusses the matter of PRS measurement outside the measurement gap based on RAN1 LS.

**Decision: Noted.**

**R4-2201643 Discussion on path RSRP**

*Type: LS out For: Approval  
 to RAN1  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201672 LS response on SRS on UL SRS-RSRPP definition**

*Type: LS out For: Approval  
 to RAN1  
 Source: Ericsson*

**Abstract:**

This contribution is a response to LS sent out by RAN1 on reference point for UL SRS-RSRPP measurement.

**Decision: Noted.**

### 6.22 Multi-Radio Dual-Connectivity enhancements

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**Email discussion: [101-bis-e][224] LTE\_NR\_DC\_enh2**

**R4-2202575 Email discussion summary: [101-bis-e][224] LTE\_NR\_DC\_enh2**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202741 (from R4-2202575).**

**R4-2202741 Email discussion summary: [101-bis-e][224] LTE\_NR\_DC\_enh2**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 19, 2022)**

**Sub-topic 1-1: MAC CE/ DCI based SCell activation**

Issue 1-1-1: Whether RAN4 need to specify requirements for Option 2 in LS [R4-2107609]

* Proposals
  + Option 1a (MTK, Apple, OPPO, Huawei, Intel): No, RAN4 only specify requirements for option 1a in LS [R4-2107609].
  + Option 1b (Nokia): UE requirements for Option 2 can be defined provided they are defined as UE requirements without functional requirements.
  + Option 2 (QC, Ericsson): Yes, RAN4 specify requirements for both option 1a and option 2 in LS [R4-2107609]
* Discussion
  + QC: We provided analysis.
  + Huawei: We do not observe benefits of Option 2. Option 2 will have impact on scheduling restrictions.
  + Apple: same view as Huawei. No consensus in RAN1 whether UE may receive DCI on a different carrier to trigger RS on another carrier
  + QC: To Huawei - Option 1a has same scheduling restrictions. RAN1 feature list is not an issue, since this functionality is available from Rel-15. To Apple – UE can monitor DCI and it can be resolved.
  + Intel, MTK: same view as Apple and Huawei
  + E///: Option 2
  + Nokia: No major concerns on Option 2 but need to discuss details.
* Agreements
  + Do not define requirements for Option 2 in Rel-17

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202688 | WF on R17 further Multi-RAT Dual-Connectivity enhancements | Huawei, HiSilicon |  |
| R4-2202689 | Draft Big CR on R17 further Multi-RAT Dual-Connectivity enhancements | Huawei, HiSilicon |  |
| R4-2202700 | Draft Big CR on R17 further Multi-RAT Dual-Connectivity enhancements | Huawei, HiSilicon |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| [R4-2200403](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200403.zip) | Draft CR for Interruption due to A-TRS based fast SCell activation | vivo | Revised |  |
| R4-2201180 | Draft CR on fast activation delay | Huawei | Revised |  |
| [R4-2200250](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200250.zip) | CR on interruptions due to SCG activation/deactivation | Apple | Revised |  |
| R4-2201761 | CR on TS36.133 for interruptions due to SCG activation/deactivation | Apple | Revised |  |
| [R4-2200527](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200527.zip) | DraftCR on interruptions due to RRM measurements on deactivated SCG | Intel | Revised |  |
| [R4-2201890](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201890.zip) | Interruptions requirments due to RLM/BFD on deactivated SCG | Ericsson | Revised |  |
| R4-2201152 | Draft CR to 38133 on SCG Activation and deactivation delay | OPPO | Revised |  |
| R4-2201153 | Draft CR to 36133 on SCG Activation and deactivation delay | OPPO | Revised |  |
| R4-2201889 | LS on Measurement requirement for deactivated SCG | Ericsson | Revised |  |
| R4-2200066 | Draft CR on 38.133 for Conditional PSCell addition delay | MediaTek | Revised |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202688 WF on R17 further Multi-RAT Dual-Connectivity enhancements**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202689 Draft Big CR: RRM requirements for Rel-17 further Multi-RAT Dual-Connectivity enhancements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: For email approval**

**R4-2202700 Draft Big CR on R17 further Multi-RAT Dual-Connectivity enhancements**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: For email approval**

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#### 6.22.1 General

#### 6.22.2 RRM core requirements

##### 6.22.2.1 Efficient activation/de-activation mechanism for SCells

**R4-2200063 Discussion on efficient activation/de-activation mechanism for SCell**

*Type: discussion For: Discussion  
 Source: MediaTek (Shenzhen) Inc.*

**Decision: Noted.**

**R4-2200248 On efficient activation/de-activation mechanism for SCells**

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

**Decision: Noted.**

**R4-2200403 Draft CR for Interruption due to A-TRS based fast SCell activation**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Revised to R4-2202690 (from R4-2200403).**

**R4-2202690 Draft CR for Interruption due to A-TRS based fast SCell activation**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Return to.**

**R4-2200423 Efficient activation and deactivation mechanism for SCells**

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

**Decision: Noted.**

**R4-2201149 Discussion on efficient activation/de-activation mechanism for Scells**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201179 Discussion on efficient activation/de-activation mechanism for Scells**

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

**Decision: Noted.**

**R4-2201180 Draft CR on fast activation delay**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202691 (from R4-2201180).**

**R4-2202691 Draft CR on fast activation delay**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201690 Discussion on efficient activation/de-activation mechanism for Scells**

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

**Decision: Noted.**

**R4-2201886 On efficient (de)activation of Scell**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Scell activation delay discussion

**Decision: Noted.**

##### 6.22.2.2 Efficient activation/de-activation mechanism for one SCG

**R4-2200064 Discussion on efficient activation/de-activation mechanism for one SCG**

*Type: discussion For: Discussion  
 Source: MediaTek (Shenzhen) Inc.*

**Decision: Noted.**

**R4-2200249 On efficient activation/de-activation mechanism for one SCG**

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

**Decision: Noted.**

**R4-2200250 CR on interruptions due to SCG activation/deactivation**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Revised to R4-2202692 (from R4-2200250).**

**R4-2202692 CR on interruptions due to SCG activation/deactivation**

*Type: draftCR For: (not specified)  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Return to.**

**R4-2200424 Efficient activation and deactivation mechanism for one SCG**

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

**Decision: Noted.**

**R4-2200526 Discussion on efficient activation for one SCG**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200527 DraftCR on interruptions due to RRM measurements on deactivated SCG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2202694 (from R4-2200527).**

**R4-2202694 DraftCR on interruptions due to RRM measurements on deactivated SCG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2200652 Further discussion on efficient activation deactivation mechanism for one SCG**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201150 Discussion on efficient activation/de-activation mechanism for one SCG**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201181 Discussion on efficient activation/de-activation mechanism for one SCG**

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

**Decision: Noted.**

**R4-2201691 Views on efficient activation/de-activation mechanism for one SCG**

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

**Decision: Noted.**

**R4-2201761 CR on TS36.133 for interruptions due to SCG activation/deactivation**

*Type: draftCR For: (not specified)  
 36.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Revised to R4-2202693 (from R4-2201761).**

**R4-2202693 CR on TS36.133 for interruptions due to SCG activation/deactivation**

*Type: draftCR For: (not specified)  
 36.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Return to.**

**R4-2201887 On efficient (de)activation of SCG**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

SCG activation delay, interruption, deactivated status measurement relaxation

**Decision: Noted.**

**R4-2201890 Interruptions requirments due to RLM/BFD on deactivated SCG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

draft CR for Interruptions due to RLM/BFD on deactivated SCG

**Decision: Revised to R4-2202695 (from R4-2201890).**

**R4-2202695 Interruptions requirments due to RLM/BFD on deactivated SCG**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

draft CR for Interruptions due to RLM/BFD on deactivated SCG

**Decision: Return to.**

##### 6.22.2.3 Conditional PSCell change and addition

**R4-2200065 Discussion on conditional PSCell addition**

*Type: discussion For: Discussion  
 Source: MediaTek (Shenzhen) Inc.*

**Decision: Noted.**

**R4-2200066 Draft CR on 38.133 for Conditional PSCell addition delay**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek (Shenzhen) Inc.*

**Decision: Revised to R4-2202699 (from R4-2200066).**

**R4-2202699 Draft CR on 38.133 for Conditional PSCell addition delay**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: MediaTek (Shenzhen) Inc.*

**Decision: Return to.**

**R4-2200251 On conditional PSCell change and addition**

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

**Decision: Noted.**

**R4-2200653 Further discussion on conditional PSCell change and addition**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201151 Discussion on conditional PSCell change and addition**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201182 Discussion on conditional PSCell change and addition**

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

**Decision: Noted.**

**R4-2201692 Conditional PSCell change and addition**

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

**Decision: Noted.**

**R4-2201888 On conditional Pscell change addition**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Conditional Pscell change delay

**Decision: Noted.**

##### 6.22.2.4 Others

**R4-2201152 Draft CR to 38133 on SCG Activation and deactivation delay**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Revised to R4-2202696 (from R4-2201152).**

**R4-2202696 Draft CR to 38133 on SCG Activation and deactivation delay**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Return to.**

**R4-2201153 Draft CR to 36133 on SCG Activation and deactivation delay**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Revised to R4-2202697 (from R4-2201153).**

**R4-2202697 Draft CR to 36133 on SCG Activation and deactivation delay**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Return to.**

**R4-2201889 LS on Measurement requirement for deactivated SCG**

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

**Abstract:**

Draft LS to RAN 2 to clarify whether will introduce parameter for deactivated SCG measurement

**Decision: Revised to R4-2202698 (from R4-2201889).**

**R4-2202698 LS on Measurement requirement for deactivated SCG**

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

**Abstract:**

Draft LS to RAN 2 to clarify whether will introduce parameter for deactivated SCG measurement

**Decision: Return to.**

### 6.23 Enhanced IIoT and URLLC support

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**Email discussion: [101-bis-e][225] NR\_IIOT\_URLLC\_enh**

**R4-2202576 Email discussion summary: [101-bis-e][225] NR\_IIOT\_URLLC\_enh**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202742 (from R4-2202576).**

**R4-2202742 Email discussion summary: [101-bis-e][225] NR\_IIOT\_URLLC\_enh**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 24th)**

Sub-topic 1-17: Side conditions - UE

* Moderator proposal
  + Reuse the side conditions defined in TS 38.133-10.1.25.2 for Rel-17 PDC RTT-based method 1 with the condition that at least AWGN channel is assumed, and at least Es/Iot = -3 dB is assumed.
  + Further discuss other channels and candidate Es/Iot values for the simulation assumptions.
* Discussion
  + Nokia: We also need fading channel. TDL-A is used for positioning. For SNR – it depends on number of samples. -3dB is sufficient.
  + E///: which version of spec do we refer?
    - Moderator: Rel-16
  + QC: The referred section assumes 4 samples. Do we plan to keep it? Do we plan to reuse requirements?
    - Moderator: the idea was to reuse Rel-16 sim assumptions and accuracy
  + vivo: RTT-based method 1 – does it mean the RTT method with PRS? For side conditions – we think it is useful in LOS channels. For requirements – we should focus on accuracy requirements (no Core requirements). We prefer to reuse Rel-17 number of samples, but can compromise to Rel-16 assumptions.
  + Huawei: Same view as vivo that LOS channel is more relevant. For Es/Iot we prefer to keep -3dB. For number of samples – we can consider 1 sample (Rel-17) or 4 samples (Rel-16)
  + QC: we are open to consider 1 or 4 samples.
* Agreements
  + Rel-17 PDC RTT-based method using PRS as the DL reference signal
    - Reuse the side conditions defined in TS 38.133-10.1.25.2
      * AWGN channel is assumed
      * Es/Iot = -3 dB is assumed
      * Further discuss if other channels and candidate Es/Iot values shall be considered.
    - [4] measurement samples are used for requirements definition

Sub-topic 1-19 Measurement accuracy requirements

* Moderator proposal
  + Measurement accuracy requirements – gNB
    - For PDC RTT gNB Rx-Tx time difference measurement accuracy requirements re-use existing gNB Rx-Tx requirements for 3dB side condition and SCS 15/30kHz (Rel-17 38.133, 13.2.2).
  + Measurement accuracy requirements – UE
    - PRS:
      * Initially, RAN4 assume 4 samples, -3dB, AWGN channel and SCS 15/30 KHz.
      * For PRS, reuse PDC RTT accuracy from R16 defined in TR 38.133-10.1.25.2 for Rel-17 PDC RTT-based method.
      * FFS: Rel-17 PRS, 1 or 4 samples more discussion and simulations (whether R17 PRS is optional/mandatory is separate discussion).
    - TRS:
      * Align the simulation assumptions for TRS based PDC RTT with the simulation assumption for PRS based PDC RTT.
      * Define the TRS based PDC RTT UE measurement accuracy requirements based on simulations using aligned simulation assumption with PRS based PDC method.
      * TRS measurement accuracy will be based on simulation results
      * FFS: 1 or 4 samples.

Topic #2: Reference point for Te requirements

Proposals

* Option 1: [Apple, Nokia, vivo, OPPO]
  + The downlink timing is defined as the time when the first detected path (in time) of the corresponding downlink frame is received from the reference cell at the UE antenna
* Option 2: [Ericsson, Huawei, QC, CMCC]
  + The downlink timing is defined as the time when the first path (in time) of the corresponding downlink frame from the reference cell arrives at the UE antenna
* Option 3:
  + The downlink timing is defined as the time when the first path (in time) of the corresponding downlink frame used by the UE to determine downlink timing is received from the reference cell at the UE antenna
  + No impact on RAN5 conformance test cases is expected

Session chair: make decision in RAN4 #101bis-e

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202701 | WF on NR\_IIOT\_URLLC\_enh\_RRM | Nokia, Nokia Shanghai Bell |  |
| R4-2202702 | Reply LS on TA-based propagation delay compensation | ZZZ |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2202014 | Correction to reference point defintion for UE timing in TS 38.133 | Ericsson, Intel, Huawei, HiSilicon | Revised |  |
| R4-2200528 | DraftCR to clarify timing reference point for UE UL timing test cases | Intel | Revised |  |
| R4-2201634 | CR on requirements for UE Rx-Tx measurement for PDC | Huawei, Hisilicon | Revised |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202701 WF on NR\_IIOT\_URLLC\_enh RRM requirements**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202702 Reply LS on TA-based propagation delay compensation**

*Type: LS out For: Approval  
 to RAN1   
 Source: TBA*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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#### 6.23.1 General

#### 6.23.2 RRM core requirements

##### 6.23.2.1 Propagation delay compensation enhancements

**R4-2201168 Discussion on propagation delay compensation enhancements**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201368 Further discussion on propagation delay compensation enhancements**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201584 Propagation Delay Compensation Enhancements for Time Synchronization**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Requirements for RTT PDC.

**Decision: Noted.**

**R4-2201633 On RRM requirements for PDC enhancements**

*Type: LS out For: Approval  
 to RAN1, RAN2  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201634 CR on requirements for UE Rx-Tx measurement for PDC**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202705 (from R4-2201634).**

**R4-2202705 CR on requirements for UE Rx-Tx measurement for PDC**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201721 Discussion of RRM Requirements for Propagation Delay Compensation Enhancements**

*Type: discussion For: Discussion  
 Source: Nokia*

**Decision: Withdrawn.**

**R4-2201723 Discussion of RRM Requirements for Propagation Delay Compensation Enhancements**

*Type: discussion For: Discussion  
 Source: Nokia*

**Decision: Noted.**

**R4-2201781 RTT-based PDC enhancements in URLLC**

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

**Decision: Noted.**

##### 6.23.2.2 Reference point for Te requirements

**R4-2200528 DraftCR to clarify timing reference point for UE UL timing test cases**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Revised to R4-2202704 (from R4-2200528).**

**R4-2202704 DraftCR to clarify timing reference point for UE UL timing test cases**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2201369 Further discussion on reference point for Te requirements**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2201635 On reference point for Te requirements**

*Type: LS out For: Approval  
 to RAN1  
 Source: Huawei, Hisilicon*

**Decision: Noted.**

**R4-2201673 Discussion on reference point for Te requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2201722 Further discussion on the reference point for UE transmit timing requirement**

*Type: discussion For: Discussion  
 Source: Nokia*

**Decision: Noted.**

**R4-2201782 Reference point for Te requirements**

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

**Decision: Noted.**

**R4-2202013 LS response on UE transmit timing error**

*Type: LS out For: Approval  
 to RAN1  
 Source: Ericsson*

**Abstract:**

This document further analyze the remaining issue of the reference point definition for UE timing error requirements. It is continuation of LS response to RAN1 in R4-2105850.

**Decision: Noted.**

**R4-2202014 Correction to reference point defintion for UE timing in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson, Intel, Huawei, HiSilicon*

**Abstract:**

Definition of reference point for UE timing error is clarified

**Decision: Revised to R4-2202703 (from R4-2202014).**

**R4-2202703 Correction to reference point defintion for UE timing in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson, Intel, Huawei, HiSilicon*

**Abstract:**

Definition of reference point for UE timing error is clarified

**Decision: Return to.**

##### 6.23.2.3 Others

### 6.24 NR Sidelink Relay

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**Email discussion: [101-bis-e][226] NR\_SL\_relay**

**R4-2202577 Email discussion summary: [101-bis-e][226] NR\_SL\_relay**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202743 (from R4-2202577).**

**R4-2202743 Email discussion summary: [101-bis-e][226] NR\_SL\_relay**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (TBA)**

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202706 | WF on NR SL relay RRM | OPPO |  |
|  |  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2201154 | CR to 38133 on measurement requirements for Selection/reselection of relay UE | OPPO | Revised |  |
| R4-2201620 | DraftCR on interruption requirements for NR SL relay | Huawei | Revised |  |
| R4-2200330 | CR: SL discovery signal intra-frequency measurement accuracy requirements | Qualcomm | Revised |  |
|  |  |  |  |  |
|  |  |  |  |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202706 WF on NR SL relay RRM**

*Type: other For: Approval  
 Source: OPPO*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202748 Draft Big CR on RRM Core requirements for Rel-17 NR SL Relay (TS 38.133)**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
 Source: OPPO*

**Abstract:**

**Decision: For email approval.**

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#### 6.24.1 General

**R4-2201154 CR to 38133 on measurement requirements for Selection/reselection of relay UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Revised to R4-2202707 (from R4-2201154).**

**R4-2202707 CR to 38133 on measurement requirements for Selection/reselection of relay UE**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: OPPO*

**Decision: Return to.**

#### 6.24.2 RRM core requirements

**R4-2200324 On NR SL relay RRM Requirement**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2200330 CR: SL discovery signal intra-frequency measurement accuracy requirements**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Qualcomm, Inc.*

**Decision: Revised to R4-2202709 (from R4-2200330).**

**R4-2202709 CR: SL discovery signal intra-frequency measurement accuracy requirements**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Qualcomm, Inc.*

**Decision: Return to.**

**R4-2201155 RRM requirements for SL relay (re)selection**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201619 Discussion on RRM requirements for R17 NR sidelink relay**

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

**Decision: Noted.**

**R4-2201620 DraftCR on interruption requirements for NR SL relay**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202708 (from R4-2201620).**

**R4-2202708 DraftCR on interruption requirements for NR SL relay**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201872 RRM requirements for Rel-17 SL relay operation**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

The release 17 work item on NR sidelink relay was discussed at previous meeting, work plan was agreed and a number of issues were identified for further discussions in [1]. In this contribution, we discuss and provide our view on those.

**Decision: Noted.**

### 6.25 NR small data transmissions in INACTIVE state

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

**Email discussion: [101-bis-e][227] NR\_SmallData\_INACTIVE**

**R4-2202578 Email discussion summary: [101-bis-e][227] NR\_SmallData\_INACTIVE**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202744 (from R4-2202578).**

**R4-2202744 Email discussion summary: [101-bis-e][227] NR\_SmallData\_INACTIVE**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (TBA)**

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202710 | WF on RRM requirements for SDT in INACTIVE State | ZTE |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2200920 | Draft CR TA validation for Small Data Transmissions | Nokia | Revised |  |
| R4-2201870 | Draft CR to TS 38.133: Requirements on UE synchronization for SDT | Ericsson | Revised |  |
| R4-2201645 | CR on UL timing requirements for SDT | Huawei | Revised |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202710 WF on RRM requirements for SDT in INACTIVE State**

*Type: other For: Approval  
 Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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#### 6.25.1 General and work plan

**R4-2200918 On BS demodulation performance requirements for CG-SDT**

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

**Abstract:**

Discussion n requirements for CG-SDT and proposals on how to handle remaining timing offset errors in RAN4.

**Decision: Noted.**

#### 6.25.2 RRM core requirements

**R4-2200300 On RRM requirement for CG-SDT**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-17)  
  
 Source: Apple*

**Decision: Noted.**

**R4-2200417 RRM requirements for NR-SDT**

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

**Abstract:**

We continue to discuss the RRM requirments for NR-SDT

**Decision: Noted.**

**R4-2200919 TA validation requirements for CG-SDT**

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

**Abstract:**

Discussion on TA validation requirements, and proposals on improvements in relation to the LTE PUR requirements.

**Decision: Noted.**

**R4-2200920 Draft CR TA validation for Small Data Transmissions**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of TA validation core requirements for CG-SDT.

**Decision: Revised to R4-2202711 (from R4-2200920).**

**R4-2202711 Draft CR TA validation for Small Data Transmissions**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of TA validation core requirements for CG-SDT.

**Decision: Return to.**

**R4-2201644 Discussion on remaining issues for SDT RRM**

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

**Decision: Noted.**

**R4-2201645 CR on UL timing requirements for SDT**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202713 (from R4-2201645).**

**R4-2202713 CR on UL timing requirements for SDT**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201792 Draft big CR for SDT RRM requirements**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: ZTE Wistron Telecom AB*

**Abstract:**

Worksplit according to the approved workplan for SDT RRM requirements (R4-2120339)

**Decision: For email approval.**

**R4-2201793 Further discussion on RRM requirements for SDT**

*Type: discussion For: Discussion  
 Source: ZTE Wistron Telecom AB*

**Decision: Noted.**

**R4-2201853 RRM requirements for SDT**

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

**Decision: Noted.**

**R4-2201869 Discussions on RRM requirements for Small Data Transmissions**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we provide an overview of the RRM requirements for CG-SDT that RAN4 needs to introduce.

**Decision: Noted.**

**R4-2201870 Draft CR to TS 38.133: Requirements on UE synchoronization for SDT**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

According to workplan in R4-2120339, requirements are UE synchonization for small data transmissions are introduced in this CR.

**Decision: Revised to R4-2202712 (from R4-2201870).**

**R4-2202712 Draft CR to TS 38.133: Requirements on UE synchoronization for SDT**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

According to workplan in R4-2120339, requirements are UE synchonization for small data transmissions are introduced in this CR.

**Decision: Return to.**

### 6.26 Support for Multi-SIM devices for LTE/NR

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**Email discussion: [101-bis-e][228] LTE\_NR\_MUSIM**

**R4-2202579 Email discussion summary: [101-bis-e][228] LTE\_NR\_MUSIM**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202745 (from R4-2202579).**

**R4-2202745 Email discussion summary: [101-bis-e][228] LTE\_NR\_MUSIM**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 24th)**

Issue 1-2-1: MGL for new periodic gap patterns for MUSIM

* Proposals:
  + Option 1: [6ms; 10ms; 20ms] (Ericsson vivo Huawei MTK Apple Nokia oppo xiaomi ZTE)
  + Option 2: 6ms (Charter Communications)
  + Option 3: [20ms; 40ms; 80ms; 160ms] (Intel)   [20ms] at the 1st round (Intel)
  + Option 7: [6ms; 10ms; 20ms, 40ms] (QC)
* Tentative agreement:
  + Define [6ms; 10ms; 20ms] MGL for new periodic gap patterns for MUSIM. FFS is other values shall be considered.
* Discussion
  + E///: suggest to remove FFS
  + QC: ok keep 6/10/20 ms. Prefer to consider longer gaps.
  + Intel: Longer MGL can be beneficial when UE makes SIB reading. Other companies raised concerns on possible impacts on Network A performance. We are ok to keep FFS but can compromise to 6/20ms. No strong benefits for 10ms MGL.
  + vivo: In the previous meeting we have agreed to consider legacy MGLs and this is why these options were excluded. We are ok to have longer values as FFS.
  + Apple: Ok with Option 1 and open to consider longer MGLs.
  + Intel: we can consider longer MGL in Rel-18 as well
* Agreements
  + Define 6ms, 10ms, 20ms MGL for new periodic gap patterns for MUSIM. FFS is longer values shall be considered.

Issue 1-2-2: MGRP for new periodic gap patterns for MUSIM

* Proposals:
  + Option 1: [320ms, 640ms, 1280ms, 2560ms] (Charter Communications, Ericsson, vivo, Apple, oppo, Huawei QC MTK Nokia xiaomi ZTE)
  + Option 2: 5120ms in addition to option 1; (Intel)
* Discussion
  + Intel: Ok with Option 1. We originally proposed 5120ms MGRPwith 20/40/80/160ms MGL. We suggest to have a single pattern with 5120ms MGRP with and 20ms MGL. See benefits for the network.
  + E///, Huawei, Apple: Fine with Intel’s proposal (5120ms MGRP with and 20ms MGL).
  + vivo: Prefer to keep it as FFS, since we have agreed to consider 4 values and it is not a part of RAN2 paging cycle values.
    - Intel: Are there any technical reasons? The MG is applicable for SI reading.
    - vivo: the gap may be too sparse and not be sufficient to cover several carriers
    - Apple: do not share vivo concern, since UE can be configured with several patterns. 5120ms MGRP can be used solely for SIB reading
      * vivo: still think it is not sufficient
    - Intel: Under certain conditions sparse patterns are required (e.g. this is the intention of aperiodic patterns)
      * vivo: Periodic and Aperiodic gaps have different purposes.
    - QC: not clear on vivo’s arguments. UE can avoid such configurations
    - QC: can this be accomplished with aperiodic gaps?
* Agreements
  + Define 320ms, 640ms, 1280ms, 2560ms MGRP for new periodic gap patterns for MUSIM
  + Define new periodic gap patterns for MUSIM with [5120ms MGRP and 20ms MGL]

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202714 | WF on R17 Support for Multi-SIM devices for LTE-NR | vivo |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| [R4-2200402](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2200402.zip) | Draft CR for introducing gap patterns for MUSIM | vivo | Postponed |  |
| [R4-2201212](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201212.zip) | draftCR on New gap pattern for MUSIM | Ericsson | Postponed |  |
| [R4-2201647](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201647.zip) | CR on measurement gap patterns for MUSIM | Huawei, Hisilicon | Postponed |  |
| [R4-2201699](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-bis-e/Docs/R4-2201699.zip) | Introduction of MUSIM switching gaps | Nokia, Nokia Shanghai Bell | Postponed |  |
|  |  |  |  |  |

**2nd round email discussion conclusions**

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202714 WF on R17 Support for Multi-SIM devices for LTE-NR**

*Type: other For: Approval  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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#### 6.26.1 General and work plan

**R4-2200669 Work plan for Multi-SIM devices for LTE/NR**

*Type: Work Plan For: Approval  
 Source: vivo*

**Decision: Noted.**

**R4-2200385 Work plan for Multi-SIM devices for LTE/NR**

*Type: discussion For: Approval  
 Source: vivo*

**Session chair: moved from AI 6.21.1 to 6.26.1**

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

**R4-2201210 Further LS response on gap handling for MUSIM**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the LS on gap handling for MUSIM

**Decision: Noted.**

#### 6.26.2 RRM core requirements

**R4-2200386 On MUSIM requirements**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2200402 Draft CR for introducing gap patterns for MUSIM**

*Type: draftCR For: Approval  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: vivo*

**Decision: Postponed.**

**R4-2200428 Discussion on MUSIM requirements**

*Type: discussion For: Discussion  
 Source: Charter Communications, Inc*

**Decision: Noted.**

**R4-2200529 Discussion on MUSIM RRM impacts**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2200672 Discussion on RAN2 LS (R2-2108861) on gap handling for MUSIM**

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

**Decision: Noted.**

**R4-2200683 Discussion on the gap pattern for MUSIM**

*Type: discussion For: Discussion  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2201169 Discussion on RRM core requirements for Multi-SIM devices**

*Type: discussion For: Discussion  
 Source: OPPO*

**Decision: Noted.**

**R4-2201211 New gap pattern for MUSIM**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the new MGPs for MUSIM

**Decision: Noted.**

**R4-2201212 draftCR on New gap pattern for MUSIM**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This draftCR introduce the new MGPs for MUSIM

**Decision: Revised to R4-2202760 (from R4-2201212).**

**R4-2202760 draftCR on New gap pattern for MUSIM**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This draftCR introduce the new MGPs for MUSIM

**Decision: Return to.**

**R4-2201646 Discussion on gap patterns for MU-SIM**

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

**Decision: Noted.**

**R4-2201647 CR on measurement gap patterns for MUSIM**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Postponed.**

**R4-2201698 Requirements for MUSIM switching gaps**

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

**Decision: Noted.**

**R4-2201699 Introduction of MUSIM switching gaps**

*Type: draftCR For: Endorsement  
 38.133 v17.4.0 CR- rev Cat: (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Postponed.**

## 8 Rel-17 Work Items for LTE

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

#### 8.9.4 RRM core requirements

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**Email discussion: [101-bis-e][229] NB\_IOTenh4\_LTE\_eMTC6\_RRM**

**R4-2202580 Email discussion summary: [101-bis-e][229] NB\_IOTenh4\_LTE\_eMTC6\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2202746 (from R4-2202580).**

**R4-2202746 Email discussion summary: [101-bis-e][229] NB\_IOTenh4\_LTE\_eMTC6\_RRM**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (January 24th)**

Issue 1-2-4: Detailed requirements for inter-frequency measurement

* Proposals
  + Option 1:
    - Without DRX and assuming no UL/DL scheduling, the available time for measurements during one NPDCCH monitoring period would be Tavail=TNPDCCH-LNPDCCH-Tproc-2·TRT, where
    - TNPDCCH is the NPDCCH monitoring period length,
    - LNPDCCH is the duration of a NPDCCH candidate with Rmax repetitions,
    - Tproc = 4 ms is the NPDCCH processing time,
    - TRT = 1 ms is the receiver retuning time.
    - Choose the duplexing mode (FDD/TDD) and carrier type (anchor, non-anchor).
    - For TDD, choose the UL/DL configuration.
    - Calculate TNPDCCH and LNPDCCH for all applicable values of (G, Rmax ).
    - Calculate Tavail=TNPDCCH-LNPDCCH-Tproc-2·TRT.
    - Given T(meas, basic) = 800 ms for NRS-based measurements in normal coverage, calculate the required number of measurement occasions: Nocc=⌈T(meas, basic)/T(meas,occ) ⌉ .
    - Calculate the number of available measurement occasions per NPDDCH period:
      * Navail= ⌈ (Tavail-T(meas,occ))/(T(meas,occ)+Tg ) ⌉+1
      * Set D=Nocc-⌈Nocc/Navail ⌉·Navail.
    - For D>0, the measurement period is given by
      * Tmeas=⌈Nocc/Navail ⌉·TNPDCCH+D·(Tocc+Tg )- Tg+LNPDCCH+Tproc+2·TRT
      * For D=0, the measurement period is given byTdetect=(⌈Nocc/Navail ⌉-1)·TNPDCCH+Navail·(Tocc+Tg )-Tg+LNPDCCH+Tproc+2·TRT
  + Option 3:
    - Requirements for inter-frequency measurement on a carrier different from serving carrier requirements is defined as:
      * Tmeasure\_inter = ∑(i=1)N Min(5000,Ta,i )ms,
      * where Ta,i is the interval between **available** measurement samples, where Ta,i ≥ 20 ms for NRS and Ta,i ≥ 40 ms for NSSS. N = 60 for NRS-based measurement and 40 for NSSS based measurement.UE will restart the measurement when the interval between two samples are larger than 5000, and the delay requirements are extended accordingly.

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
| R4-2202715 | WF on RRM requirements for Rel-17 NB-IoT and LTE-MTC | Huawei, HiSilicon |  |
| R4-2202716 | Draft Big CR on RRM requirements for Rel-17 NB-IoT and LTE-MTC | Huawei, HiSilicon |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
| R4-2201437 | Draft CR on including channel quality table for 16 QAM for Rel-17 NB-IoT | Huawei, Hisilicon | Revised |  |

**2nd round email discussion conclusions**

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

**R4-2202715 WF on RRM requirements for Rel-17 NB-IoT and LTE-MTC**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2202716 Draft Big CR: RRM requirements for Rel-17 NB-IoT and LTE-MTC**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Abstract:**

**Discussion:**

**Decision: For email approval**

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##### 8.9.4.1 Neighbour cell measurement in RRC Connected state for NB-IoT

**R4-2200764 On NB-IoT neighbor cell measurements in RRC\_CONNECTED**

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

**Decision: Noted.**

**R4-2201208 Discussion on RRM requirements for Rel-17 NB-IoT**

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

**Decision: Noted.**

**R4-2201437 Draft CR on including channel quality table for 16 QAM for Rel-17 NB-IoT**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Revised to R4-2202717 (from R4-2201437).**

**R4-2202717 Draft CR on including channel quality table for 16 QAM for Rel-17 NB-IoT**

*Type: draftCR For: Endorsement  
 36.133 v17.4.0 CR- rev Cat: B (Rel-17)  
  
 Source: Huawei, Hisilicon*

**Decision: Return to.**

**R4-2201866 Discussions on remaining issues of RRM requirements for NB-IoT**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we discuss the open issues of Rel-17 NB-IoT.

**Decision: Noted.**

#### 8.9.5 Others

**R4-2201431 Introduction of channel quality report table for NB-IoT supporting 16QAM**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution proposes how to capture the channel quality reporting mapping table in RAN4 specification.

**Decision: Noted.**

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**Email discussion: [101-bis-e][2xx] TBA**

**R4-22xxxxx Email discussion summary: [101-bis-e][2xx] TBA**

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

**Abstract:**

**Discussion:**

**Decision: Return to.**

**GTW session (TBA)**

**1st round email discussion conclusions**

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Comments** |
|  |  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**2nd round email discussion conclusions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Decision** | **Comments** |
|  |  |  |  |  |

**WF/LS for approval**

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**R4-22AAAAA WF on XXXX**

*Type: other For: Approval  
 Source: TBA*

**Abstract:**

**Discussion:**

**Decision: Return to.**