**Third Generation Partnership Project (3GPP™)**

**DRAFT Meeting Report  
for  
TSG RAN WG4  
meeting: 98bis-e**

**Electronic Meeting, Online, 12/04/2021 to 20/04/2021**

## 5 Rel-16 non-spectrum related work items for NR

### 5.1 NR-based access to unlicensed spectrum

#### 5.1.2 RRM core requirements maintenance (38.133)

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**Email discussion: [98-bis-e][201] NR\_unlic\_RRM\_1**

**R4-2105671 Email discussion summary: [98-bis-e][201] NR\_unlic\_RRM\_1***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 13, 2021)

**Sub-topic 3-3: SCell activation/deactivation when sCellDeactivationTimer is NOT configured**

* Issue 3-3-1: Applicability of SCell activation requirements when sCellDeactivationTimer is NOT configured
  + Proposals
    - Proposals 1a (Ericsson, Huawei/HiSilicon, Apple, QC): Option 1 supported
      * The SCell activation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured, when the SCell activation delay exceeds some pre-defined time (e.g., equivalent or comparable to the longest possible value of sCellDeactivationTimer).
    - Proposal 1b (Ericsson): The SCell deactivation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured.
    - Proposals 2 (Nokia, ZTE Corporation): Option 2 supported
      * SCell activation delay requirements are applicable in Scenario A (CA with NR PCell and NR SCell) with any LBT type and in Scenario B and C (E-UTRAN-NR-U DC/SA NR-U) with LBT type 2C. Requirements are also applicable in all scenarios, if the UE does not experience any UL LBT failures during SCell activation/deactivation.
      * SCell activation delay requirements are applicable when sCellDeactivationTimer is not configured also in Scenarios B and C (EN-DC and SA) LBT types other than 2C.
    - Proposals 3a (Ericsson, MediaTek inc, Apple, QC, Huawei): Option 3 (possible compromise solution) can be accepted
      * SCell activation delay requirements are applicable in Scenario A (CA with NR PCell and NR SCell) with any LBT type and in Scenario B and C (E-UTRAN-NR-U DC/SA NR-U) with LBT type 2C. Requirements are also applicable in all scenarios, if the UE does not experience any UL LBT failures during SCell activation/deactivation.
      * For all other scenarios the SCell activation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured, when the SCell activation delay exceeds some pre-defined time (e.g., equivalent or comparable to the longest possible value of sCellDeactivationTimer).
    - Proposal 3b (Ericsson): No LS to RAN2 is needed, since requirements applicability is pure RAN4 issue.
  + Discussion
    - MTK: 3a
    - Apple: 1a and 3a
    - Nokia: 2
    - QC: 1a and ok with 3a
    - Huawei: 1a and ok with 3a
    - E///: can compromise to 3a
    - Nokia: Option 3 is still a major problem. It is unclear what is UE behavior when UE requirements do not apply
      * E///: when the requirements do not apply the activation process may take longer time
      * Nokia: is UE assumed to stop SCell deactivation?
        + E///: we think UE is supposed to stop the ongoing SCell activation/deactivation process
        + Nokia: we need to go to RAN2 to check and need to check
        + E///: do not see need to check with RAN2.
        + E///: we make decision on requirements applicability in RAN4
        + Nokia: see no harm to check with RAN2
  + Agreements:
    - Applicability of SCell activation requirements when sCellDeactivationTimer is NOT configured
      * SCell activation delay requirements are applicable in
        + Scenario A (CA with NR PCell and NR SCell) with any LBT type
        + Scenario B and C (E-UTRAN-NR-U DC/SA NR-U) with LBT type 2C.
        + In all scenarios, if the UE does not experience any UL LBT failures during SCell activation/deactivation.
      * For all other scenarios the SCell activation requirements for NR-U do not apply, when the SCell activation delay exceeds the pre-defined time period T = 1280 ms.
        + Note 1: UE behavior for this case is left undefined
        + Note 2: Pre-defined time period T = 1280ms corresponds to the longest possible value of sCellDeactivationTimer
      * Send LS to RAN2 to inform on the agreements

**Sub-topic 9-1: DRX impact on timing**

* Issue 9-1-1: Definition of the reference cell which is not available, with respect to DRX
  + Proposals
    - Proposal 1 (Ericsson, Huawei, HiSilicon, Qualcomm Incorporated): SSB does not have to be within ON duration in a reference cell subject to DL CCA in order to meet UE timing requirements
      * No clarification related to DRX is needed on the current definition of unavailability of a reference cell on a carrier frequency subject to CCA in section 7.1.1.
    - Proposal 3 (MediaTek): If DRX is configured, the availability of the reference NR-U cell is based on DRX cycles.
    - Proposal 4 (Apple):

In the requirements of clause 7.1.2, the term reference cell on a carrier frequency subject to CCA is not available at the UE refers to when at least one SSB is configured by gNB, but the first two successive candidate SSB positions for the same SSB index within the discovery burst transmission window are not available at the UE due to DL CCA failures at gNB during the last max{PHY measurement time interval of reference cell, 160 ms}; otherwise the reference cell on the carrier frequency subject to CCA is considered as available at the UE.

* + - * when UE performs intra-frequency measurement on reference cell without MG, PHY measurement time interval of reference cell in proposal 1 is as below,

|  |  |
| --- | --- |
| DRX cycle | PHY measurement time interval |
| No DRX | Kp x SMTC period x CSSFintra |
| DRX cycle≤ 320ms | 1.5 x Kp x max(SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320ms | Kp x DRX cycle x CSSFintra |

* + - * when UE performs intra-frequency measurement on reference cell with MG, PHY measurement time interval of reference cell in proposal 1 is as below,

|  |  |
| --- | --- |
| DRX cycle | PHY measurement time interval |
| No DRX | max(MGRP, SMTC period) x CSSFintra |
|  |  |
| DRX cycle≤ 320ms | 1.5x max(MGRP, SMTC period, DRX cycle) x CSSFintra |
| DRX cycle>320ms | (MGRP, DRX cycle) x CSSFintra |

* + Discussion
    - Apple: Option 4
    - E///: When UE wakes up and SSB is not available, then UE is not expected to meet the requirements. UE needs to wake up a bit earlier before ON duration to make time/freq sync. No different comparing to the legacy case.
    - MTK: Can support option 3 and 4
    - Qualcomm: We agree with Option 1. Same time we share MTK view. Compromise solution is to mention that UE is not expected to measure anything outside the DRX ON window.
    - E///: Compromise approach – do not mention anything in Core requirements, for test cases to verify UE timing requirement we’ll not configure the DRX.
    - Apple: For licensed case UE can wake up any time as long as it meets the requirements. For compromised approach, we do not agree with E/// and think it should be addressed in Core spec. UE should be given opportunity to wake up in longer period.
      * MTK: For NR-U UE will be required to wake up every 160ms. Agree with Apple compromise proposal.
      * E///: We are ok to use longer SSB period but we should not relax the Te requirements
      * Apple: We propose to relax the side condition to 1280ms (how long UE can maintain the timing). No plans to relax the accuracy requirements.
      * Huawei: we are ok with compromised approach. If Te is not relaxed then it may mean that UE may need to maintain the timing for a longer time
      * QC: Cannot agree with such a relaxation. Cannot except anything beyond 160ms. Beyond that point the timing point may be outdated and shall not be used.
      * Apple: UE can still wake up each 160ms. But in case it has better capabilities, then it may wake up with longer periodicity.
      * QC: Network transmits SSB every 160ms. If the SSB is not there then UE is not required to meet the accuracy requirements.
    - E///: UE is not required to wake up every 160ms. If the SSB is not available then UE is not supposed to meet the requirements.
    - Apple: the question is whether we force UE to wake up before DRX ON duration.
    - Chair: continue discussion

1st round email discussion conclusions

2nd round email discussion conclusions

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##### 5.1.2.1 General

**R4-2104430 On terminology updates for measurements in NR-U**

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

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

**R4-2106840 Terminology updates for NR-U in 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Terminology updates for NR-U in 38.133

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

**R4-2106841 Terminology updates for NR-U in 36.133**

*Type: draftCR For: Approval  
 36.133 v16.9.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Terminology updates for NR-U in 36.133

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

**R4-2106959 Discussion on NR-U terminology clarification**

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

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

**R4-2107087 Discussion on terminology for NR-U RRM requirements**

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

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

##### 5.1.2.2 RRC connection mobility control

**R4-2106960 Discussion on SI reading with LBT**

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

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

**R4-2106961 Draft CR on SI acquisition for RRC connection mobility control for NR-U TS 36.133**

*Type: draftCR For: Endorsement  
 36.133 v16.9.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2106962 Draft CR on SI acquisition for RRC connection mobility control for NR-U TS 38.133**

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

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

##### 5.1.2.3 SCell activation/deactivation (delay and interruption)

**R4-2104826 On SCell activation requirement for NR-U**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Apple*

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

**R4-2104827 CR on SCell activation requirement for NR-U R16**

*Type: CR For: Agreement  
 38.133 v16.7.0 CR-1804 rev Cat: F (Rel-16)  
  
 Source: Apple*

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

**R4-2104828 CR on SCell activation requirement for NR-U R17**

*Type: CR For: Agreement  
 38.133 v17.1.0 CR-1805 rev Cat: A (Rel-17)  
  
 Source: Apple*

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

**R4-2105005 Draft CR on SCell activation requirement for NR-U R16**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

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

**R4-2106573 SCell (de)activation requirement applicability when sCellDeactivationTimer is not configured**

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

**Abstract:**

Discussion about Scell activation and deactivation requirement applicability when sCellDeactivationTimer is not configured.

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

**R4-2106844 On remaining issues for SCell activation in NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On remaining issues for SCell activation in NR-U

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

**R4-2106845 Updates in SCell activation in NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Updates in SCell activation in NR-U

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

**R4-2106914 On SCell activation in NR-U**

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

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

**R4-2106963 Discussion on SCell activation and deactivation requirements for NR-U**

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

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

**R4-2106964 Draft CR on SCell activation requirements for NR-U**

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

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

**R4-2107088 Discussion on Scell activation requirement in NR-U**

**for NR-U**

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

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

**R4-2107358 Interruptions during SCell activation in NR-U**

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

**Abstract:**

In this paper, we discuss remaining open issues interruptions during Scell activation in NR-U

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

##### 5.1.2.4 Active TCI state switching

**R4-2106965 Draft CR on Active TCI state switching for NR-U**

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

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

##### 5.1.2.5 RLM

**R4-2106966 Draft CR on RLM requirements for NR-U**

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

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

##### 5.1.2.6 Beam management

**R4-2106967 Draft CR on Beam management requirements for NR-U**

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

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

##### 5.1.2.7 Measurement requirements

**R4-2106968 Draft CR on measurement requirements for NR-U**

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

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

##### 5.1.2.8 Measurement capability and reporting criteria

**R4-2106969 Draft CR on CSSF updating for NR-U**

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

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

##### 5.1.2.9 Timing

**R4-2104823 On reference cell availability for NR-U**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Apple*

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

**R4-2104824 CR on reference cell availability for NR-U R16**

*Type: CR For: Agreement  
 38.133 v16.7.0 CR-1802 rev Cat: F (Rel-16)  
  
 Source: Apple*

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

**R4-2104825 CR on reference cell availability for NR-U R17**

*Type: CR For: Agreement  
 38.133 v17.1.0 CR-1803 rev Cat: A (Rel-17)  
  
 Source: Apple*

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

**R4-2105004 Draft CR on reference cell availability for NR-U R16**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

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

**R4-2106970 Discussion on timing requirements for NR-U**

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

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

**R4-2106971 Draft CR on timing requirements for NR-U**

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

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

**R4-2107089 Discussion on UE Transmit Timing for NR-U**

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

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

**R4-2107138 Further analysis of UE transmit timing under DL LBT failure in reference cell**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper discusses open issues on timing

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

**R4-2107359 Reference cell under CCA for UE transmit timings**

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

**Abstract:**

In this paper, we discuss DRX and measurement gaps related issues w.r.t. reference cell definition for UE transmit timing requirements in NR-U

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

##### 5.1.2.10 Other requirements

**R4-2106839 On SSB availability to meet NR-U requirements in DRX**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On SSB availability to meet NR-U requirements in DRX

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

**R4-2106842 NR-U bands**

*Type: draftCR For: Approval  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

NR-U bands

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

**R4-2106972 Draft CR on core requirements maintenance of IDLE mode inter-RAT measurement for NR-U TS 36.133**

*Type: draftCR For: Endorsement  
 36.133 v16.9.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2106973 Draft CR on PSCell Addition requirements for NR-U**

*Type: draftCR For: Endorsement  
 36.133 v16.9.0 CR- rev Cat: (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2106974 Draft CR on SI acquisition for paging interruption for NR-U**

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

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

#### 5.1.3 RRM perf. requirements (38.133)

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**Email discussion: [98-bis-e][202] NR\_unlic\_RRM\_2**

**R4-2105672 Email discussion summary: [98-bis-e][202] NR\_unlic\_RRM\_2***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 13, 2021)

* Issue 2-1-1: FBE and LBE applicability
  + Proposals
    - Option 1 (ZTE):
      * A UE that signals both FBE and LBE capability need to be tested under both modes.
      * A UE that signals FBE only capability is subject to tests only with FBE configuration.
      * A UE that signals LBE only capability is subject to tests only with LBE configuration.
    - Option 2 (Nokia):
      * For a UE that supports both LBE and FBE, all test cases are run with LBE, and additionally some specific test cases are also run with FBE.
    - Option 3 (QC):
      * For a UE that supports both LBE and FBE, all test cases are run with LBE, and additionally some specific test cases are also run with FBE.
      * A UE that signals FBE only capability is subject to tests only with FBE configuration.
      * A UE that signals LBE only capability is subject to tests only with LBE configuration.
  + Discussion
    - ZTE: it is important to ensure the full set of requirements
    - ZTE: why is it assumed that if UE passed LBE test, then it can pass the FBE test?
      * QC: LBE requires monitoring more SSB positions. For LBE in UL UE is required to acquire COT.
    - MTK: Option 3 is ok.
    - E///: Option 3 is fine. To QC, which additional FBE tests are needed?
      * QC: we can further discuss
  + Agreements:
    - For a UE that supports both LBE and FBE, all test cases are run with LBE, and additionally some specific test cases are also run with FBE.
      * The set of test cases is FFS
    - A UE that signals FBE only capability is subject to tests only with FBE configuration.
    - A UE that signals LBE only capability is subject to tests only with LBE configuration.
* Issue 2-3-4: How to avoid exceeding Lmax in RRM tests
  + Proposals
    - Option 1 (Nokia):
      * Proposal 1a: Test environment should not have test runs that are rendered useless due to exceeded LBT failures
      * Proposal 1b: Test equipment should make sure that Lmax is not exceeded during a test by monitoring the number of CCA failures and preventing additional CCA failures from happening after Lmax is reached.
    - Option 2 (Huawei): Add a note in each test cases where no particular behaviour to be verified that a test where Lmax is exceeded shall not be considered in the statistics.
  + Agreements:
    - Test environment should not have test runs that are rendered useless due to exceeded LBT failures
    - Test equipment should make sure that Lmax is not exceeded during a test by monitoring the number of CCA failures and preventing additional CCA failures from happening after Lmax is reached.
* Issue 2-4-1: UL CCA model
  + Proposals
    - Proposal 1 (Nokia) Define baseline UL CCA model as:
      * Use DL FBE model to transmit a OCNG noise pattern with CCA BW in one or more of the scheduled/configured UL resource with probability P.
        + P is FFS
      * The test equipment keeps a count of the number of UL CCA failures it may cause.
      * When the OCNG signal is transmitted, the test equipment does not monitor the UL resource in which the OCNG is transmitted.
      * When the OCNG signal is not transmitted, the test equipment monitors the UL resource for the desired UL signal.
      * Based on whether it receives the signal or not, the test equipment declares the test case pass/fail
      * Consistent UL CCA failures are modelled by means of a low CCA success probability.
    - Proposal 2 (QC): to adopt a baseline UL CCA model as below:
      * TCCA ms prior to each UL transmission burst in the test:
        + The test equipment (TE) generates a uniform random variable p from the range [0, 1].
        + If p<PCCA\_UL, the TE transmits a OCNG noise pattern with a high [TBD] energy within the UE BW scheduled/configured for the UL transmission for at-least TCCA ms.

TCCA is the channel sensing period depending on LBT category being used by the UE

PCCA\_UL is the probability of a successful UL CCA

* + - * The TE keeps a count of the number of UL CCA failures it causes.
      * The TE monitors the UL resource for the desired UL signal.
      * Based on when and/or whether the TE receives the desired UL signal, it deems the test case to pass/fail
    - Proposal 3 (Ericsson): Prior to each UL transmission burst within a time interval i of the test:
      * Generate a uniform random variable p from the range [0, 1].
      * If p<PCCA\_UL,i, then the energy generated by the test system in the corresponding portion of UL slot is equal to or below the energy detection threshold [TBD]; otherwise the energy generated by the test system in the portion of UL slot is above the energy detection threshold [TBD].
  + Discussion
    - Nokia: ok with Proposal 2. May need to include energy detection threshold
    - E///: The energy detection threshold should be above LBT threshold? Is the difference to use OCNG?
    - QC: Energy detection threshold is the LBT threshold. We can use any random signal pattern. OCNG can emulate real field scenario.
  + Agreements:
    - Adopt a baseline UL CCA model as below:
      * TCCA ms prior to each UL transmission burst in the test:
        + The test equipment (TE) generates a uniform random variable p from the range [0, 1].
        + If p<PCCA\_UL, the TE transmits an [OCNG noise pattern] with an energy level X within the UE BW scheduled/configured for the UL transmission for at-least TCCA ms.

TCCA is the channel sensing period depending on LBT category being used by the UE

PCCA\_UL is the probability of a successful UL CCA

Energy level X is FFS and is higher than the LBT detection threshold

* + - * The TE keeps a count of the number of UL CCA failures it causes.
      * The TE monitors the UL resource for the desired UL signal.
      * Based on when and/or whether the TE receives the desired UL signal, it deems the test case to pass/fail
      * Note 1: applicability of OCNG noise pattern is FFS
* Issue 2-4-4: Additional delay in acquiring PRACH resource due to UL LBT failures
  + Proposals
    - Proposal 1 (Qualcomm): RAN4 to define one typical test case to test – Additional delay in acquiring PRACH resource due to UL LBT failures for the following requirements:
      * Handover to target cell using CCA
      * RRC re-establishment using CCA
      * Random access
      * RRC connection release with re-direction
      * BWP switch delay on consistent UL LBT recovery
    - Proposal 2 (Qualcomm): RAN4 to test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirement:
      * Random access to a target cell using CCA
    - Proposal 3 (Qualcomm): RAN4 to not test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirements:
      * Handover to target cell using CCA
      * RRC re-establishment using CCA
      * RRC connection release with re-direction
      * BWP switch delay on consistent UL LBT recovery
    - Proposal 4 (Huawei): The UL CCA failure in PRACH transmission shall only be considered in RA test cases.
  + Agreements:
    - RAN4 to test additional delay in acquiring PRACH resource due to UL LBT failures in the following requirement:
      * Handover to a target cell using CCA

1st round email discussion conclusions

2nd round email discussion conclusions

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##### 5.1.3.1 General

**R4-2106846 Draft Big CR: Introduction of Rel-16 NR-U RRM performance requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Draft Big CR: Introduction of Rel-16 NR-U RRM performance requirements

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

**R4-2106848 Updated test case list for NR-U**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Updated test case list for NR-U

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

**R4-2107360 SI Reading time during RRC Mobility Control in NR-U**

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

**Abstract:**

In this paper, we discuss the SI reading related issues in RRC mobility control related performance requirements in NR-U

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

**R4-2107362 Updated NR-U RRM Performance Work Plan**

*Type: Work Plan For: Approval  
 Source: Qualcomm Incorporated*

**Abstract:**

In this paper, we present the updated work-plan based on 3 months extension to complete the WI

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

##### 5.1.3.2 Measurement accuracy requirements

**R4-2106843 NR-U conditions**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

NR-U conditions

**Decision: Postponed.**

**R4-2106847 NR-U accuracy requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

NR-U accuracy requirements

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

**R4-2106879 DraftCR 36.133 Correction of accuracy requirements for NR-U bands**

*Type: draftCR For: Endorsement  
 36.133 v16.9.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Updates pertaining to supported NR-U band combinations, and to reference to NR band group definitions.

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

**R4-2106975 Draft CR on inter-RAT NR measurement accuracy requirements**

*Type: draftCR For: Endorsement  
 36.133 v16.9.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

##### 5.1.3.3 Test cases

###### 5.1.3.3.1 General

**R4-2104431 Configurations for NR-U RRM test cases**

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

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

**R4-2106357 Discussion on RRM test cases in NR-U**

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

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

**R4-2106574 On remaining details of NR-U RRM test configurations**

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

**Abstract:**

Discussion about remaining details of DL and UL CCA model and other test configurations.

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

**R4-2106580 Draft CR on DL CCA model for NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Updates to NR-U DL CCA model description.

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

**R4-2106849 On CCA model in NR-U test cases**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On CCA model in NR-U test cases

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

**R4-2106850 CCA model in NR-U test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

CCA model in NR-U test cases

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

**R4-2106871 Common test parameters for NR-U RRM tests**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the RMC used for NR-U RRM test cases.

**Decision: Noted.**

**R4-2106873 Draft CR: Update of RMC for NR-U test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This draft CR define RMCs used for NR-U RRM test cases.

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

**R4-2106976 Discussion on RRM performance testing for NR-U**

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

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

**R4-2106977 Draft CR of test case configurations for NR-U**

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

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

**R4-2107361 CCA models in NR-U**

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

**Abstract:**

In this paper, we discuss various issues related to CCA models in NR-U

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

###### 5.1.3.3.2 RRC IDLE cell re-selection

**R4-2106853 Discussions on cell reselection test cases for NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we provide views on testing of the new cell reselection test cases that were agreed at last meeting.

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

**R4-2106854 Introduction of NR-U cell reselection tests**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR introduces the new cell reselection test cases for NR-U that were agreed at last meeting.

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

###### 5.1.3.3.3 HO (delay and interruptions)

**R4-2106575 Discussion about HO test cases with shared core requirements**

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

**Abstract:**

Discussion about how to introduce NR-U test cases that share the same core requirements with existing NR or NR-U test cases.

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

**R4-2106576 Draft TC NR-U handover test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Remaining NR-U handover test cases.

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

**R4-2106855 Discussions on handover test cases for NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we provide views on testing of the new handover test cases that were agreed at last meeting.

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

**R4-2106856 Introduction of NR-U handover tests**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR introduces the new handover test cases for NR-U that were agreed at last meeting.

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

**R4-2106978 Draft CR of test cases for HO delay and interruption for NR-U**

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

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

###### 5.1.3.3.5 RRC Connection Release with Redirection

**R4-2104433 Test cases for RRC release with re-direction in NR-U**

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

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

**R4-2106979 Draft CR on test cases for RRC release with redirection for NR-U**

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

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

**R4-2107143 RRC connetion release with re-direction from NR to NR-U test**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper describes test case on RRC re-direction from NR to NR-U carriers

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

**R4-2107144 RRC connetion release with re-direction from NR to NR-U test in 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The CR contains test case on RRC re-direction from NR to NR-U

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

###### 5.1.3.3.6 Random access

**R4-2106579 Draft CR NR-U RRM random access performance requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Test cases for NR-U random access requirements.

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

**R4-2106876 Test cases on random access for NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the test cases for random access procedure in NR-U

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

**R4-2106877 Draft CR: Random access procedure test cases for NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This draft CR introduces the test cases of random access procedure in NR-U.

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

###### 5.1.3.3.7 Timing (transmit timing and TA)

**R4-2104434 Test cases for timing in NR-U**

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

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

**R4-2106980 Discussion on test cases for timing requirements for NR-U**

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

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

###### 5.1.3.3.8 BWP switching delay and interruptions

**R4-2104435 Test cases for BWP switching in NR-U**

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

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

**R4-2107145 Test cases on BWP switching for NR-U SA**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper describes test cases on BWP swiching for NR-U SA

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

**R4-2107146 Test cases on BWP switching for NR-U SA in TS 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The CR on test cases on BWP swiching for NR-U SA. It applies to UE which supports only NR-U bands

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

###### 5.1.3.3.9 PSCell addition/release (delay and interruption)

**R4-2106981 Draft CR of test cases for PSCell addition and release for NR-U**

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

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

###### 5.1.3.3.10 SCell activation/deactivation (delay and interruption)

###### 5.1.3.3.11 Other interruptions

###### 5.1.3.3.12 RLM

###### 5.1.3.3.13 Beam management (BFD and link recovery)

**R4-2106874 Test cases on link recovery and L1-RSRP reporting for NR-U**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the test cases for beam failure recovery and L1-RSRP reporting in NR-U.

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

**R4-2106875 Draft CR: Update of beam management test cases for NR-U**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This draft CR introduces the test cases for bean failure recovery and L1-RSRP reporting in NR-U.

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

###### 5.1.3.3.14 SS-RSRP/SS-RSRQ/SS-SINR/L1-RSRP measurement procedure (intra-frequency, inter-frequency, inter-RAT)

**R4-2106578 Draft TC NR-U inter-frequency measurements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Test cases for inter-frequency measurement procedure.

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

**R4-2106982 Draft CR on test cases for inter-RAT measurement for NR-U**

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

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

###### 5.1.3.3.15 RSSI/CO measurement procedure (intra-frequency, inter-frequency, inter-RAT)

###### 5.1.3.3.16 SFTD measurement procedure

###### 5.1.3.3.17 SS-RSRP/SS-RSRQ/SS-SINR/L1-RSRP measurement accuracy (intra-frequency, inter-frequency, inter-RAT)

**R4-2106358 Introduction of test cases for NR-U inter-frequency SS-RSRP measurement accuracy**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: MediaTek inc.*

**Decision: Postponed.**

**R4-2106359 Introduction of test cases for L1-RSRP measurement accuracy with CCA serving cell**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: MediaTek inc.*

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

**R4-2106983 Draft CR on test cases for intra-frequency measurement accuracy for NR-U**

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

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

###### 5.1.3.3.18 RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT)

**R4-2104829 On RSSI and CO testing in NR-U**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Apple*

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

**R4-2104830 Test cases for RSSI and CO measurement accuracy in NR-U R16**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Apple*

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

###### 5.1.3.3.19 SFTD measurement accuracy

###### 5.1.3.3.20 Other

**R4-2106984 Discussion on test cases for TCI switching for NR-U**

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

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

**R4-2107139 Applicability rules for legacy NR tests for NR-U**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper discusses applicability of legacy test cases for NR-U scenario

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

**R4-2107140 Applicability rules for legacy NR tests for NR-U in 38.133**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The draft CR defines applicability of legacy test cases for NR-U scenario

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

### 5.3 Integrated Access and Backhaul for NR

#### 5.3.3 RRM perf. Requirements

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**Email discussion: [98-bis-e][203] NR\_IAB\_RRM**

**R4-2105673 Email discussion summary: [98-bis-e][203] NR\_IAB\_RRM***Type: other For: Information  
Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

1st round email discussion conclusions

2nd round email discussion conclusions

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##### 5.3.3.1 General

**R4-2104482 On IAB test cases**

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

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

**R4-2106950 Discussion on RRM performance requirements for IAB**

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

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

**R4-2106951 Draft CR on maintenance for IAB-MT RRM test cases**

*Type: draftCR For: Endorsement  
 38.174 v16.2.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2107133 Big CR: IAB-MT RRM test cases in 38.174**

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

**Abstract:**

The draft CR on on three TDD UL/DL configurations for IAB-MT RRM test cases

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

**R4-2107134 Analysis of side conditions for IAB-MT RRM test cases**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The paper analyzes side conditions (SSB Es/Iot and SSP\_RP) for IAB-MT requirements

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

**R4-2107135 Side conditions for IAB-MT RRM test cases in TS 38.174**

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

**Abstract:**

The draft CR on side conditions (SSB Es/Iot and SSP\_RP) for IAB-MT requirements

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

##### 5.3.3.2 Test cases

###### 5.3.3.2.1 RRC Re-establishment

###### 5.3.3.2.2 RRC Connection Release with Redirection

**R4-2106952 Draft CR on test cases for RRC release with redirection for IAB-MT**

*Type: draftCR For: Endorsement  
 38.174 v16.2.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

###### 5.3.3.2.3 IAB-MT transmit timing

**R4-2104930 [draft CR] Test cases for timing for IAB-MT**

*Type: draftCR For: Endorsement  
 38.174 v16.2.0 CR- rev Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

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

###### 5.3.3.2.4 RLM

**R4-2107136 Analysis of CSI-RS based RLM tests for LA IAB-MT**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

The document describes test cases to verify IAB-MT CSI-RS based RLM requirements for IAB-MT LA class

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

**R4-2107137 CSI-RS based RLM tests for LA IAB-MT in TS 38.174**

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

**Abstract:**

The draft CR on IAB-MT CSI-RS based RLM tests for IAB-MT LA class

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

###### 5.3.3.2.5 Beam Failure Detection and Link Recovery

**R4-2104928 [draft CR] Test cases for Beam Failure Detection and Link Recovery with CSI-RS in FR1**

*Type: draftCR For: Endorsement  
 38.174 v16.2.0 CR- rev Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

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

**R4-2104929 [draft CR] Test cases for Beam Failure Detection and Link Recovery with SSB in FR1**

*Type: draftCR For: Endorsement  
 38.174 v16.2.0 CR- rev Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

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

**R4-2106953 Draft CR to introduce test cases for BFD and LR based on SSB in FR2 for IAB-MT**

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

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

**R4-2107220 draftCR on test cases for CSI-RS based BFD and LR for IAB-MTs**

*Type: draftCR For: Endorsement  
 38.174 v16.2.0 CR- rev Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

draftCR on test cases for CSI-RS based BFD and LR for IAB-MTs

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

### 5.4 Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements

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**Email discussion: [98-bis-e][204] LTE\_NR\_DC\_CA\_RRM\_1\_NWM**

**R4-2105674 Email discussion summary: [98-bis-e][204] LTE\_NR\_DC\_CA\_RRM\_1\_NWM***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

1st round email discussion conclusions

2nd round email discussion conclusions

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**Email discussion: [98-bis-e][205] LTE\_NR\_DC\_CA\_RRM\_2**

**R4-2105675 Email discussion summary: [98-bis-e][205] LTE\_NR\_DC\_CA\_RRM\_2***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 14, 2021)

* Issue 1-1-1: Principle for branching of requirement
  + Proposals
    - Option 1 (Apple): When discussing the replacement of measCycleSCell, the principle “if the target cell has been measured less than ~~160ms~~ X ms before the activation command, then no additional time for AGC is needed” should not be changed.
    - Option 2 (Nokia): Only split requirements based on known/unknown cell status. Do not further split requirements depending on measurement rate etc for known cells.
  + Discussion
    - Nokia: Prefer EUTRAN approach
    - Apple: We use measCycleSCell as one of the conditions to derive that UE needs additional AGC time.
    - Nokia: Option 1 is acceptable
    - QC: there may be some uncertainty on the wording “target cell has been measured” since the measurement is up to UE implementation
      * Apple: we’ll follow the measurement period requirement. From NW perspective UE makes the measurements.
  + Conclusion: Principle in Option 1 is agreeable. Further discussion on exact text is required.
* Issue 1-1-2: Replacement of measCycleSCell
  + Proposals
  + Option 1 (Apple): Replace condition on measCycleSCell with Tsample\_interval defined as follows:
    - If no DRX is configured or DRX cycle>320ms, Tsample\_interval = Max(MGRP, SMTC period, DRX cycle) × CSSFinter
    - Otherwise, Tsample\_interval = 1.5 × Max(MGRP, SMTC period, DRX cycle) × CSSFinter
  + Option 2a (Apple): Replace condition on measCycleSCell as follows:
    - TFirstSSB+ 5ms, if the SCell has been measured within measurement gap before activation and TSSB\_measurement\_period\_inter, as specified in Table 9.3.5-1, is equal to or smaller than 1280ms; or if the SCell has been measured without measurement gap before activation and TSSB\_measurement\_period\_intra, as specified in Table 9.3.9-1, is equal to or smaller than 800ms.
    - TFirstSSB\_MAX + Trs + 5ms, if the SCell has been measured within measurement gap before activation and TSSB\_measurement\_period\_inter, as specified in Table 9.3.5-1, is larger than 1280ms; or if the SCell has been measured without measurement gap before activation and TSSB\_measurement\_period\_intra, as specified in Table 9.3.9-1, is larger than 800ms.
  + Option 2b (Ericsson): Replace condition on measCycleSCell as follows:
    - TFirstSSB+ 5ms, if the measurement period is at most 1280ms,
    - TFirstSSB\_MAX + Trs + 5ms, if the measurement period is longer than 1280ms.
  + Option 3 (Ericsson): Replace condition on measCycleSCell as follows:
    - If the SCell is known and has been reported within last 1280ms, Tactivation\_time is TFirstSSB + 5ms,
    - If the SCell is known and has been reported outside last 1280ms, Tactivation\_time is TFirstSSB\_MAX + Trs + 5ms.
  + Option 4 (Nokia): Replace condition on measCycleSCell in NR FR1 as follows, i.e., only consider known/unknown cell status:
    - If the SCell is known and belongs to FR1, Tactivation\_time is TFirstSSB+ 5ms,
    - If the SCell is unknown and belongs to FR1, TFirstSSB\_MAX + TSMTC\_MAX + 2\*Trs + 5ms
  + Discussion
    - Apple: ok with 2b
    - Nokia: ok with 2b. Put values to []
    - NEC: How was 1280ms derived? Is it 160\*8 with 8 as the scaling factor?
      * Apple: we derived based on the existing inter-frequency measurement. The current equation is for FR1 only.
  + Agreements:
    - Replace condition on measCycleSCell in NR FR1 as follows:
      * TFirstSSB+ 5ms, if the measurement period is at most [1280ms],
      * TFirstSSB\_MAX + Trs + 5ms, if the measurement period is longer than [1280ms].
* Issue 1-1-3: Definition of known cell in Direct SCell activation
  + Proposals
    - Option 1 (Nokia): Use same definition, for known SCell conditions for the NR FR1 cell being directly activated, as in LTE.
      * [36.133:] The SCell is known provided the following conditions are met for the SCell:
      * During the last 5 seconds before the reception of the direct SCell configuration command:
        + the UE has sent a valid measurement report for the SCell being directly activated or directly hibernated, and
        + the SCell being directly activated or directly hibernated remains detectable according to the cell identification conditions specified in section 8.3.3.2,
        + SCell being directly activated or directly hibernated also remains detectable during the SCell activation delay according to the cell identification conditions specified in section 8.3.3.2
      * Otherwise, the SCell is unknown.
  + Discussion
    - Chair: all companies are fine with Option 1 in general but some wording adjustments are required and will be handled in the email discussion.

1st round email discussion conclusions

2nd round email discussion conclusions

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#### 5.4.1 RRM core requirements maintenance (38.133/36.133)

##### 5.4.1.1 Early Measurement reporting

**R4-2106990 CR on LTE-NR EMR requirements 36133**

*Type: draftCR For: Endorsement  
 36.133 v16.9.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2106991 CR on EMR requirements correction 38133**

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

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

##### 5.4.1.2 Efficient and low latency serving cell configuration, activation and setup

**R4-2104860 Core requirement maintenance on direct SCell activation**

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

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

**R4-2104861 CR for core requirement maintenance on direct SCell activation**

*Type: draftCR For: (not specified)  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

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

**R4-2106387 Discussion on Tactivation\_time for Direct SCell activation**

*Type: discussion For: Approval  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2106388 Draft CR Correction of activation delay for Direct activated Scell**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2106885 Core maintenance for Direct SCell activation**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on core requirement maintenance for Direct SCell activation: TCI state indication, and measurement rate.

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

**R4-2106993 CR on direct SCell activation**

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

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

**R4-2106994 CR on SCell dormancy requirements**

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

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

#### 5.4.2 RRM perf. requirements (38.133)

##### 5.4.2.1 Early Measurement reporting

###### 5.4.2.1.1 General

**R4-2106389 Measurement Performance Requirements test for MR-DC**

*Type: discussion For: Approval  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2106390 Draft CR for Idle Mode measurements of inter-frequency RAT CA candidate cells for early reporting (TC#3)**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2106391 Draft Big CR: Introduction of Rel-16 MR-DC EMR RRM performance requirements (TS 38.133)**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

###### 5.4.2.1.2 Measurement accuracy requirements

###### 5.4.2.1.3 Test cases

**R4-2104859 Testing of measurement performance for RSRP/RSRQ in EMR**

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

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

**R4-2106992 draftCR to update EMR TC4**

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

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

##### 5.4.2.2 Efficient and low latency serving cell configuration, activation and setup

###### 5.4.2.2.1 General

**R4-2106884 Draft Big CR 38.133: Introduction of Rel-16 MR-DC Direct SCell activation and SCell dormancy RRM performance requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Draft Big CR with test cases for Direct SCell activation and SCell Dormancy.

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

###### 5.4.2.2.2 Test cases for direct SCell activation

###### 5.4.2.2.3 Test case for SCell Dormancy

**R4-2106995 Discussion on remaining issues for SCell dormancy tests**

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

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

**R4-2106996 draftCR on SCell dormancy TC**

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

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

### 5.5 NR Positioning Support

#### 5.5.1 RRM core requirements maintenance (38.133)

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**Email discussion: [98-bis-e][206] NR\_pos\_1**

**R4-2105676 Email discussion summary: [98-bis-e][206] NR\_pos\_1***Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 14, 2021)

* 1-1-1: PRS resource muting
  + Proposals
    - Option 1 (CATT, Intel, Nokia)
      * Do not define requirements for the case of PRS resource muting in Rel-16.
    - Option 2a (QC, vivo, HW, OPPO)
      * If muting option 1 is applied, the periodicity of a PRS resource is scaled by N\_muting where N\_muting is X \* dl-prs-MutingBitRepetitionFactor, and X is the size of NR-MutingPattern-r16 for mutingOption1-r16.
    - Option 2b (Nokia)
      * If muting option 1 is applied, the periodicity of a PRS resource is scaled by N\_muting where N\_muting is X \* dl-prs-MutingBitRepetitionFactor, and X is the [maximum] number of consecutive zeros of NR-MutingPattern-r16 for mutingOption1-r16.
  + Discussion
    - Intel: Need to resolve in this meeting.
    - Nokia: Muting may extend the requirements too much. What happens if we don’t agree on anything. Does it mean no requirements in Rel-16?
      * Intel: Option 1 means that we’ll follow the existing requirements.
    - QC: Muting will likely be used in deployments. Current requirements do not address it. Need to have smth simple.
    - vivo: PRS muting requirement need to be defined
    - Huawei: Agree with QC/vivo that lack of requirements will limit the deployments.
    - CATT: no need to extend requirements in case the muting pattern is applied.
    - QC: To Nokia - If no muting is configured, then the scaling is not applied. To CATT – this is not ideal solution but simple enough.
  + Agreements:
    - If muting option 1 is applied, the periodicity of a PRS resource is scaled by N\_muting where N\_muting is X \* dl-prs-MutingBitRepetitionFactor, and
      * Option 1: X is the size of NR-MutingPattern-r16 for mutingOption1-r16.
      * Option 2: X is the [maximum] number of consecutive zeros of NR-MutingPattern-r16 for mutingOption1-r16
      * Note: the decision to be done in RAN4 #98-bis-e
* 1-2-1: Consideration on different resource offsets in measurement period
  + Proposals
    - Option 1a (QC, Intel)
      * Redefine as = + (currently = + )
    - Option 1b (Nokia)
      * If dl-PRS-Periodicity-and-ResourceSetSlotOffset-r16 offset of a single PFL is configured differently, then the requirement is extended by = + .
      * Otherwise, no change is needed due to dl-PRS-ResourceSlotOffset-r16offsets.
    - Option 2 (OPPO)
      * Avoid PRS configurations with different resource offsets on the same PFL
    - Option 3 (HW)
      * RSTD measurement period of a single PRS frequency layer is extended by T ms
  + Agreements:
    - Redefine as = + (currently = + )
* 1-3-1: Observation window
  + Proposals
    - Option 1 (CATT, QC, OPPO, vivo, HW)
    - Option 2a (HW, Intel)
      * TPRS,i
    - Option 2b (Nokia, Intel)
      * TPRS,i
      * The observation window sizes for *Lprs* and for *UE processing capability ‘N’* are identical.
    - Option 3 (vivo)
      * Ti
  + Discussion
    - Intel: 2a/2b are ok
    - vivo: Option 3. Option 1 is fine with clarification that resources are within the MG
    - HW: also ok with Option 1. For measurement PRS resources within MG – this is discussed in a separate issues
    - Nokia: The side condition which we mentioned is important and needs to be clarified. When UE reports the capability, it may not know the MGs and may not be able to calculated the
      * Huawei: the condition puts restriction on the NW side. The capability is addressed in the requirements and UE does not needed to account for MGs when it reports the capability.
      * QC: Capability – number of resources within pre-defined time.
    - Huawei: for condition from Nokia – what does it really limit and how to capture this.
      * Nokia: it does not restrict anything in the NW side. When UE reports the capability then it needs to count the N within the same window
      * Huawei: UE capability is static. UE cannot adjust the reporting based on NW configuration.
    - QC: May need more discussion and clarify Nokia question
    - vivo: that’s the reason we proposed to use Ti. Teffect may already address it.
  + Agreements:
    - Observation window for Lprs
      * Option 1:
      * Option 2: TPRS,i. The observation window sizes for *Lprs* and for *UE processing capability ‘N’* are identical.
* 1-4-2: Requirements for non-overlapping case
  + Proposals
    - Option 1 (CATT, QC, Intel, vivo, HW, Nokia)
      * The requirement of non-overlapping case should be the same as for overlapping case (sum approach)
    - Option 2 (Ericsson)
      * RAN4 agrees that the current measurement period in TS 38.133 is over-defined for the non-overlapping case – it is unnecessarily scaled to account for the overlap which does not exist and thus too long.
      * Measurement period for the non-overlapping case shall be:

TRSTD, Total = maxi (TRSTD,i), where

the measurement period starts with the first MG and it is the same for all frequencies (agreement from RAN4#96-e). Hence, the time to the last sample across all frequencies will correctly determine TRSTD, Total, regardless of the order the frequencies are measured.

* + Agreements:
    - The requirement of non-overlapping case should be the same as for overlapping case (i.e. sum approach)

1st round email discussion conclusions

2nd round email discussion conclusions

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##### 5.5.1.1 PRS-RSTD measurement requirements

**R4-2104427 [draft CR] Core maintenance for NR Positioning**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

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

**R4-2104741 Discussion on PRS RSTD measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104743 CR on PRS RSTD measurement requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: CATT*

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

**R4-2106334 On PRS-RSTD measurement requirements**

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

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

**R4-2106452 Further discussion on NR PRS RSTD measurement report requirements**

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

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

**R4-2106515 Discussion on RSTD measurement requirements**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106624 Further discussion on PRS RSTD measurement requirements**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106628 CR to 38.133 correction to PRS RSTD measurement requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

**R4-2106997 Discussion on remaining issues for RSTD measurement requirements**

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

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

**R4-2106998 CR to update RSTD measurement requirements**

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

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

**R4-2107159 On RSTD measurement requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On RSTD measurement requirements

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

**R4-2107160 RSTD measurement requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RSTD measurement requirements

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

**R4-2107181 On PRS-RSTD measurement period definition**

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

**Abstract:**

Discussion on RSTD measurement period definition for NR positioning

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

##### 5.5.1.2 PRS-RSRP measurement requirements

**R4-2106335 On PRS-RSRP measurement requirements**

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

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

**R4-2106625 Discussion on PRS-RSRP measurement requirements**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106629 CR to 38.133 correction on PRS-RSRP measurement requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

**R4-2106999 Discussion on remaining issues for PRS-RSRP measurement requirements**

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

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

**R4-2107000 CR to update PRS-RSRP measurement requirements**

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

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

**R4-2107161 On PRS-RSRP measurement requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On PRS-RSRP measurement requirements

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

**R4-2107162 PRS-RSRP measurement requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

PRS-RSRP measurement requirements

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

**R4-2107182 On PRS-RSRP measurement period definition**

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

**Abstract:**

Discussion on PRS-RSRP measurement period definition for NR positioning

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

##### 5.5.1.3 UE Rx-Tx time difference measurement requirements

**R4-2104742 Discussion on UE Rx-Tx time difference measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104744 CR on UE Rx-Tx time difference measurement requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: CATT*

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

**R4-2106336 On UE Rx-Tx measurement requirements**

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

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

**R4-2106453 Discussion on UE RX-TX time difference measurement requirements**

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

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

**R4-2106516 Discussion on maintenance for UE Rx-Tx time difference measurements**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106517 CR to TS 38.133 on UE Rx-Tx time difference measurements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: OPPO*

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

**R4-2106626 Further discussion on UE RX-TX timing difference measurement requirements**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106630 CR to 38.133 correction on UE Rx-Tx timing difference measurement requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

**R4-2107001 Discussion on remaining issues for UE Rx-Rx time difference measurement requirements**

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

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

**R4-2107002 CR to update UE Rx-Tx time difference measurement requirements**

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

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

**R4-2107163 On UE Rx-Tx measurement requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On UE Rx-Tx measurement requirements

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

**R4-2107164 UE Rx-Tx measurement requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

UE Rx-Tx measurement requirements

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

**R4-2107183 On UE RX-TX measurement period definition**

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

**Abstract:**

Discussion on UE Rx-Tx measurement period definition for NR positioning

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

##### 5.5.1.4 Other requirements

**R4-2106337 On general PRS measurement requirements**

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

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

**R4-2106518 Others requirements: maintenance for general PRS measurements**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106627 Further discussion on general requirements for NR positioning**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106631 CR to 38.133 correction on CCSF for NR measurements for positioning**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

**R4-2107003 Discussion on CSSF, measurement capability and MG for PRS measurement**

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

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

**R4-2107004 CR on CSSF, measurement capability and MG for PRS measurement 38.133**

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

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

**R4-2107005 CR to remove measurement gap pattern #25 for LTE measurement in 36.133**

*Type: draftCR For: Endorsement  
 36.133 v16.9.0 CR- rev Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2107184 Discussion on other NR positioning requirements**

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

**Abstract:**

Discussion on RSTD period definition for NR positioning

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

#### 5.5.2 RRM perf. requirements (38.133)

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**Email discussion: [98-bis-e][207] NR\_pos\_2**

**R4-2105677 Email discussion summary: [98-bis-e][207] NR\_pos\_2***Type: other For: Information  
Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 14, 2021)

* Sub-topic 2-2 Applicable propagation channel for accuracy requirement
  + Proposals
    - Option 1 (vivo, Intel, Ericsson, OPPO). No need to define the applicability with propagation channels for accuracy requirement. (e.g. TDL-C channel model with 300 ns delay spread shall be considered also)
    - Option 2 (Huawei): Captured in the specification the propagation channel models based on which the accuracy requirements are derived, or the accuracy requirements are applicable only for AWGN
    - Option 2a (CATT): Captured in the specification the propagation channel models based on which the accuracy requirements are derived.
    - Option 3 (Qualcomm): RAN4 to consider defining PRS-RSTD and UE Rx-Tx measurement accuracy requirements only for AWGN
    - WF: Capture in the specification the propagation channel models based on which the accuracy requirements are derived.
  + Discussion
    - E///: In 38.133 Annex we do not specify any propagation conditions, so WF is not clear.
    - vivo: Agree with E///. Requirements shall be based on typical propagation channels.
    - QC: We need to specify for which channels the accuracy requirements will apply. For gNB side the accuracy requirements are defined based on AWGN. We can send a mixed signal to the ecosystem. We can define the requirements for different channels as an alternative approach.
    - Intel: Current spec does not mention the channel model, but it was noted in the last meeting that performance is very sensitive to channel models. So, we are fine to add corresponding clarifications to the specification.
    - Huawei: Do not support to define separate requirement and one set of requirements is preferred. We are fine to define requirements based on fading channel, but it should be explicitly clarified. To vivo – not sure which channel is typical.
    - CMCC: We prefer the legacy requirement approach (i.e. requirements apply to different conditions).
    - R&S: we are concerned on defining the fading test cases for positioning. Typically, these are separate systems.
    - E///: If we don’t define fading test cases, then we need to have 2 set of requirements for fading/AWGN
    - QC: Our preference is to define AWGN requirements only
    - R&S: for FR2 fading was considered for Demod and we need to have radiated 2 stage approach (wireless cable) and emulating fading for multi-cell is very complex.
  + Agreements:
    - PRS-RSTD and UE Rx-Tx measurement accuracy requirements
      * Option 1: Single set of requirements is defined for AWGN and fading conditions
      * Option 2: Two set of requirements are defined for AWGN and fading conditions
    - Test cases for accuracy requirements are defined for
      * AWGN conditions
      * FFS: fading conditions for FR1
* Sub-topic 2-6 RSTD accuracy requirements for FR1/FR2 (ref: simulation results collection)
  + Sub-topics
    - FR1 parameters
      * PRS BW, PRB & SCS
        + Option A1: BW (≥ 24; ≥48; ≥ 132) + all SCS
        + Option A2: BW (≥24; ≥52; ≥104; ≥268) + all SCS
        + Option A3: BW (24-40; 44-84; 88-168; 172-max) + all SCS
        + Option A4: BW (≥ 24; ≥ 52; ≥ 104; ≥ 268) for 15kHz and BW ( ≥ 48; ≥ 132; ≥ 272) for 30kHz SCS
        + …
      * Repetitions
        + Repetition factor [38.211]

Option B1: All

Option B2: 1, 2, 3, 4

* + - * + Repetition within slot (i.e. [38.211])

Option C1: All

* + - * + Comb size [38.211]

Option D1: All

* + - * + PRS\_NormLenthPerSlot

Option E1: 1/3/4/6

* + - * PRS Ês/Iot
        + Option F1: Same requirements for all
        + Option F2: ≥-13dB; ≥-6dB
    - Alignment?
  + Discussion
    - QC: There is a big dependency on BW and we need to have 4-5 ranges. It is also relevant UE capabilities. We suggest to consider min required repetition factor. PRS\_NormLenthPerSlot is a good option. For side conditions, we prefer to keep a single one.
    - Intel: Need to consider PRS BW. Minimize the amount of parameters. Consider min repetition and consider additional repetitions in case the performance is bad.
    - Vivo: Prefer to keep min amount of parameters
    - QC: should we use 90% of absolute error?
    - Chair: what is the source of misalignment
      * Intel: We should consider no oversampling; also there is some different in algo and interference handling. Also, the error should be integer since it is a reported value.
      * E///: We can use a scaling function to make it integer. We have oversampling in our results. We can provide updated results this week.
    - Chair: continue discussion on alignment. How to structure the requirements can be identified based on averaged results.
* Sub-topic 3-1 PRS-RSRP SINR side condition of #1
  + Proposals
    - Option 1(OPPO): -6dB
    - Option 1a (CATT): Define the side condition #1 for PRS RSRP measurement accuracy requirements in DL-AoD as -6dB.
    - Option 2 (Ericsson): -3dB
  + Agreements:
    - PRS-RSRP SINR side condition of #1 is -3dB

1st round email discussion conclusions

2nd round email discussion conclusions

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##### 5.5.2.1 General

**R4-2107158 Draft Big CR: Introduction of Rel-16 NR Positioning RRM performance requirements and test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson, Intel*

**Abstract:**

Draft Big CR: Introduction of Rel-16 NR Positioning RRM performance requirements and test cases

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

**R4-2107216 Summary of all link level accuracy simulation results for RSTD, PRS-RSRP, and UE Rx-Tx**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Summary of all link level accuracy simulation results for RSTD, PRS-RSRP, and UE Rx-Tx

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

##### 5.5.2.2 UE requirements and test cases

###### 5.5.2.2.1 General

**R4-2106457 Summary of link level simulation result of RSTD, PRS RSRP and UE Rx-Tx time difference**

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

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

**R4-2106519 Simulation results of link level simulation result of RSTD and PRS RSRP**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2107169 On positioning test cases**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On positioning test cases

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

###### 5.5.2.2.2 Measurement accuracy requirements

**R4-2106343 NR Pos performance simulation results**

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

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

5.5.2.2.2.2 PRS RSRP

**R4-2104746 Discussion on PRS RSRP accuracy requirements**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104747 CR on PRS-RSRP accuracy requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: CATT*

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

**R4-2106339 On PRS-RSRP measurement accuracy requirements**

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

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

**R4-2106456 Discussion on PRS RSRP accuracy requirements for NR Positioning**

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

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

**R4-2106521 Discussion on PRS RSRP accuracy requirements**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106633 Discussion on PRS-RSRP accuracy requirements**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106636 Link level simulation results for PRS-RSRP**

*Type: other For: Information  
 Source: vivo*

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

**R4-2107008 Discussion on accuracy requirements for PRS-RSRP measurement**

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

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

**R4-2107166 On PRS-RSRP measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On PRS-RSRP measurement accuracy requirements

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

5.5.2.2.2.3 UE Rx-Tx time difference

**R4-2106340 On UE Rx-Tx measurement accuracy requirements**

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

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

**R4-2106455 Discussion on UE RX-TX time difference measurement accuracy requirements**

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

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

**R4-2106522 Discussion on accuracy requirements for UE Rx-Tx time difference**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106634 Discussion on UE Rx-Tx timing difference accuracy requirements**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106637 Link level simulation results for UE Rx-Tx timing difference**

*Type: other For: Information  
 Source: vivo*

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

**R4-2107009 Discussion on accuracy requirements for UE Rx-Tx time difference measurement**

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

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

**R4-2107167 On UE Rx-Tx measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

On UE Rx-Tx measurement accuracy requirements

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

**R4-2107168 UE Rx-Tx measurement accuracy requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

UE Rx-Tx measurement accuracy requirements

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

###### 5.5.2.2.3 Test cases

5.5.2.2.3.1 General

**R4-2106341 Design of test cases for NR positioning**

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

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

**R4-2106449 Discussion on NR Positioning test cases configuration**

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

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

**R4-2106450 [draftCR] PRS configurations for NR Pos RRM tests**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Intel Corporation*

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

**R4-2106523 Discussion on remaining issues of test cases for NR positioning**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2107010 Discussion on RRM test case for UE positioning requirements**

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

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

**R4-2107048 Test case design principles for NR Positioning**

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

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

5.5.2.2.3.2 Measurement requirements

**R4-2104748 CR on test case for PRS-RSRP measurement requirements for FR2 in SA**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: CATT*

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

**R4-2106451 [draftCR] Test case of RSTD measurement requirements reporting in SA**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Intel Corporation*

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

**R4-2107011 draftCR to introduce TC for PRS-RSRP measurement requirements for FR1 in SA**

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

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

**R4-2107170 TC5 and TC6: UE Rx-Tx time difference measurement requirements for FR1 and FR2 in SA**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

TC5 and TC6: UE Rx-Tx time difference measurement requirements for FR1 and FR2 in SA

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

5.5.2.2.3.3 Accuracy requirements

**R4-2106921 [draft CR] Test cases for PRS-RSRP measurement accuracy**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

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

**R4-2107012 draftCR to introduce TC for RSTD measurement accuracy for FR1 and FR2 in SA**

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

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

**R4-2107171 TC11 and TC12: UE Rx-Tx time difference measurement accuracy for FR1 and FR2 in SA**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

TC11 and TC12: UE Rx-Tx time difference measurement accuracy for FR1 and FR2 in SA

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

###### 5.5.2.2.4 Other

##### 5.5.2.3 gNB requirements

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**Email discussion: [98-bis-e][208] NR\_pos\_3**

**R4-2105678 Email discussion summary: [98-bis-e][208] NR\_pos\_3***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 14, 2021)

* Issue 4-1-2: Reference time definition if the UL RTOA accuracy requirements are defined
  + Proposals
    - Option 1:
      * Option 1a: Ericsson
        + UL RTOA Reference Time used for performing the UL RTOA measurement is locally derived by the gNB
      * Option 1b: CATT
        + The reference time in the ideal UL-RTOA is based on gNB’s interpretation of the SFN initialisation time.
    - Option 2:
      * None.
  + Discussion
    - Nokia: we are not sure if the measurement accuracy can be reused.
    - QC: UL RTOA reference time is already defined in the spec.
      * E///: 38.215 includes a definition but it is ambiguous. If we go with UL RTOA then we prefer to use more clear definition.
      * Nokia: If UL RTOA is defined, then we need to use exactly the definition in 38.215. The reference time is provided by LMF.
      * Huawei: For RAN4 to define the measurement requirement, we need to discuss ideal RTOA. For Options above we need to combine the two above.
      * QC: there should be alignment between gNB and LMF on the reference time. If it is derived locally at the gNB, then how does LMF know this?
        + E///: The signalling is already defined.
      * Chair: are there any plans to adjust RAN1 or measurement definition
        + E///: No
      * E///: current 38.215 definition is ok. The main reason for the change is to make sure that we have reliable source of time.
    - E///: quite many open issues for UL RTOA and difficult to converge
    - QC: can we define a new set of requirements?
      * E///: there may be not enough time.
    - CATT: What is the reference for measured RTOA? Why do we need to discuss ideal RTOA reference? If measured/ideal have same reference, then it is not a problem.
      * Nokia: we may need to discuss definition of ideal RTOA
      * E///: Definition of ideal RTOA is required to check the measurement accuracy performance.
  + Agreements:
    - Do not define UL RTOA performance requirements in Rel-16 NR Pos

1st round email discussion conclusions

2nd round email discussion conclusions

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###### 5.5.2.3.1 General

**R4-2106399 Summary of link level simulation results of SRS RSRP and gNB TOA**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution summarizes link level simulation results and can be used to collect results from all companies

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

**R4-2106400 gNB positioning link level simulation results**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution the results of the link level simulation results for gNB TOA and SRS-RSRP are analyzed

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

**R4-2106922 Beam configuration for gNB measurement accuracy**

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

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

**R4-2107013 Discussion on general issues for gNB positioning measurement requirements**

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

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

**R4-2107014 Updated link level simulation assumption for gNB positioning measurement performance**

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

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

**R4-2107177 General aspects for gNB measurement accuracy requirements**

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

**Abstract:**

Discussion on general aspects for gNB measurement accuracy requirements

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

###### 5.5.2.3.2 SRS-RSRP requirements

**R4-2106401 gNB SRS-RSRP requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution uses simulation results analysis to propose groupings of SRS parameters for SRS-RSRP requirements definition

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

**R4-2106403 gNB SRS-RSRP measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

(Replaces R4-2104052)

**Abstract:**

draft CR to include SRS parameter groupings findings in a accuracy definition table skeleton

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

**R4-2106948 Link level simulation results for SRS-RSRP**

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

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

**R4-2107017 Discussion on SRS-RSRP requirements**

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

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

**R4-2107018 draftCR to introduce SRS-RSRP requirements**

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

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

**R4-2107178 Link simulation results for SRS-RSRP accuracy**

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

**Abstract:**

Link simulation results for SRS-RSRP accuracy for agreed SRS configurations

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

###### 5.5.2.3.3 gNB Rx-Tx time difference requirements

**R4-2104749 Discussion on gNB Rx-Tx time difference measurement requirements**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2106342 On gNB Rx-Tx measurement accuracy requirements**

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

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

**R4-2106404 gNB Rx-Tx time difference requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution uses simulation results analysis to propose groupings of SRS parameters for gNB TOA requirements definition

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

**R4-2106405 gNB Rx-Tx measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

(Replaces R4-2104053)

**Abstract:**

draft CR to include SRS parameter groupings findings in a accuracy definition table skeleton

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

**R4-2106949 Link level simulation results for gNB TOA measurement**

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

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

**R4-2107015 Discussion on gNB Rx-Tx time difference requirements**

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

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

**R4-2107016 draftCR to introduce gNB Rx-Tx time difference requirements**

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

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

**R4-2107179 Link simulation results for gNB Rx-Tx time difference accuracy**

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

**Abstract:**

Link simulation results for gNB Rx-Tx time difference accuracy for agreed SRS configurations

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

###### 5.5.2.3.4 UL RTOA requirements

**R4-2106406 UL RTOA requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the side conditions for UL RTOA requirement definition

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

**R4-2106407 UL RTOA requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

draft CR to include SRS parameter groupings findings in a accuracy definition table skeleton and adding side condition

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

**R4-2107019 Discussion on UL-RTOA requirements**

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

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

**R4-2107020 draftCR to introduce UL-RTOA requirements**

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

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

**R4-2107180 On UL-RTOA requirements for NR positioning**

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

**Abstract:**

Discussion on introduction of RTOA requirements for NR positioning

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

### 5.6 NR RRM requirement enhancement

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**Email discussion: [98-bis-e][209] NR\_RRM\_Enh\_1**

**R4-2105679 Email discussion summary: [98-bis-e][209] NR\_RRM\_Enh\_1***Type: other For: Information  
Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 14, 2021)

* Issue 1-1-2: Whether requirement for RRC based BWP switch on multiple CCs for Rel-16 is applicable
  + Proposals
    - Option 1 (Apple, OPPO, Huawei, MediaTek, vivo): Yes.
    - Option 2 (Nokia, Huawei, OPPO, MediaTek, vivo, Intel): Yes, further clarification is needed.
      * Clarify that RRC-based BWP switch on multiple CCs are applicable for SCells with the parameter change except the modification of parameters firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id
    - Option 3: No.
    - Option 3a (Intel, Ericsson):
      * Proposal 2: There is no scenario for RRC based simultaneous BWP switching on multiple CCs. Don’t need to design test case for the scenario.
      * Proposal 3: For non-simultaneous RRC based multiple BWP switching case, clarify that the requirement apply if there is only one CC in either PCell or PSCell.
      * Proposal 4: Delay time for non-simultaneous RRC based BWP switch on multiple CC will be updated to:
    - Option 3b (Ericsson):
      * Proposal 2: Simultaneous RRC based BWP switch delay requirement for multiple CCs in section 8.6.3A.1 is removed.
      * Proposal 3: Non-simultaneous RRC based BWP switch delay requirement for multiple CCs in section 8.6.3A.2 is applicable to only PCell and PSCell in NR-DC.
      * Proposal 4: Define delay requirements for changing any BWP parameter other than the firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id via RRC on SCell.
      * Proposal 5: The delay requirement in proposal #4 is defined by reusing the delay defined in section 8.3.2, TS 38.133.
  + Discussion
    - TBA
  + Agreements:
    - TBA
* Issue 2-1-1: Delay requirements for MAC–CE based UL spatial relation switch
  + Proposals
    - Option 1 (Intel): Refer to section 8.14 for additional delay due to PL-RS switch in UL spatial relation switch for known PL-RS.
    - Option 1a (Qualcomm): need to specify that the no requirement is imposed during transient period (before PL-RS switch complete).
    - Option 2 (Apple): Refer to section 8.14 for additional delay due to PL-RS switch in UL spatial relation switch.
    - Option 3 (Huawei, MediaTek, Qualcomm):
      * If Only pucch-PathlossReferenceRS is changed in PUCCH-SpatialRelationInfo, refer to section 8.14.
      * If both pucch-SpatialRelation for transmission and pucch-PathlossReferenceRS are changed in PUCCH-SpatialRelationInfo, longer delay is expected.
  + Discussion
    - TBA
  + Agreements:
    - TBA

1st round email discussion conclusions

2nd round email discussion conclusions

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**Email discussion: [98-bis-e][210] NR\_RRM\_Enh\_2**

**R4-2105680 Email discussion summary: [98-bis-e][210] NR\_RRM\_Enh\_2***Type: other For: Information  
Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

1st round email discussion conclusions

2nd round email discussion conclusions

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**Email discussion: [98-bis-e][211] NR\_RRM\_Enh\_3**

**R4-2105681 Email discussion summary: [98-bis-e][211] NR\_RRM\_Enh\_3***Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 14, 2021)

* Issue1-1: add conditions for SSB-based inter-frequency measurement to object with measurement gap
  + Proposals
    - Option 1 (Ericsson, MediaTek): SSB-based inter-frequency measurement object with measurement gap in clause 9.3.4:
      * Including inter-frequency measurement with no measurement gap, when all of the SMTC occasions of this inter-frequency measurement object are overlapped by the measurement gap, if UE supports interFrequencyMeas-NoGap-r16 and the flag interFrequencyConfig-NoGap-r16 is configured by the Network.
      * Including inter-frequency measurement with no measurement gap, when part of the SMTC occasions of this inter-frequency measurement object are overlapped by the measurement gap, if UE supports interFrequencyMeas-NoGap-r16 and the flag interFrequencyConfig-NoGap-r16 is configured by the Network, but it is not a CA capable UE.
  + Discussion
    - TBA
  + Agreements:
    - TBA
* Issue 1-2-1: Condition of SMTC configuration to apply multiple SCell activation requirement
  + Proposals
    - Option 1 (Huawei): Multiple SCell activation requirements apply provided that SMTC offset is same
      * - for all SCells activated by the same MAC CE if UE does not support per FR gap, or
      * - for all SCells activated by the same MAC CE in each FR if UE supports per FR gap
  + Discussion
    - TBA
  + Agreements:
    - TBA
* Issue 1-2-2: Condition of SSB offset to apply SCell activation requirement without cell detection
  + Proposals
    - Option 1 (Huawei): For scenarios where UE is not assumed to perform cell detection on the target SCell, the SCell activation requirements apply provided that SSB is in the same half frame on the target SCell and the active or known serving cell.
  + Discussion
    - TBA
  + Agreements:
    - TBA

1st round email discussion conclusions

2nd round email discussion conclusions

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#### 5.6.1 RRM core requirements maintenance (38.133)

**R4-2104481 Interruption requirements for SRS carrier based switching between different FR**

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

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

**R4-2104630 Regarding RRC based BWP switch for Scell**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2104842 On Core Requirements Maintenance for RRM Enhancements**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2105003 Draft CR on UL spatial relation info switch for PUCCH**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

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

**R4-2105137 draftCR on TS38.133 for inter-freq meas without gap**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

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

**R4-2106458 Discussion on remaining issues for RRM enhancement in Rel-16**

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

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

**R4-2106460 CR on RRC based BWP switching on multiple CCs**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Intel Corporation*

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

**R4-2106524 Discussion on remaining issues for BWP switching on multiple CCs**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106611 Draft CR to 38.133 correction on SRS carrier based switching core requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo, Qualcomm, Huawei, HiSilicon, MediaTek Inc., Apple, Nokia*

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

**R4-2106612 Further discussion on SRS carrier switching between FR1 and FR2**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106930 Correction on SRS carrier switching**

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

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

**R4-2106932 Discussion on the needforgap measurement**

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

**Decision: Noted.**

**R4-2106933 CR on the measurement requirements of needforgap**

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

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

**R4-2106934 Discussion on uplink spatial relation switch delay for PL-RS**

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

**Decision: Noted.**

**R4-2106935 Update on uplink spatial relation switch delay**

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

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

**R4-2106954 Discussion on RRM requirements for RRC based BWP switch on multiple CCs**

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

**Decision: Noted.**

**R4-2106955 DraftCR on maintenance of BWP Switch on multiple CCs TS38.133**

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

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

**R4-2106956 DraftCR on maintenance of BWP Switch on multiple CCs TS36.133**

*Type: draftCR For: Endorsement  
 36.133 v16.9.0 CR- rev Cat: (Rel-16)  
  
 Source: Huawei, HiSilicon*

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

**R4-2107021 Discussion on remaining issues in multiple SCell activation**

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

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

**R4-2107022 CR on remaining issues in multiple SCell activation**

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

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

**R4-2107154 Analysis of RRC based BWP switch on multiple CCs**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Further analysis based on RAN2 LS response (in R2-2102476) on RRC based BWP switch

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

**R4-2107155 Correction to RRC based BWP change delay requirements**

*Type: draftCR For: Agreement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

RRC based BWP switch delay requirements are corrected. Delay requirements for change of other BWP parameter on SCell are added.

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

**R4-2107221 discussion on RRC-based BWP switch on multiple CCs**

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

**Abstract:**

discussion on RRC-based BWP switch on multiple CCs

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

**R4-2107222 draftCR on RRC-based BWP switch on multiple CCs**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

draftCR on RRC-based BWP switch on multiple CCs

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

**R4-2107287 Maintenance on FR1 SCell Activation**

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

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

#### 5.6.2 RRM perf. requirements maintenance (38.133)

##### 5.6.2.1 General

##### 5.6.2.2 Test cases

###### 5.6.2.2.1 SRS carrier switching requirements

**R4-2104899 CR: SRS carrier switching TCs**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Qualcomm, Inc.*

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

**R4-2106613 Draft CR to 38.133 correction on SRS carrier based switching test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

###### 5.6.2.2.2 Multiple Scell activation/deactivation

**R4-2107288 Test cases with OTA testability**

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

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

###### 5.6.2.2.3 CGI reading requirements with autonomous gap

**R4-2104568 DraftCR on SA CGI identification of E-UTRA neighbor cell Test Case**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

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

**R4-2104900 CR: CGI reading TCs**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Qualcomm, Inc.*

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

###### 5.6.2.2.4 BWP switching on multiple CCs

**R4-2106957 Discussion on performance requirements on RRC based BWP switch on multiple CCs**

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

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

**R4-2106958 Draft CR on RRC based BWP switch on multiple CCs**

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

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

**R4-2107223 discussion on test cases for RRC-based BWP switch on multiple CCs**

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

**Abstract:**

discussion on test cases for RRC-based BWP switch on multiple CCs

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

###### 5.6.2.2.5 Inter-frequency measurement requirement without MG

###### 5.6.2.2.6 Mandatory MG patterns

**R4-2104480 On test cases for mandatory gap patterns**

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

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

**R4-2104862 Test applicability for mandatory gap patterns**

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

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

**R4-2104863 CR for test applicability for mandatory gap patterns**

*Type: draftCR For: (not specified)  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Apple*

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

**R4-2104947 Discussion on test cases for mandatory MG patterns**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2106886 On test case applicability for mandatory measurement gaps in R15/R16**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on test case applicability for measurement gaps.

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

**R4-2106931 Discussion on mandatory gap pattern test**

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

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

###### 5.6.2.2.7 UE-specific CBW change

###### 5.6.2.2.8 Spatial relation switch for uplink

**R4-2104901 CR: UL spatial relation TCs**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Qualcomm, Inc.*

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

###### 5.6.2.2.9 Inter-band CA requirement for FR2 UE measurement capability of independent Rx beam

### 5.7 NR RRM requirements for CSI-RS based L3 measurement

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**Email discussion: [98-bis-e][212] NR\_CSIRS\_L3meas\_1**

**R4-2105682 Email discussion summary: [98-bis-e][212] NR\_CSIRS\_L3meas\_1***Type: other For: Information  
Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 13, 2021)

* Issue 2-3: Timing offset and upper limit of side condition for specifying CSI-SINR measurement accuracy requirements
  + RAN4 #98 agreement
    - The upper limit of Es/Iot for CSI-SINR measurement with timing offset(T△)
      * Option 1: Es/Iot ≤ [10] dB for the case that timing offset is within CP.
      * Option 2: Es/Iot ≤ [18] dB for the case that timing offset is within CP/2.
  + Proposals
    - Specify CSI-SINR accuracy requirement based on one of the following options on timing offset between the reference measurement timing and the target CSI-RS (TΔ) and Es/Iot side condition
      * When |TΔ |≤ CP/2
        + Option 1: (MTK, vivo)

Es/Iot ≤ 25 dB for AWGN only

* + - * + Option 2: (Qualcomm)

Es/Iot ≤ [18]dB

* + - * When |TΔ |≤ CP
        + Option 3: (MTK)

Es/Iot ≤ 0 dB

* + - * + Option 4: (CATT)

Es/Iot ≤ 15 dB

* + - * When |TΔ |≤ 0.9\*CP
        + Option 5: (OPPO)

Es/Iot ≤ [12] dB

* + - * + Option 6: (Huawei)

Es/Iot ≤ 6dB

* + - * Option 7: (CMCC)
        + Both |TΔ |≤ CP with Es/Iot ≤ [10] dB and |TΔ |≤ CP/2 with Es/Iot ≤ [18] dB are applied. But choose one to design the test cases.
  + Discussion
    - QC: fine with Option 2. See some degradation for > CP/2 and Es/Iot > 10dB
    - Apple: fine with Option 2. Need to consider positive/negative offsets. In this case CP/2 is fine. Prefer a single set of requirements.
    - Huawei: CP/2 and Es/Iot = 15 dB
    - CMCC: Prefer to keep Es/Iot from the last meeting. The requirements shall be applicable for both options and define test cases for single scenario (e.g. CP/2).
    - OPPO: One set of requirements. Option 5 or 2
    - MTK: One set of requirements. CP/2 is preferred.
    - Vivo: CP/2 is preferred to define the requirements. 18dB is a bit challenging. 15dB can be considered. Alternatively, AWGN can be used with higher Es/Iot
    - CATT: requirements can be defined for both sets
    - CMCC: need to have 2 set of requirements
      * Intel: If we define 2 sets of requirements, does UE need to pass both test cases? Single set of requirements is preferred.
      * Huawei: we are ok with 2 set of requirements but only one of them is tested
      * MTK: prefer to follow the previous meeting agreements and keep a single set of requirements.
      * Apple: Agree with MTK
      * CMCC: have strong concerns on going with a single set of side conditions with CP/2.
    - CMCC: for |TΔ|≤ CP/2 prefer to keep 18 dB Es/IoT condition
  + Agreements:
    - Specify CSI-SINR accuracy requirement based on one of the following options on timing offset between the reference measurement timing and the target CSI-RS (TΔ) and Es/Iot side condition(s)
      * Side condition #1:
        + |TΔ|≤ CP/2
        + Es/IoT

Option A: Es/Iot ≤ 18 dB

Option C: Es/Iot ≤ 15 dB

* + - * FFS: Side condition #2
        + |TΔ|≤ CP
        + No dedicated test cases will be introduced for Side condition #2 if introduced
        + Side condition #2 is subject to decision in RAN4 #98-bis-e
* Sub-topic 1-2 Time domain restriction for CSI-RS configuration
  + RAN4 #98e agreements
    - On CSI-RS resources in the same MO with different offset
      * Option 1: All CSI-RS resources in the same MO are configured in the same 5ms window.
      * Option 2: Different CSI-RS resources in the same MO may fall in different 5ms window.
  + Proposals
    - Option 1: (Xiaomi, CATT, Apple, Intel, OPPO, vivo, Qualcomm)
      * No. All CSI-RS resources in the same MO are configured in the same 5ms window.
    - Option 2a: (Nokia, Huawei)
      * Yes. Different CSI-RS resources in the same MO may fall in different 5ms window
    - Option 3a: (CATT)
      * The CSI-RS resources can be configured as
        + where and are time offsets (in millisecond) of CSI-RS resource i and j respectively.
    - Option 3b: (vivo)
      * All CSI-RS resources in the same MO are configured in the same 5ms window for inter frequency measurement, and measurement requirements should allow all CSI-RS resources in the same MO are configured in two separated 5ms windows during one CSI-RS resource period for intra frequency measurement.
  + Discussion
    - CATT: one possible compromise is to have same 5ms window for inter-frequency and different windows for intra-frequency
    - Huawei: Support compromise proposal
    - Nokia: 5ms is the restriction to the network configuration. Prefer Option 2a
    - Apple: Support option 1. To Nokia, we can define a single periodicity and single offset for all CSI-RS in the same MO. It is up to the NW whether to configure all CSI-RS in the 5ms window and if it is outside then UE may not measure it.
    - MTK: Have concerns on CATT suggestion.
    - CMCC: See benefit of having different 5ms window. Support CATT suggestion.
    - vivo: Option 1. Can compromise to CATT suggestion.
    - Xiaomi: Have some concerns on CATT suggestion. It is still not feasible.
    - Qualcomm: Option 1. Not supporting Option 2 does not break the functionality
    - Intel: Option 1.
    - OPPO: Do not agree with CATT suggestion.
    - Nokia/Huawei: Objection on Option 1.
    - Apple: we just say that the requirement are define under certain assumption. We still need to define some applicability rules.
    - Nokia: It may be still be problematic to fit all CSI-RS resources in the same 5ms window
    - Vivo: Option 1 is aligned with current spec
      * MTK: same view with vivo. However, spec may have some ambiguity.
      * Huawei: Current spec does not say “same 5ms” window
      * Nokia: Share the view with Huawei
        + Spec:
        + *The requirements in this clause apply, provided:*
        + *- Only one MO is configured on the CSI-RS layer, and*
        + *- all CSI-RS resources in the same MO are configured with the same csi-rs-MeasurementBW, and*
        + *- associated SSB is QCLed with the corresponding CSI-RS resources in FR2, and*
        + *- the CSI-RS resources on one frequency layer are configured within a window of up to 5ms where the measurements of CSI-RS on the frequency layer are to be performed, and*
  + Agreements:
    - On CSI-RS resources in the same MO with different offset
      * Option 1: Rel-16 L3 CSI-RS requirements are defined under assumption that all CSI-RS resources in the same MO are configured in the same 5ms window
        + Note: It is up to the network whether to configure all CSI-RS in the 5ms window and if CSI-RS resources are configured outside then UE may not measure it and the requirements do not apply.
      * Option 2: Keep the current specification unchanged
      * Option 3: All CSI-RS resources in the same MO are configured in the same 5ms window for inter frequency measurement, and measurement requirements should allow all CSI-RS resources in the same MO are configured in two separated 5ms windows during one CSI-RS resource period for intra frequency measurement.

1st round email discussion conclusions

2nd round email discussion conclusions

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**Email discussion: [98-bis-e][213] NR\_CSIRS\_L3meas\_2**

**R4-2105683 Email discussion summary: [98-bis-e][213] NR\_CSIRS\_L3meas\_2***Type: other For: Information  
Source: Moderator (OPPO)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 13, 2021)

Not treated

1st round email discussion conclusions

2nd round email discussion conclusions

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#### 5.7.1 RRM core requirements maintenance (38.133)

**R4-2104692 Discussion on the remaining issues for CSI-RS L3 measurement**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104733 Discussion on core part maintenance open issues**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104734 draft CR on CSI-RS based L3 measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: CATT*

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

**R4-2104836 On remaining issues of RRM core requirements for CSI-RS based L3 measurement**

*Type: discussion For: Agreement  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Apple*

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

**R4-2106410 Open issues on the CSI-RS based measurement requirements**

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

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

**R4-2106459 Discussion about CSI-RS L3 measurement**

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

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

**R4-2106525 On the remaining issues of CSI-RS based L3 measurement**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106614 Remaining issues on CSI-RS L3 measurement core requirements**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106620 Draft CR to 38.133 Correction on core requirements for CSI-RS based measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

**R4-2106926 Discussion on remaining issues for CSI-RS based L3 measurement**

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

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

**R4-2106927 CR on CSI-RS based intra-frequency scheduling restriction**

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

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

**R4-2106928 CR on CSI-RS measurement window and intra-frequency measurements**

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

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

**R4-2106929 Adding intra-frequency CSI-RS measurement in CSSF**

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

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

**R4-2107218 Remaining issues of CSI-RS L3 core requirements**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

Views on CMTC window and TDD scheduling restriction

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

**R4-2107365 Remaining issues of CSI-RS L3 core requirements**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

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

#### 5.7.2 RRM perf. requirements (38.133)

##### 5.7.2.1 General

**R4-2106411 Discussion on the performance of CSI-RS based measurements**

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

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

**R4-2106615 Further discussion on accuracy requirements for CSI-RS based measurement**

*Type: discussion For: Discussion  
 Source: vivo*

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

##### 5.7.2.2 Measurement accuracy requirements

###### 5.7.2.2.1 CSI-RSRP requirements

**R4-2104577 CSI-RSRP measurement accuracy requirement**

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

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

**R4-2104735 Discussion on performance requirement for CSI-RSRP**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104737 draft CR on performance requirement for CSI-RSRP**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: CATT*

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

**R4-2104937 Simulation results for CSI-RSRP**

*Type: discussion For: Information  
 Source: CMCC*

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

**R4-2104940 Discussion on CSI-RSRP measurement accuracy**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2106412 38.133 draftCR on the CSI-RSRP accuracy requirements**

*Type: draftCR For: Discussion  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2106526 Simulation results for CSI-RS RSRP accuracy requirements**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106616 Updated simulation results for CSI-RSRP measurement accuracy**

*Type: other For: Information  
 Source: vivo*

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

**R4-2107023 Discussion on CSI-RSRP accuracy requirements**

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

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

**R4-2107214 Updated simulation results for CSI-RSRP measurement**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

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

###### 5.7.2.2.2 CSI-RSRQ requirements

**R4-2104738 draft CR on performance requirement for CSI-RSRQ**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: CATT*

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

**R4-2104938 Simulation results for CSI-RSRQ**

*Type: discussion For: Information  
 Source: CMCC*

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

**R4-2104941 Discussion on CSI-RSRQ measurement accuracy**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2106527 Simulation results for CSI-RS RSRQ accuracy requirements**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106617 Updated simulation results for CSI-RSRQ measurement accuracy**

*Type: other For: Information  
 Source: vivo*

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

###### 5.7.2.2.3 CSI-SINR requirements

**R4-2104578 CSI-SINR measurement accuracy requirement**

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

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

**R4-2104736 Discussion on performance requirement for CSI-SINR**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104739 draft CR on performance requirement for CSI-SINR**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: CATT*

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

**R4-2104942 Discussion on side condition for CSI-SINR measurement**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2106528 Discussion and simulation results for CSI-RS SINR accuracy requirements**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106618 Updated simulation results for CSI-SINR measurement accuracy**

*Type: other For: Information  
 Source: vivo*

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

**R4-2106619 Further iscussion on CSI-SINR measurement accuracy requirements**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2107024 Discussion on CSI-SINR accuracy requirements**

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

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

**R4-2107025 draftCR on CSI-SINR accuracy requirements**

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

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

**R4-2107215 Updates on simulation results for CSI-SINR measurement**

*Type: discussion For: Discussion  
 38.133 v CR- rev Cat: (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

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

##### 5.7.2.3 Test cases

###### 5.7.2.3.1 General

**R4-2106529 Discussion on remaining issues for CSI-RS L3 measurement tests**

*Type: discussion For: Discussion  
 Source: OPPO*

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

###### 5.7.2.3.2 Intra-frequency measurement

**R4-2104740 draft CR on test case for intra-frequency CSI-RS based measurement**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: B (Rel-16)  
  
 Source: CATT*

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

**R4-2106413 38.133 CR on the test case of EN-DC event triggered reporting for intra-frequency CSI-RS based measurements in FR1**

*Type: draftCR For: Discussion  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2106530 Updated CR on CSI-RS based L3 measurement RRM test cases**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: OPPO*

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

**R4-2107172 Draft test case of CSI-RS based intra-frequency test for EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

Remove the bracket for cell timing difference based on the endorsed big CR R4-2101533

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

###### 5.7.2.3.3 Inter-frequency measurement

**R4-2106623 Draft CR to 38.133 on SA event triggered reporting tests with gap for NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

###### 5.7.2.3.4 Measurement performance

**R4-2104579 Draft CR to update timing offset in test case for CSI-SINR in SA FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: MediaTek inc.*

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

**R4-2106414 38.133 CR on the TC of CSI-RSRP accuracy requirement in EN-DC in FR1**

*Type: draftCR For: Discussion  
 38.133 v16.7.0 CR- rev Cat: (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

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

**R4-2106621 Draft CR to 38.133 on test cases for EN-DC CSI-SINR measurement accuracy**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

**R4-2106622 Draft CR to 38.133 on CSI-RSRQ measurement accuracy for NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: vivo*

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

**R4-2107026 draft CR to update TC3 and TC12 for CSI-RS accuracy test**

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

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

**R4-2107173 Draft test case of measurement performance for EN-DC CSI-RSRP measurement accuracy for NR neighbor cell in FR2**

*Type: draftCR For: Endorsement  
 38.133 v16.7.0 CR- rev Cat: F (Rel-16)  
  
 Source: Qualcomm CDMA Technologies*

**Abstract:**

Remove the bracket for cell timing offset based on endorsed big CR R4-2101533

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

## 6 Rel-16 UE feature list

**R4-2104858 On R16 NR HST UE capabilities**

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

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

**R4-2106442 Discussion on UE capabilities**

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

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

**R4-2106989 Discussion on per-FR gap capability**

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

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

## 7 Rel-17 spectrum related Work Items for NR

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**Email discussion: [98-bis-e][214] Spectrum\_RRM**

**R4-2105684 Email discussion summary: [98-bis-e][214] Spectrum\_RRM***Type: other For: Information  
Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

1st round email discussion conclusions

2nd round email discussion conclusions

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### 7.25 Introduction of channel bandwidths 35MHz and 45MHz for NR

#### 7.25.5 RRM requirements

**R4-2104602 Discussion on impact of 35MHz and 45MHz introduction on RRM test cases**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2106940 Discussion on RRM impact on channel bandwidths 35MHz and 45MHz for NR FR1**

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

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

**R4-2107156 Impact of new FR1 channel BWs on RRM requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This document analyzes impact of new channel BWs on RRM requirements

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

### 7.27 Introduction of NR 47 GHz band

#### 7.27.3 RRM (38.133)

**R4-2107147 Analysis of RRM core requirements for band n262**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

This document analysis RRM requirements for new band on 47 GHz (n262) for different UE power classes

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

**R4-2107148 RRM core requirements for band n262 in 38.133**

*Type: draftCR For: Agreement  
 38.133 v17.1.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This is big CR on RRM core requirements for all power classes for new band in 47 GHz

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

**R4-2107149 Analysis of RRM performance requirements for band n262**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

This document analysis RRM performance requirements for new band on 47 GHz (n262) for UE power class 3

Session chair: moved to AI 7.27.3

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

**R4-2107150 RRM performance requirements for band n262 in 38.133**

*Type: draftCR For: Agreement  
 38.133 v17.1.0 CR- rev Cat: B (Rel-17)  
  
 Source: Ericsson*

**Abstract:**

This is CR on RRM performance requirements for band n262 for UE power class 3

Session chair: moved to AI 7.27.3

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

### 7.39 Introduction of FR2 FWA UE with maximum TRP of 23dBm for band n259

#### 7.39.2 RRM Perf. requirements

**R4-2107157 Impact of FR2 FWA for band n259 on RRM requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This document analyzes impact of FR2 FWA with maximum TRP of 23dBm for band n259 on RRM requirements

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

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

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

#### 8.3.7 RRM core requirements

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**Email discussion: [98-bis-e][215] NR\_RF\_FR2\_req\_enh2\_RRM**

**R4-2105685 Email discussion summary: [98-bis-e][215] NR\_RF\_FR2\_req\_enh2\_RRM***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

1st round email discussion conclusions

2nd round email discussion conclusions

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##### 8.3.7.1 Inter-band DL CA enhancements

**R4-2104632 Considerations on RRM requirements for inter-band DL CA in NR FR2**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2104837 On the feasiblity of CBM with MRTD more than CP length**

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

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

**R4-2104978 Discussion on FR2 inter-band DL CA enhancements**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We provide our views on some of the FR2 enhancements and MRTD requirement for FR2 inter-band CA

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

**R4-2105141 Support up to 3 us MRTD**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this contribution we develop why at least 3us MRTD is feasible from both from a network perspective and a UE perspective, for co-located deployments.

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

**R4-2106302 Discussion on MRTD requirements for FR2 inter-band CA based on CBM and IBM**

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

**Abstract:**

It discusses MRTD requirements for FR2 inter-band CA based on CBM and IBM.

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

**R4-2106393 Discussion on FR2 RF RRM**

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

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

**R4-2106394 DraftCR for CBM and IBM applicability**

*Type: draftCR For: Endorsement  
 38.133 v17.1.0 CR- rev Cat: (Rel-17)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Postponed.**

**R4-2106506 Discussion on MRTD requirements for inter-band DL CA in FR2**

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

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

**R4-2106531 RRM requirements for FR2 inter-band DL CA enhancements**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106944 Discussion on FR2 inter-band DL CA enhancement**

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

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

**R4-2107289 FR2 Inter-band DL CA**

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

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

##### 8.3.7.2 Inter-band UL CA

**R4-2106945 Discussion on FR2 inter-band UL CA**

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

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

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

**R4-2106395 UL Gaps for PA calibration and proximity detection**

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

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

**R4-2106946 Discussion on UL gaps for self-calibration and monitoring**

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

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

**R4-2107078 Discussion on RRM impact of UL gaps for self-calibration and monitoring**

*Type: discussion For: Discussion  
 Source: vivo*

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

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

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**Email discussion: [98-bis-e][216] NR\_RRM\_enh2\_1**

**R4-2105686 Email discussion summary: [98-bis-e][216] NR\_RRM\_enh2\_1***Type: other For: Information  
Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

1st round email discussion conclusions

2nd round email discussion conclusions

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**Email discussion: [98-bis-e][217] NR\_RRM\_enh2\_2**

**R4-2105687 Email discussion summary: [98-bis-e][217] NR\_RRM\_enh2\_2***Type: other For: Information  
Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

1st round email discussion conclusions

2nd round email discussion conclusions

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#### 8.4.1 General and work plan

#### 8.4.2 RRM core requirements

##### 8.4.2.1 SRS antenna port switching

**R4-2104565 Discussion on SRS antenna port switching**

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

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

**R4-2104694 Discussion on SRS antenna switching interruption requirements**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104758 Further discussion on SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104831 On SRS antenna port switching**

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

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

**R4-2104909 SRS antenna switching discussion**

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

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

**R4-2104945 Discussion on SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104979 Discussion on SRS antenna port switching**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We analyze the interruption requirements for SRS antenna port switching

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

**R4-2104991 Discussion on interruption due to SRS antenna port switching**

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

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

**R4-2106409 Discussion on the interruption requirements at SRS antenna port switching**

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

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

**R4-2106462 Discussion about SRS antenna port switching**

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

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

**R4-2106532 RRM requirements for SRS ant port switch**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106881 On RRM requirements for SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on RRM requirements for antenna port switching

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

**R4-2106986 Discussion on requirements for SRS antenna switching**

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

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

**R4-2107079 Discussion on RRM requirements for SRS antenna port switching**

*Type: discussion For: Discussion  
 Source: vivo*

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

##### 8.4.2.2 HO with PSCell

**R4-2104685 Discussion on RRM requirements for handover with PSCell**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104759 Further discussion on HO with PSCell**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104832 On RRM requirement for handover with PSCell**

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

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

**R4-2104932 Views on Procedures of HO with PSCell**

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

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

**R4-2104943 Discussion on HO with PSCell**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104980 Discussion on PSCell HO**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We analyze the requirements for HO with PSCell

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

**R4-2106463 Discussion about HO with PSCell**

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

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

**R4-2106533 RRM requirements for HO with PSCell**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106882 On handover with PSCell**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on handover with PSCell

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

**R4-2106924 Discussion on handover with PSCell**

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

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

**R4-2106987 Discussion on requirements for HO with PSCell**

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

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

**R4-2107080 Discussion on RRM requirements for HO with PSCell**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2107123 Discussion on HO with PSCell**

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

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

**R4-2107224 discussion on HO with PSCell**

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

**Abstract:**

discussion on HO with PSCell

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

**R4-2107249 Discussion on timelines of HO with PSCell**

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

**Abstract:**

Timeline of joint PCell HO with PSCell change

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

##### 8.4.2.3 PUCCH SCell activation/deactivation

**R4-2104564 Discussion on PUCCH SCell activation and deactivation**

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

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

**R4-2104633 Regarding PUCCH SCell activation and deactivation**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2104686 Discussion on SCell activation and deactication requirements for PUCCH Scell**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104760 Further discussion on PUCCH SCell activation\_deactivation**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104833 On PUCCH SCell activation and deactivation**

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

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

**R4-2104944 Discussion on PUCCH SCell activation/deactivation**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104981 Discussion on PUCCH SCell activation**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We analyze the requirements for PUCCH SCell activation/deactivation for single and multiple SCells

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

**R4-2105104 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:** The document was **not treated**.

**R4-2106408 Discussion on the activation delay for deactivated PUCCH SCell**

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

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

**R4-2106534 RRM requirements for PUCCH SCell ActivationDeactivation**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106883 On SCell (de)activation with PUCCH**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on SCell activation and deactivation for PUCCH SCell.

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

**R4-2106988 Discussion on requirements for PUCCH SCell activation**

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

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

**R4-2107290 Discussion on PUCCH SCell Activation**

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

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

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

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**Email discussion: [98-bis-e][218] NR\_MG\_enh\_1**

**R4-2105688 Email discussion summary: [98-bis-e][218] NR\_MG\_enh\_1***Type: other For: Information  
Source: Moderator (MediaTek)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 15, 2021)

* Issue 2-1: Definition of independent gap
  + Proposals
    - Option 1a: (MTK, Xiaomi, Apple, LGE, QC, Nokia, OPPO, ZTE, Huawei)
      * Multiple MGs with their own separate configurations, i.e., MGL, MGRP, time offset.
    - Option 1b: (CMCC, Huawei)
      * Multiple MGs with their own separate configurations, i.e., MGL, MGRP, time offset, MGTA.
    - Option 2: (NEC)
      * Measurement gaps are considered as independent if UE can measure on these gaps simultaneously without impacting the measurement performance requirements of each MG.
    - Option 3: (Intel, E///, vivo, CATT)
      * The definition of independent MG is unnecessary
  + Recommendations for 2nd round: Option 1a gets the most support. At the same time, some companies suggest to drop the term ‘a common period of time’ in Issue 2-2, while the majority of companies prefer to merge the definitions of concurrent gap and independent gap in Issue 2-3. Moderator suggest to use Option 1a/b as a starting point, then try to merge the definitions and to address the concern in Option 3. Also, the discussions on whether the gap may have the same purposes or the gap may fully overlapped in time can be moved to other discussions such as Issue 2-5 and Issue 2-11, respectively. Moderator suggests the following definition:
    - Concurrent gaps are configured by multiple and independent RRC IE MeasGapConfig [during a common period of time]
  + Discussion
    - vivo: Agree with proposed WF. Will fully overlapping MG case be allowed?
      * Intel, E///, CATT, Nokia: this can be allowed
      * MTK: we do not resolve everything and discuss further
    - Apple: for “during a common period of time” – need to consider the case that MG pattern may be deactivated
      * Intel: we can decouple the issues. The concept shall apply to activated MGs.
      * E///, Nokia: it shall apply to activated MGs
      * Huawei: it requires some studies
    - Intel: Ok with WF. Common period needs discussion.
    - NEC: In our understanding the independent MGs means that UE may process them independently. UE behavior aspect needs to be considered in the definition.
      * MTK: we can discuss this further
    - CATT: can multiple MGs be configured by one single RRC?
      * MTK: Current RRC includes a single MeasGapConfig IE. We are proposing several MeasGapConfig IE
      * Nokia: this is more in RAN2 scope
    - CMCC: what is the meaning of independent RRC IE (does it mean that one or more parameters are different)
    - OPPO: Do not need to define the common period of time
    - NEC: change “multiple and independent” to “separate”. Add UE behavior aspect.
  + Agreements:
    - Concurrent gaps are configured by multiple RRC IE MeasGapConfig [during a common period of time]
      * FFS on the definition of the “common period of time” and whether it shall be introduced
      * FFS how to handle fully overlapping multiple MG case
      * FFS how to handle activated/deactivated pre-configured MGs (in case they are defined)
      * Detailed RRC configuration is up to RAN2
      * UE behavior for measurement of multiple MG patterns is FFS

1st round email discussion conclusions

2nd round email discussion conclusions

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**Email discussion: [98-bis-e][219] NR\_MG\_enh\_2**

**R4-2105689 Email discussion summary: [98-bis-e][219] NR\_MG\_enh\_2***Type: other For: Information  
Source: Moderator (Intel Corporation)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 15, 2021)

* Issue 1-1-1: Whether can pre-configured MGs be configured per UE/FR or per BWP
  + Proposals
    - Option 1a (Apple, NEC). Pre-configured MGs are configured per BWP. Different MG patterns (or no MG) can be pre-configured for different BWP.
    - Option 2 (Ericsson, Intel, Huawei, Xiaomi, CATT, MTK, CMCC, QC, ZTE, LG). Pre-configured MGs are configured per UE or per FR
    - Option 2a (Nokia, Apple, OPPO): Pre-configured MGs are configured per-UE or per-FR. Pre-configured MGs additionally can be configured per BWP
    - Option 2b (Qualcomm) Pre-configured MGs are configured per-UE or per-FR. The (de)activation indication is pre-configured per BWP.
  + Discussion
    - Chair: further discuss the timelines to discuss pre-configured MGs + multiple concurrent MG scenarios.
  + Agreements:
    - Pre-configured MG(s) are configured per UE or per FR
      * FFS if pre-configured MGs can be additionally configured per BWP
    - FFS on the activation/deactivation mechanism and its signalling indication (if needed)
  + Tentative agreement (for further discussion)
    - A single pre-configured MG is considered for the case of non-concurrent MG scenarios.
    - FFS if more pre-configured MGs shall be considered for the multiple concurrent MG scenarios.
* Issue 1-0-2 Whether the pre-configured MG for the BWP switching on multiple CCs shall be considered?
  + Proposals
    - Option 1 (Ericsson, Qualcomm, CMCC): Yes.
    - Option 1a (ZTE): For NR-CA case, focus on intra-frequency measurement.
    - Option 2 (Apple, Intel, Nokia, CATT, MTK, Huawei): Focus on the application scenarios of the pre-configured gap for single CC BWP switching
  + Discussion
    - Chair: further discuss the timelines to discuss multiple CC BWP switching.
  + Agreements:
    - Focus on the scenarios with the pre-configured MG for single CC BWP switching scenario.
    - FFS whether to define pre-configured MG for multiple CC BWP switching scenario for NR-CA case

1st round email discussion conclusions

2nd round email discussion conclusions

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#### 8.5.1 General and work plan

**R4-2104581 Work plan of R17 NR and MR-DC measurement gap enhancements WI**

*Type: Work Plan For: Approval  
 Source: MediaTek inc.*

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

#### 8.5.2 RRM core requirements

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

**R4-2104582 Pre-configured MG pattern(s) per configured BWP**

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

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

**R4-2104635 On pre configured MG patterns**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2104687 Discussion on pre-configured MG pattern for NR**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104750 Discussion on pre-configured MG pattern**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104854 Consideration on preconfigured measurement gap patterns**

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

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

**R4-2104921 Views on pre-configured MG patterns**

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

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

**R4-2104936 Discussion on pre-configured MG pattern(s)**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104983 Discussion on preconfigured measurement gap**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We provide our view on the definition of pre-configured MG and their activation and deactivation procedures

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

**R4-2106446 Discussion on pre-configured measurement gap**

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

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

**R4-2106535 On pre-configured MG pattern(s) for NR\_MG\_enh**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2107027 Discussion on pre-configured MG**

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

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

**R4-2107151 Analysis of requirements for pre-configured measurement gap pattern**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

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

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

**R4-2107175 Discussion on Pre-configured MG patterns**

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

**Abstract:**

Discussion on pre-configured MG patterns for NR

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

**R4-2107347 Realizing pre-configured MG via network controlled fast gap(NCFG)**

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

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

##### 8.5.2.2 Multiple concurrent and independent MG patterns

**R4-2104583 Multiple concurrent and independent gap patterns**

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

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

**R4-2104636 Consideration on multiple concurrent and independent MG patterns**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2104688 Discussion on multiple concurrent and independent MG patterns for NR**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104751 Discussion on multiple concurrent and independent MG patterns**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104855 Discussion on multiple concurrent and independent MG patterns**

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

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

**R4-2104933 Discussion on multiple concurrent and independent MG patterns**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104982 Discussion on concurrent and independent MG**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We discuss the principle for defining requirements for multiple concurrent and independent MG patterns

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

**R4-2106303 Discussion on multiple concurrent and independent MG patterns**

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

**Abstract:**

It discusses multiple concurrent and independent MG patterns.

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

**R4-2106344 Discussion on mulitple concurrent and independent MG patterns**

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

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

**R4-2106392 Discussion on concurrent and independent MG patterns**

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

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

**R4-2106447 Discussion on multiple and independent concurrent measurement gaps in NR**

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

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

**R4-2106536 On multiple concurrent and independent MG patterns for NR\_MG\_enh**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106880 On parallel measurement gap patterns**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on parallel measurement gap patterns

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

**R4-2106923 Discussion on independent and concurrent MGs**

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

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

**R4-2107028 Discussion on multiple concurrent MGs**

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

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

##### 8.5.2.3 Network Controlled Small Gap

**R4-2104584 Network Controlled Small Gap**

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

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

**R4-2104634 On network controlled small gap**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2104752 Discussion on Network Controlled Small Gap (NCSG)**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104856 On network controlled small gap**

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

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

**R4-2104934 Discussion on Network Controlled Small Gap**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2106448 Discussion on NCSG in NR**

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

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

**R4-2106537 On NCSG for NR\_MG\_enh**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2107029 Discussion on NCSG**

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

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

**R4-2107152 Analysis of requirements for network controlled small gap**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

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

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

**R4-2107176 Discussion on Network Controlled Small Gaps for NR**

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

**Abstract:**

Discussion on introduction of NCSG for NR

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

**R4-2107318 Discussion on open issues of network controlled small gap for NR**

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

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

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

#### 8.6.1 General and work plan

**R4-2104946 Updated work plan for enhancement for NR high speed train scenario in FR1**

*Type: Work Plan For: Approval  
 Source: CMCC*

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

#### 8.6.2 RRM core requirements

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**Email discussion: [98-bis-e][220] NR\_HST\_FR1\_enh\_RRM**

**R4-2105690 Email discussion summary: [98-bis-e][220] NR\_HST\_FR1\_enh\_RRM***Type: other For: Information  
Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 15, 2021)

* Issue 2-2: Enhancement on CSSFwithin\_gap,i for SCell measurement
  + Background:
    - In last meeting, it was agreed to reuse the PCell enhancement in Rel-16 HST to specify the requirements for activated Scell. *Further enhancement can be further studied.* (R4-2103678):
    - According to the clause 9.1.5.1 of TS 38.133, for the calculation of CSSFoutside\_gap,i, NSCC\_SSB is the number of configured SCell(s) with only SSB based L3 measurement configured
  + Question 1: for CSSFoutside\_gap,i, except the SCell(s) measured without MG, whether the SCell(s) measured with MG are counted in NSCC\_SSB
    - Option 1: Yes, for CSSFoutside\_gap,i, both SCell(s) measured without MG and SCell(s) measured with MG are counted in NSCC\_SSB (Huawei, QC, E///)
    - Option 2: No, for CSSFoutside\_gap,i, only SCell(s) measured without MG are counted in NSCC\_SSB (MTK, Apple, vivo)
  + Discussion
    - Huawei: Option 1
    - Apple: the spec does not say anything. Are we checking the save version?
      * CMCC: this is from the latest version of the Rel-16 spec
    - QC: Option 1. This is an issue but how to fix it requires separate discussion
    - E///: Option 1. Current spec is contradictive.
    - Apple: we are ok to clarify spec. However SCell shall be accounted only once either in CSSFoutside\_gap,i or CSSFinside\_gap,i
      * Huawei: we had a discussion in Rel-15. The original intention was to do some relaxation for CSSFoutside\_gap,i
      * Apple: is there any some intention to count it twice
    - MTK: we are aligned with Apple.
  + Tentative agreements:
    - RAN4 has the following common understanding of the current non-HST specification:
      * For CSSFoutside\_gap,i, both SCell(s) measured without MG and SCell(s) measured with MG are counted in NSCC\_SSB.
        + Both activated and deactivated SCells are included
* Issue 5-1: whether to consider inter-frequency measurement
  + Proposals
    - Option 1 (MTK): NO
    - Option 2 (QC, HW, Nokia, Ericsson, Apple, vivo, CATT, CMCC, OPPO, DCM, Intel): Yes
  + Discussion
    - MTK: NW may know UE position. So NW can pre-configure frequency layers. The measurements can be done without MGs and not sure we need inter-frequency measurements.
    - QC: Theoretically it is possible by network may not necessarily configure this.
    - Apple: Network may deploy > 1 candidate carrier. We want to avoid situation when NW preconfigures all carriers while UE will use only few of them. It will have impact on UE power consumption.
    - MTK: it should not be a problem for NW to pre-configure multiple carriers.
      * Apple: even in this case UE may need to use additional hardware resources for measurements. Same time UE may not use all CCs.
    - Huawei: Inter-frequency is very useful. Pcell and Scell change will happen. We cannot guarantee that target cells will be within the set of pre-configured CCs.
    - CMCC: see the benefit to support inter-frequency measurement report
    - Nokia: Support Option 2. For Option 1 it is not clear on how does NW know when to configure SCell.
    - MTK: We think PCell and SCell are co-located in HST. For HO to the new PCell, the suitable cell will be already known. No additional measurement is needed before the SCell is added.
    - QC: MTK arguments are reasonable. Inter-frequency enhancements may provide more network flexibility.
  + Agreements:
    - Further define RRC Connected state inter-frequency measurement enhancements
      * Support of HST inter-frequency measurement enhancements is up to UE capability. Details are FFS.
    - FFS whether enhancements for RRC IDLE inter-frequency measurements are needed

1st round email discussion conclusions

2nd round email discussion conclusions

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##### 8.6.2.1 UE RRM core requirements for CA scenario

**R4-2104566 Discussion on Rel-17 HST in FR1**

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

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

**R4-2104753 Discussion on HST RRM for CA in FR1**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104812 On SCell RRM enhancement for NR high speed train scenario in FR1**

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

**Abstract:**

Draft CR on Scell enhancement for HST FR1

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

**R4-2104813 On SCell RRM enhancement for NR high speed train scenario in FR1**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Scell enhancement for HST FR1

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

**R4-2104857 On R17 FR1 HST RRM measurement requirement**

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

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

**R4-2104904 FR1 HST RRM discussion**

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

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

**R4-2104935 Discussion on NR HST RRM enhancement for FR1 CA scenario**

*Type: discussion For: Approval  
 Source: CMCC*

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

**R4-2106538 RRM requirement for Rel17 FR1 HST**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106936 Discussion on Enhancement for NR high speed train scenario in FR1**

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

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

**R4-2107081 Discussion on R17 NR FR1 HST RRM requirements**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2107250 Discussion on NR FR1 HST RRM open issues for CA**

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

**Abstract:**

The document has addressed several RRM open issues related to enhancements for CA under HST scenarios.

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

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

#### 8.7.4 RRM core requirements

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**Email discussion: [98-bis-e][221] NR\_HST\_FR2\_RRM**

**R4-2105691 Email discussion summary: [98-bis-e][221] NR\_HST\_FR2\_RRM***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

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**R4-2104907 FR2 HST RRM discussion**

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

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

##### 8.7.4.1 General

**R4-2104754 Discussion on the maximum supported speed analysis for NR HST FR2**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104814 RRM general considerations for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on signaling for HST FR2

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

**R4-2104851 Discussion on FR2 HST RRM requirement - geneal**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2105027 Maximum Supported Speed from RRM perspective for FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2106505 General aspects of RRM requirements for HST in FR2**

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

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

**R4-2106583 Simulation analysis for HST in FR2**

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

**Abstract:**

Simulation results and analysis for HST operation in FR2.

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

##### 8.7.4.2 RRM requirements for FR2 HST

**R4-2104755 Discussion on RRM requirements for NR FR2 HST**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104815 RRM requirements for HST FR2**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on RRM requirememt for HST FR2

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

**R4-2104852 Discussion on RRM requirement for FR2 HST**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2104949 Discussion on RRM requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2106504 RRM requirements for HST in FR2**

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

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

**R4-2106584 Discussion about RRM requirements for HST in FR2**

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

**Abstract:**

Discussion about RRM requirements and needed changes for HST operation in FR2.

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

**R4-2106836 Further discussion on RRM requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: BEIJING SAMSUNG TELECOM R&D*

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

**R4-2106838 Further discussion on RRM requirements for FR2 HST**

*Type: discussion For: Discussion  
 Source: Samsung*

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

**R4-2106937 Discussion on NR support for high speed train scenario in FR2**

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

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

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

#### 8.8.4 RRM core requirements

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**Email discussion: [98-bis-e][222] NR\_NTN\_solutions\_RRM\_1**

**R4-2105692 Email discussion summary: [98-bis-e][222] NR\_NTN\_solutions\_RRM\_1***Type: other For: Information  
Source: Moderator (Fraunhofer HHI)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 15, 2021)

* 2-4: Criteria of GNSS accuracy
  + Proposals
    - Option 1: Criteria of GNSS accuracy must be more stringent than current TA accuracy requirement anyhow. Further evaluation of GNSS needs calculation with available satellite speed and elevation/azimuth angle and UE position in cell and needs to take error introduced between satellite and gateway into account.
    - Option 2: The requirements of UE transmit timing can be defined based on UE capability of GNSS accuracy.
  + Discussion
    - CATT: Option 2. GNSS accuracy can affect timing. Option 1 and 2 are not exclusive.
    - Xiaomi: This is similar to the issue 2-3. Many companies suggested to handle on a case by case basis.
    - MTK: Need to consider total error budget
    - CMCC: Both option 1 and 2 are general guidance and not sure we need to capture. Agree with MTK that total error budget needs to be considered.
    - Apple: Do we plan to have any enhancements for GNSS accuracy or simply consider GNSS accuracy impact on the RRM requirements?
    - Huawei: Option 2 shall be discussed in the other thread. Not sure why we need more stringent requirement.
    - Intel: GNSS accuracy is typically better than what we have in 3GPP. Testability feasibility needs to be assessed. So far we think timing requirements are affected
    - Thales: It is important to understand if we will have any test. GNSS accuracy needs to be considered.
  + Agreements:
    - The impact of GNSS accuracy should be considered when defining each RRM requirement
      * GNSS accuracy (e.g. as a function of UE GNSS capability) and side conditions and exact impact on the RRM requirements are FFS.
      * GNSS accuracy enhancements are out of scope

1st round email discussion conclusions

2nd round email discussion conclusions

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**Email discussion: [98-bis-e][223] NR\_NTN\_solutions\_RRM\_2**

**R4-2105693 Email discussion summary: [98-bis-e][223] NR\_NTN\_solutions\_RRM\_2***Type: other For: Information  
Source: Moderator (Xiaomi)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session (April 15, 2021)

* Reply LS for the incoming LS (R1-2102263)
  + Chair: should we provide any response in this meeting (e.g. RAN4 plans)
  + Xiaomi: no sufficient conclusions in this meeting to send the LS reply
  + CATT: we have concluded on frequency error
  + Chair: we can have 2 LS (one for freq and another for time) due to different timelines for agreements
* Issue 1.2.1-1: How to capture the UE specific TA estimation error
  + Proposals
    - Option 1: the UE specific TA estimation accuracy is counted into the UE transmit timing error requirement (MTK, Xiaomi, CMCC, Huawei, Ericsson, Qualcomm, Apple, Nokia, ZTE, NEC, CATT)
    - Option 2: the UE specific TA estimation accuracy is counted into the timing advance adjustment accuracy requirement. (Xiaomi, Huawei, Ericsson)
    - Option 3: the UE specific TA estimation accuracy is defined as a separate accuracy requirement. (Intel, CMCC, Huawei, Ericsson, THALES)
  + Discussion
    - Intel: Option 1 and 3 are not conflicting each other. The main concern on Option 3 is that it is not testable. Same time, it is good to clearly list Core requirement. UE behavior for UE specific TA estimation need to be considered
    - E///: We support Option 1/2/3. We need to work on the total budget.
    - Thales: Option 1 and 3 are not contradicting each other. For Option 3 UE needs to do some autonomous estimation of UE specific TA estimation.
    - QC: Option 1 and 3 are not contradicting each other.
  + Agreements:
    - The UE specific TA estimation accuracy is counted into the UE transmit timing error requirement
      * UE specific TA estimation accuracy is FFS
      * FFS whether the UE specific TA estimation accuracy shall be also defined as a separate accuracy requirement
      * Specify UE behavior related to UE specific TA estimation and the detailed behavior is FFS

1st round email discussion conclusions

2nd round email discussion conclusions

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**R4-2107277 NTN UL timing accuracy**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The goal of this document is to further clarify NTN UL timing synchronization requirements to be considered by NTN RAN4 work.

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

##### 8.8.4.1 General

**R4-2104603 Discussion on general NTN RRM related issues**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104763 Discussion on RRM requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104764 draft LS reply on NTN UL time and frequency synchronization requirements**

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

**Abstract:**

This contribution is also related to both email discussions of [98bis-e][309] NTN\_Solutions\_Part3; [98bis-e][223] NR\_NTN\_solutions\_RRM\_2

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

**R4-2105142 Discussion on NTN GNSS requirement**

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

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

**R4-2107030 Discussion on general issues for NTN RRM**

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

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

**R4-2107254 NTN - On reference points**

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

**Abstract:**

Observation 1: Having the time reference point at the satellite means RAN4 has to define timing requirement for both gNB and UE towards the satellite.

Observation 2: Implementation of time reference point at the gNB requires less RAN4 specification work,

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

##### 8.8.4.2 Timing requirements

**R4-2104604 Discussion on NTN timing requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104689 Discussion on timing requirements for NR NTN**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104765 Discussion on timing requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104927 Discussion on timing requirements for NTN**

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

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

**R4-2104985 Discussion on RRM timing related requirements for NTN**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

In this contribution we provide our views on the RRM timing requirements for NTN UE

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

**R4-2105139 Timing requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

RRM timing requirements for UE.

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

**R4-2105140 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:** The document was **not treated**.

**R4-2106360 Discussion on timing requirements in NTN**

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

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

**R4-2106444 Discussion on NTN timing pre-compensation**

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

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

**R4-2106947 Discussion on NTN timing related requirements**

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

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

**R4-2107259 NTN - On timing requirements**

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

**Abstract:**

Proposal 1: Use the existing Te requirements as defined in TS 38.133, Table 7.1.2-1 for NTN

Proposal 2: RAN4 to investigate how open and closed loop TA control impact on the Te requirements

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

**R4-2107291 Timing requirements in NTN Systems**

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

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

##### 8.8.4.3 Measurement requirements

**R4-2104598 NTN RRM measurement requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104690 Discussion on measurement requirements for NR NTN**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104766 Discussion on measurement requirements for NTN**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104816 Measurement RRM requirements for NTN**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on RRM measurement requirememt for NTN

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

**R4-2104834 On GNSS measurement for NTN**

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

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

**R4-2104986 Discussion on RRM measurement requirements for NTN**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

In this contribution we provide our views on measurement requirements of NTN UE

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

**R4-2105143 Discussion on measurement requirements for NTN**

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

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

**R4-2106939 Discussion on measurement in NTN**

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

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

**R4-2107256 NTN - On measurement requirements**

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

**Abstract:**

Observation 1: A static SMTC window duration may be unable to handle serving and neighbour cell propagation delay variations.

Observation 2: The transparent satellite amplification type impacts UE and network interpretation of measurements.

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

**R4-2107292 Measurement requirements in NTN Systems**

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

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

### 8.9 UE Power Saving Enhancements

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**Email discussion: [98-bis-e][224] NR\_UE\_pow\_sav\_enh\_RRM**

**R4-2105694 Email discussion summary: [98-bis-e][224] NR\_UE\_pow\_sav\_enh\_RRM***Type: other For: Information  
Source: Moderator (MediaTek)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

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#### 8.9.1 General and work plan

**R4-2107082 Considerations on study phase conclusions for R17 RLM BFD relaxation**

*Type: discussion For: Discussion  
 Source: vivo*

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

#### 8.9.2 UE measurements relaxation for RLM and/or BFD

**R4-2104605 Discussion on RLM/BFD relaxation for NR power saving enhancement**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104693 Discussion on RLM/BFD measurement relaxation for power saving**

*Type: discussion For: Discussion  
 Source: Xiaomi*

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

**R4-2104756 Discussion on RLM/BFD relaxation measurement**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104757 Update simulation results for RLM/BFD relaxation**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104850 UE measurements relaxation for RLM and/or BFD**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2104908 Power saving RRM discussion**

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

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

**R4-2106461 Discussions on UE power saving for RLM and BM**

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

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

**R4-2106539 Discussion on RRM requirements for R17 RLM/BFD relaxation**

*Type: discussion For: Discussion  
 Source: OPPO*

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

**R4-2106540 Simulation results for R17 RLM/BFD relaxation**

*Type: discussion For: Information  
 Source: OPPO*

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

**R4-2106581 Simulation results for RLM/BFD measurement relaxation**

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

**Abstract:**

Simulation results for system level and power saving evaluation for RLM and BFD relaxation.

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

**R4-2106582 Discussion about RLM/BFD measurement relaxation**

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

**Abstract:**

Further discussion about RLM/BFD measurement relaxation feasibility and other details.

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

**R4-2106851 Simulation results on UE power saving for RLM and BM**

*Type: discussion For: Information  
 Source: Ericsson*

**Abstract:**

In this contribution we present the SINR difference (delta SINR) for RLM-RS based on SSB for different relaxation factors and UE speeds as in agreed in previous meeting.

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

**R4-2106852 Discussions on UE power saving for RLM and BM**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

In this contribution we continue the discussions on release 17 UE power saving based on the identified issues from last meeting.

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

**R4-2106915 On RLM and RLF relaxation for UE power saving**

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

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

**R4-2106942 Discussion on RLM/BFD measurement relaxation for power saving enhancements**

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

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

**R4-2106943 Updated simulation results for RLM/BFD relaxation evaluation**

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

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

**R4-2107083 Discussion on R17 RLM and BFD relaxation for NR**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2107084 Evaluation results on R17 RLM and BFD relaxation for NR**

*Type: other For: Information  
 Source: vivo*

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

**R4-2107085 Updated evaluation assumptions for R17 RLM and BFD relaxation**

*Type: other For: Approval  
 Source: vivo*

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

**R4-2107124 Evaluation on Rel-17 RLM/BFD measurement relaxation**

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

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

## 12 Liaison and output to other groups

### 12.1 R17 related

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**Email discussion: [98-bis-e][225] LS\_reply\_R1-2009798\_MR\_DC\_NWM**

**R4-2105695 Email discussion summary: [98-bis-e][225] LS\_reply\_R1-2009798\_MR\_DC\_NWM***Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

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**R4-2104428 On temporary RS for efficient SCell activation**

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

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

**R4-2104631 Considerations on temporary RS for efficient SCell activation in NR CA**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2106443 Discussion on temporary RS for efficient Scell activation**

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

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

**R4-2106887 Temporary RS for Scell activation delay reduction**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussions on TRS for SCell activation delay reduction. In response to RAN1 LS R1-2009798.

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

**R4-2106938 Discussion on temporary RS for efficient SCell activation in NR CA**

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

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

**R4-2107125 Discussion on temporary RS**

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

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

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**Email discussion: [98-bis-e][226] LS\_reply\_R2-2102165\_NBIOT**

**R4-2105696 Email discussion summary: [98-bis-e][226] LS\_reply\_R2-2102165\_NBIOT***Type: other For: Information  
Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

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**R4-2104429 Reply LS on neighbour cell measurement in NB-IoT RRC\_CONNECTED state**

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

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

**R4-2106345 Discussion of neighbor cell measurements in RRC\_CONNECTED for Rel-17 NB-IoT**

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

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

**R4-2106857 Reply LS on neighbour cell measurement in NB-IoT RRC\_CONNECTED state**

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

**Abstract:**

This contribution contains LS response for the RAN2 incoming LS on CONNECTED mode neighbor cell measurements for NB-IOT for reducing the time between UE declaring RLF to the time UE performs RRC re-establishment on another cell.

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

**R4-2106985 Reply LS on neighbour cell measurement in NB-IoT RRC\_CONNECTED state**

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

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

**R4-2107185 Discussion on neighbour cell measurements in NB-IoT RRC\_CONNECTED state**

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

**Abstract:**

Discussion on incoming LS from RAN2

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

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**Email discussion: [98-bis-e][227] LS\_reply\_R1-2102245\_IIoT\_URLLC**

**R4-2105697 Email discussion summary: [98-bis-e][227] LS\_reply\_R1-2102245\_IIoT\_URLLC***Type: other For: Information  
Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

1st round email discussion conclusions

2nd round email discussion conclusions

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**R4-2104609 Discussion and draft LS on UE transmit timing error**

*Type: discussion For: Discussion  
 Source: CMCC*

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

**R4-2104648 Discussion on the reply to LS on UE transmit timing error**

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

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

**R4-2104708 Discussion on UE transmit timing error**

*Type: LS out For: Approval  
 to RAN1  
 Source: Nokia Corporation*

**Decision: Withdrawn.**

**R4-2104725 Discussion on UE transmit timing error**

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

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

**R4-2104767 Discussion on UE transmit timing error**

*Type: discussion For: Discussion  
 Source: CATT*

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

**R4-2104768 Response LS on UE transmit timing error**

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

**Decision: Noted.**

**R4-2104822 On UE Tx transmit timing error and the reply LS**

*Type: discussion For: Discussion  
 Source: ZTE Wistron Telecom AB*

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

**R4-2104853 Discussion on RAN1 LS on UE transmit timing error for R17 URLLC**

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

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

**R4-2104984 Discussion for reply LS of UE transmit timing error**

*Type: discussion For: Approval  
 Source: NEC*

**Abstract:**

We discuss the potential RAN4 response to RAN1 LS R4-2102245

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

**R4-2106445 Reply to LS on UE transmit timing error**

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

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

**R4-2107031 reply LS on UE transmit timing error**

*Type: LS out For: Approval  
 to RAN1  
 Source: Huawei, HiSilicon*

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

**R4-2107153 LS response on UE transmit timing error**

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

**Abstract:**

This document analyzes and provide response on RAN1 LS on timing error

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

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**Email discussion: [98-bis-e][228] LS\_reply\_R1-2102248\_feMIMO**

**R4-2105698 Email discussion summary: [98-bis-e][228] LS\_reply\_R1-2102248\_feMIMO***Type: other For: Information  
Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

GTW session discussion conclusions (date)

1st round email discussion conclusions

2nd round email discussion conclusions

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**R4-2104567 Reply LS on TCI State Update for L1/L2-Centric Inter-Cell Mobility**

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

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

**R4-2104848 Discussion on reply LS on TCI State Update for L1/L2-Centric Inter-Cell Mobility**

*Type: discussion For: Discussion  
 Source: Apple*

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

**R4-2106398 Discussion on incoming L1/L2 mobility LS.**

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

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

**R4-2106878 Reply LS on TCI State Update for L1/L2 Centric Inter-Cell Mobility**

*Type: LS out For: Approval  
 to RAN1, cc RAN2, RAN3, RAN  
 Source: Ericsson*

**Abstract:**

Discussion and LS reply on the two questions addressed to RAN4.

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

**R4-2106941 Discussion on TCI State Update for L1/L2-Centric Inter-Cell Mobility**

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

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

**R4-2107086 Discussion on LS on TCI State Update for L1/L2-Centric Inter-Cell Mobility**

*Type: discussion For: Discussion  
 Source: vivo*

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

**R4-2107364 Discussion on incoming RAN1 LS for L1/L2 inter-cell mobility and draft LS out**

*Type: LS out For: Approval  
 to RAN1, cc RAN2, RAN3  
 Source: Qualcomm CDMA Technologies*

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

## 15 Close of the E-meeting

**R4-21AAAAA Way forward on XXXX**

*Type: other For: Approval  
 Source: TBA*

**Abstract:**

**Discussion:**

**Decision: Return to.**