**3GPP TSG-RAN WG4 Meeting # 97-e R4-2017275**

Electronic Meeting, 2nd – 13th November, 2020

**Agenda item:** 7.1.6

**Source:** Moderator (Ericsson)

**Title:** Email discussion summary for [97e][205] NR\_unlic\_RRM\_1

**Document for:** Information

# Introduction

The discussion covers NR-U AIs within 7.1.6.

**When updating this document, please remember to:**

* **use track changes while adding your comments in this document (only updates marked with change marks will be taken into the next version),**
* **change the file name, adding your company name,**
* **NOT change the version number (which can be incremented only by the moderator).**

## 1st round

The following list of open issues was identified, based on the contributions, for the 1st round.

The following colour marking is used below:

* A topic/issue proposed for discussion in: GTW session 1
* No discussion in the 1st round
* **Topic #1: General (AI 7.1.6.1)**

Sub-topic 1-1: Terminology updates with and without DRX

Issue 1-1-1: Terminology updates for the case without DRX, MGRP, etc. for 38.133

Issue 1-1-2: Terminology updates for the case without DRX, MGRP, etc. for 36.133

Issue 1-1-3: Terminology updates for the case with DRX

Sub-topic 1-2: Number of candidate SSBs for cell detection

Issue 1-2-1: Number of candidate SSBs for cell detection

Sub-topic 1-3: Exact candidate SSB positions

Issue 1-3-1: Exact candidate SSB positions

Sub-topic 1-4: Set of candidate SSB positions in RRM requirements

Issue 1-4-1: Further clarification on the set of candidate SSB positions

* **Topic #2: Cell re-selection (AI 7.1.6.2)**
* **Topic #3: Handover (AI 7.1.6.3)**
* **Topic #4: RRC connection mobility control (AI 7.1.6.4)**

Sub-topic 4-1: RRC re-establishment

Issue 4-1-1: Cell search delay for unknown intra-frequency cell

Issue 4-1-2: Cell search delay for unknown inter-frequency cell

Sub-topic 4-2: Random Access requirements

Issue 4-2-1: RA requirements in TS 38.133 – general

Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type

Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type

* **Topic #5: SCell activation/deactivation (delay and interruption) (AI 7.1.6.5)**

Sub-topic 5-1: Interruptions for inter-band CA

Issue 5-1-1: Interruption for inter-band CA

Issue 5-1-2: The interruption window location for inter-band CA

Sub-topic 5-2: Interruptions for intra-band CA

Issue 5-2-1: Interruption length for intra-band CA

Issue 5-2-2: Number of interruption windows for intra-band CA

Issue 5-2-3: The interruption window location for intra-band CA

Sub-topic 5-3: Additional RF tuning with no active serving cells

Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated

Sub-topic 5-4: Measuring CSI-RS during SCell activation

Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation

Sub-topic 5-5: SCell activation/deactivation when *sCellDeactivationTimer* is NOT configured

Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured

Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured

Sub-topic 5-6: SCell activation/deactivation when *sCellDeactivationTimer* IS configured

Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured

* **Topic #6: Active TCI state switching (AI 7.1.6.6)**

Sub-topic 6-1: Enhancements in Rel-17

Issue 6-1-1: TCI state switching enhancements in Rel-17

* **Topic #7: Active BWP switching (AI 7.1.6.7)**
* **Topic #8: RLM (AI 7.1.6.8)**

Focus on CRs

* **Topic #9: Beam management (AI 7.1.6.9)**

Sub-topic 9-1: L1-RSRP

Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133

Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting

* **Topic #10: Measurement requirements (AI 7.1.6.10)**

Sub-topic 10-1: RSSI measurements

Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol

Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133

Sub-topic 10-2: Intra- and inter-frequency measurements

Issue 10-2-1: Applicable time difference between the target NR-U cell and PCell/PSCell

Issue 10-2-2: Scheduling restrictions for inter-band CA

Sub-topic 10-3: SFTD measurements

Issue 10-3-1: SFTD capability

Issue 10-3-2: SFTD measurement for NR neighbor cell (issue 1-6 in Rel-16 UE feature list discussed from Main session)

Sub-topic 10-4: CSSF

Issue 10-4-1: CSSF outside gap

Issue 10-4-2: CSSF within gap- general

Issue 10-4-3: CSSF within gap

* **Topic #11: Measurement capability and reporting criteria (AI 7.1.6.11)**

Focus on CRs

* **Topic #12: Timing (AI 7.1.6.12)**

Sub-topic 12-1: Reference cell definition

Issue 12-1-1: Reference cell definition

* **Topic #13: Other requirements (AI 7.1.6.13)**

Focus on the CR

## 2nd round

The following colour marking is used below:

* No discussion in the 2nd round

The following list of open issues was identified, based on the contributions, for the 2nd round.

* **Topic #1: General (AI 7.1.6.1)**

Sub-topic 1-1: Terminology updates with and without DRX

Issue 1-1-1: Terminology updates for the case without DRX, MGRP, etc. for 38.133

Issue 1-1-2: Terminology updates for the case without DRX, MGRP, etc. for 36.133

Issue 1-1-3: Terminology updates for the case with DRX

Sub-topic 1-2: Number of candidate SSBs for cell detection

Issue 1-2-1: Number of candidate SSBs for cell detection

Focus on the CRs

Sub-topic 1-3: Exact candidate SSB positions

Issue 1-3-1: Exact candidate SSB positions

Sub-topic 1-4: Set of candidate SSB positions in RRM requirements

Issue 1-4-1: Further clarification on the set of candidate SSB positions

Focus on the CRs

* **Topic #2: Cell re-selection (AI 7.1.6.2)**
* **Topic #3: Handover (AI 7.1.6.3)**
* **Topic #4: RRC connection mobility control (AI 7.1.6.4)**

Sub-topic 4-1: RRC re-establishment

Issue 4-1-1: Cell search delay for unknown intra-frequency cell

Issue 4-1-2: Cell search delay for unknown inter-frequency cell

Sub-topic 4-2: Random Access requirements

Issue 4-2-1: RA requirements in TS 38.133 – general

Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type

Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type

* **Topic #5: SCell activation/deactivation (delay and interruption) (AI 7.1.6.5)**

Sub-topic 5-1: Interruptions for inter-band CA

Issue 5-1-1: Interruption for inter-band CA

Issue 5-1-2: The interruption window location for inter-band CA

Sub-topic 5-2: Interruptions for intra-band CA

Issue 5-2-1: Interruption length for intra-band CA

Issue 5-2-2: Number of interruption windows for intra-band CA

Issue 5-2-3: The interruption window location for intra-band CA

Sub-topic 5-3: Additional RF tuning with no active serving cells

Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated

Sub-topic 5-4: Measuring CSI-RS during SCell activation

Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation

Sub-topic 5-5: SCell activation/deactivation when *sCellDeactivationTimer* is NOT configured

Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured

Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured

Sub-topic 5-6: SCell activation/deactivation when *sCellDeactivationTimer* IS configured

Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured

* **Topic #6: Active TCI state switching (AI 7.1.6.6)**

Sub-topic 6-1: Enhancements in Rel-17

Issue 6-1-1: TCI state switching enhancements in Rel-17

Focus on the CR

* **Topic #7: Active BWP switching (AI 7.1.6.7)**
* **Topic #8: RLM (AI 7.1.6.8)**

Focus on CR

* **Topic #9: Beam management (AI 7.1.6.9)**

Sub-topic 9-1: L1-RSRP

Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133

Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting

Focus on CR

* **Topic #10: Measurement requirements (AI 7.1.6.10)**

Sub-topic 10-1: RSSI measurements

Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol

Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133

Sub-topic 10-2: Intra- and inter-frequency measurements

Issue 10-2-1: Applicable time difference between the target NR-U cell and PCell/PSCell

Issue 10-2-2: Scheduling restrictions for inter-band CA

Sub-topic 10-3: SFTD measurements

Issue 10-3-1: SFTD capability

Issue 10-3-2: SFTD measurement for NR neighbor cell (issue 1-6 in Rel-16 UE feature list discussed from Main session)

Sub-topic 10-4: CSSF

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Issue 10-4-3: CSSF within gap

* **Topic #11: Measurement capability and reporting criteria (AI 7.1.6.11)**

Focus on CRs

* **Topic #12: Timing (AI 7.1.6.12)**

Sub-topic 12-1: Reference cell definition

Issue 12-1-1: Reference cell definition

* **Topic #13: Other requirements (AI 7.1.6.13)**

Focus on the CR

# Topic #1: General

Contributions from AI 7.1.6.1 are discussed here.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014867 | MediaTek Inc. | **Proposal 1:** For the requirements with DRX in use, to add notes “X is the number of DRX cycles with at least one SMTC where there are no SSBs available at the UE during … period when DRX is used”, where   * X shall be replaced depending on the requirement with:   + RLM-RS SSB in RLM requirements,   + CBD-RS SSB in CBD requirements,   + SSB in L1-RSRP measurement requirements,   + SMTC in measurement requirements other than RSSI requirements and L1-RSRP, * and … shall be replaced with what is appropriate:   + evaluation,   + detection,   + identification,   + measurement, etc. |
| R4-2014868 | MediaTek Inc. | CR 38.133: Clarification for NR-U RRM requirements with DRX in use |
| R4-2015515 | Huawei, HiSilicon | **Proposal 1**: For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.  **Proposal 2**: The exact candidate SSB positions that UE is required to monitor shall be further clarified. |
| R4-2016408 | Ericsson | **Proposal 1**: The terminology needs to be updated in the following sections of TS 38.133, to capture the agreements from R4-2012249 [1]:   |  |  |  | | --- | --- | --- | | **Section number/title as agreed in [1]** | **Section number in TS 38.133** | **Terminology updates needed in TS 38.133** | | 4.2A Cell Re-selection when CCA is used | Same as in [1] | Yes | | 6.1A Handover when CCA is used at least in the target cell | 6.1B | Yes | | 6.2.1A RRC Re-establishment with CCA | Same as in [1] | Yes | | 6.2.3A RRC Connection Release with Redirection with CCA | 6.2.3.2.3 | Yes | | 8.1A Radio Link Monitoring with CCA on target frequency | Same as in [1] | Yes | | 8.3A Activation and Deactivation Delay of SCell operating with CCA | Same as in [1] | Yes | | 8.5A Link Recovery Procedures when CCA is used on target frequency | Same as in [1] | Yes | | 8.10A Active TCI state switching delay when CCA is used on target frequency | Same as in [1] | Yes | | 9.2A NR intra-frequency measurements when CCA is used | Same as in [1] | Yes | | 9.3A NR inter-frequency measurements when CCA is used | Same as in [1] | Yes | | 9.5.4A L1-RSRP measurement requirements (with CCA on serving cell) | Same as in [1] | Yes |   **Proposal 2**: The terminology needs to be updated in the following sections of TS 36.133, to capture the agreements from R4-2012249 [1]:   |  |  |  | | --- | --- | --- | | **Section number/title as agreed in [1]** | **Section number in TS 36.133** | **Terminology updates needed in TS 36.133** | | 4.2.2.5.7 Measurements of NR cells operating with CCA (CCA requirements for interRAT reselection) | Same as in [1] | Yes | | 5.3.4A E-UTRAN - NR FR1 Handover when CCA is used in the target cell | Same as in [1] | Yes | | 6.3.2.4A RRC connection release with redirection to NR with CCA | 6.3.2.5 | Yes | | 7.31A Addition and Release Delay of NR PSCell operating with CCA for E-UTRA - NR Dual Connectivity | Same as in [1] | Yes | | 8.1.2.4.21A E-UTRAN FDD – NR measurements when CCA is used | Same as in [1] | Yes | | 8.17.2.2.a SFTD Measurement requirements with CCA on target frequency | Same as in [1] | Yes | | 8.17.4A E-UTRA Inter-RAT NR Measurements when Configured with E-UTRA-NR Dual Connectivity Operation when CCA is used | Same as in [1] | Yes | |
| R4-2016409 | Ericsson | CR 38.133: Terminology updates for NR-U |
| R4-2016410 | Ericsson | CR 36.133: Terminology updates for NR-U |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 1-1: Terminology updates with and without DRX

**Issue 1-1-1: Terminology updates for the case without DRX, MGRP, etc. for 38.133**

Proposals

* Proposal 1 (Ericsson): The terminology needs to be updated in the following sections of TS 38.133, to capture the agreements from R4-2012249 [1]:

|  |  |  |
| --- | --- | --- |
| **Section number/title as agreed in [1]** | **Section number in TS 38.133** | **Terminology updates needed in TS 38.133** |
| 4.2A Cell Re-selection when CCA is used | Same as in [1] | Yes |
| 6.1A Handover when CCA is used at least in the target cell | 6.1B | Yes |
| 6.2.1A RRC Re-establishment with CCA | Same as in [1] | Yes |
| 6.2.3A RRC Connection Release with Redirection with CCA | 6.2.3.2.3 | Yes |
| 8.1A Radio Link Monitoring with CCA on target frequency | Same as in [1] | Yes |
| 8.3A Activation and Deactivation Delay of SCell operating with CCA | Same as in [1] | Yes |
| 8.5A Link Recovery Procedures when CCA is used on target frequency | Same as in [1] | Yes |
| 8.10A Active TCI state switching delay when CCA is used on target frequency | Same as in [1] | Yes |
| 9.2A NR intra-frequency measurements when CCA is used | Same as in [1] | Yes |
| 9.3A NR inter-frequency measurements when CCA is used | Same as in [1] | Yes |
| 9.5.4A L1-RSRP measurement requirements (with CCA on serving cell) | Same as in [1] | Yes |

Recommended WF

* Can Proposal 1 be agreed?

**Issue 1-1-2: Terminology updates for the case without DRX, MGRP, etc. for 36.133**

Proposals

* Proposal 1 (Ericsson): The terminology needs to be updated in the following sections of TS 36.133, to capture the agreements from R4-2012249 [1]:

|  |  |  |
| --- | --- | --- |
| **Section number/title as agreed in [1]** | **Section number in TS 36.133** | **Terminology updates needed in TS 36.133** |
| 4.2.2.5.7 Measurements of NR cells operating with CCA (CCA requirements for interRAT reselection) | Same as in [1] | Yes |
| 5.3.4A E-UTRAN - NR FR1 Handover when CCA is used in the target cell | Same as in [1] | Yes |
| 6.3.2.4A RRC connection release with redirection to NR with CCA | 6.3.2.5 | Yes |
| 7.31A Addition and Release Delay of NR PSCell operating with CCA for E-UTRA - NR Dual Connectivity | Same as in [1] | Yes |
| 8.1.2.4.21A E-UTRAN FDD – NR measurements when CCA is used | Same as in [1] | Yes |
| 8.17.2.2.a SFTD Measurement requirements with CCA on target frequency | Same as in [1] | Yes |
| 8.17.4A E-UTRA Inter-RAT NR Measurements when Configured with E-UTRA-NR Dual Connectivity Operation when CCA is used | Same as in [1] | Yes |

Recommended WF

* Can Proposal 1 be agreed?

**Issue 1-1-3: Terminology updates for the case with DRX**

Proposals

* Proposal 1 (MediaTek Inc.): For the requirements with DRX in use, to add notes “X is the number of DRX cycles with at least one SMTC where there are no SSBs available at the UE during … period when DRX is used”, where
* X shall be replaced depending on the requirement with:
  + RLM-RS SSB in RLM requirements,
  + CBD-RS SSB in CBD requirements,
  + SSB in L1-RSRP measurement requirements,
  + SMTC in measurement requirements other than RSSI requirements and L1-RSRP,
* and … shall be replaced with what is appropriate:
  + evaluation,
  + detection,
  + identification,
  + measurement, etc.

Recommended WF

* Can Proposal 1 be agreed?

### Sub-topic 1-2: Number of candidate SSBs for cell detection

**Issue 1-2-1: Number of candidate SSBs for cell detection**

Proposals

* Option 1 (Nokia, R4-2015387 in AI 7.1.6.10): For cell detection, UE is required to monitor at least the same number of candidate SSB positions as in other RRM measurements.
* Option 2 (Huawei/HiSilicon, Apple [R4-2014283 in AI 7.1.6.11], Qualcomm [R4-2016564 in AI 7.1.6.10]): For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.

Recommended WF

* Discuss the options

Agreement from GTW

Agreement:

* + For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.
    - Note: 1 candidate SSB position for detection should not be impacted by what UE is already monitoring

Recommended WF after GTW

* Discuss how to capture the agreement in the CR

### Sub-topic 1-3: Exact candidate SSB positions

**Issue 1-3-1: Exact candidate SSB positions**

Proposals

* Option 1: no need to fix
* Option 2 (Huawei/HiSilicon): The exact candidate SSB positions that UE is required to monitor shall be further clarified.

Recommended WF

* Down select between the options

Agreement from GTW

Agreement: Do not fix exact SSB positions for cell detection

### Sub-topic 1-4: Set of candidate SSB positions in RRM requirements

**Issue 1-4-1: Further clarification on the set of candidate SSB positions**

Proposals

* Option 1 (Apple, R4-2014283 in AI 7.1.6.11): Except cell detection, RRM core requirements are defined under assumption what UE monitors the first 2 successive QCL’ed candidate SSB positions (i.e. N1 = N2 = 2). For a certain SSB index which has only one single candidate SSB position in the SSB burst, UE monitors 1 candidate SSB position for this SSB in one SSB burst.
* Option 2: no need to further clarify

Recommended WF

* Discuss the options

Agreement from GTW

Agreement: Except cell detection, RRM core requirements are defined under assumption what UE monitors the first 2 successive QCL’ed candidate SSB positions (i.e. N1 = N2 = 2). For a certain SSB index which has only one configured candidate SSB position in the SSB burst, UE monitors 1 candidate SSB position for this SSB in one SSB burst.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 1-1-1: Terminology updates for the case without DRX, MGRP, etc. for 38.133**: …  **Issue 1-1-2: Terminology updates for the case without DRX, MGRP, etc. for 36.133**: …  **Issue 1-1-3: Terminology updates for the case with DRX**: …  **Issue 1-2-1: Number of candidate SSBs for cell detection**: …  **Issue 1-3-1: Exact candidate SSB positions**: …  **Issue 1-4-1: Further clarification on the set of candidate SSB positions**: …  **Others**: … |
| Huawei | **Issue 1-2-1: Number of candidate SSBs for cell detection**: …  We support option 2. As analyzed in our paper, if UE is required to detect QCL-ed candidate SSB positions, when performing combining among SMTCs, UE has to consider tons of combinations of SSB positions.  **Issue 1-3-1: Exact candidate SSB positions**: …  It is also related to issue 1-4-1. It has been discussed in previous RAN4 meeting that PBCH decoding for index reading is not needed for reporting as UE only needs to report the SSB index not the candidate SSB position. However, it means UE will only know the SSB index of an SSB which UE has no idea what the exact position of the current SSB. It is one of the SSBs that are QCL-ed with each other.  **Issue 1-4-1: Further clarification on the set of candidate SSB positions**  We agree with option 1. But as commented in issue 1-3-1, even the detected SSB has multiple candidate SSB positions within the burst, without knowing the exact candidate SSB positions, UE has no idea which two candidate positions to monitor. |
| MTK | **Issue 1-1-1: Terminology updates for the case without DRX, MGRP, etc. for 38.133**: …  Agree with Proposal 1, which is following the previous agreement.  **Issue 1-1-2: Terminology updates for the case without DRX, MGRP, etc. for 36.133**: …  Agree with Proposal 1, which is following the previous agreement.  **Issue 1-1-3: Terminology updates for the case with DRX**: …  Agree with Proposal 1 as the proponent. The current terminology for no available SSB are not considering DRX in use. When DRX in use, the terminology should be aligned with the terminology used in ILDE mode.  <2nd time comment>  @Ericsson: We agree that the availability should take such as max(DRX, MGRP, SMTC) into account, and we can further study how to fix it. This clarification is to capture the bad luck UE and most UEs would have better luck not to miss SSB at every time it wakes up. Regarding the UE behavior at exceeding Lmax, we also observe the mismatch understanding between UE and NW when DRX is in used, even in the current spec. However, we don’t have proper solution at this moment, and it also needs to be fix.  **Issue 1-2-1: Number of candidate SSBs for cell detection**: …  Support with Option 2, 3, 4, they are identical.  **Issue 1-3-1: Exact candidate SSB positions**: …  Comment on Option 2: Most likely UE will measure at least on the same candidate position. It can assume either the first positions or the same position detected in the last time.  **Issue 1-4-1: Further clarification on the set of candidate SSB positions**: …  No strong view. It could be obvious, because UE is not required to monitor SSB outside SMTC. |
| Ericsson | Issue 1-1-1 thru 1-1-3 (terminology) : Proposals need more consideration. If DRX period is smaller than SMTC period then it is the SMTC that determines SSB availability, not the DRX. And the case of MGRP also needs further consideration. We also see an issue with the UE behaviours at Lmax in the CR since the UE only knows what happens in SMTC it receives and not in SMTC while it is sleeping. So if we define an availability of SMTC Lmax behaviour based on all the SMTC in the DRX cycle, the UE would need to monitor them all which is clearly not possible with reasonable power consumption.  Issue 1-2-1 : (number of SSB candidate positions) : In principle option 2 could be agreeable but some clarifications are necessary on the wording from the input contributions:   * + - 1. Our understanding of option 2 is that the UE would be expected to detect an SSB provided that the SSB is available in the same candidate position for a time of Tpss\_sss\_sync       2. There is no coupling between what the UE is already monitoring (for measurement purposes) and SSB detection, meaning that if the UE is monitoring an SSB in one candidate position it still attempts to detect the same SSB in other candidate positions   Issue 1-3-1 : Option 1 (no need to fix). If the UE is already monitoring an SSB at a certain candidate position and then cell detection finds the same PCI/SSB index at a candidate position outside of the UE capabilities (ie not within 2 successive QCL’ed candidate positions) there is no need for RAN4 to specify a UE behaviour (e.g. UE may continue to monitor the old candidate position, drop the measurement at the old candidate position and start to monitor at the newly detected candidate position or any other option according to its implementation)  Issue 1-4-1 : Option 1 is OK for us with earlier clarifications |
| Nokia | Issue 1-1-1, 1-1-2 and 1-1-3: we agree with Ericsson’s comment. The proposals need to be further clarified.  Issue 1-2-1: We prefer option 1. Even in NR, the requirements are defined under the assumption that the UE is monitoring different SSB indexes. With option 2, there is no assurance for the gNB that the UEs will be monitoring other candidate SSBs, this is more relaxed than the other requirements, which will be tested with the assumption that UEs will be monitoring 2 candidate positions. Note that with option 1 it is not being required that the UE combines SSB indexes in different positions, but that it monitors it. However, we understand that this might increase UE complexity, and at this point we are willing to compromise to Option2, if the wording is clarified as commented by Ericsson.  Issue 1-3-1: Option 1, there is no need to fix the agreements.  Issue 1-4-1: We believe that the clarification is not necessary. But if the other companies support it, we will not object to clarify it. |
| Apple: | **Issue 1-1-1: Terminology updates for the case without DRX, MGRP, etc. for 38.133**: …  **Issue 1-1-2: Terminology updates for the case without DRX, MGRP, etc. for 36.133**: …  **Issue 1-1-3: Terminology updates for the case with DRX**: …  Fine with MTK proposal.  **Issue 1-2-1: Number of candidate SSBs for cell detection**: …  Support option 2  **Issue 1-3-1: Exact candidate SSB positions**: …  We agree that it shall be further clarified in the spec. Maybe just say two of the candidate QCLed SSBs.  **Issue 1-4-1: Further clarification on the set of candidate SSB positions**: …  support option 1 but still needs to take into account the conclusion from issue 1-3-1.  **Others**: … |
| Qualcomm | **Issue 1-2-1: Number of candidate SSBs for cell detection**:  **Suggest to modify the text as:**  “For cell detection, the requirements are defined under the assumption that UE monitors at least 1 candidate SSB position for a particular SSB index in one SSB block burst.”  The term “**particular** SSB index in one SSB Block burst” clarifies the intent that the candidate SSB positions for the same SSB index are being monitored in one SSB Block burst |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2014868 (38.133, MediaTek) | Ericsson : While we understand the issue, the solution proposed seems to have some problem. Under the proposed solution, if an SMTC failure occurs while the UE is sleeping it will be unaware about that but we have a specified behaviour when the UE reaches Lmax. Also, what is DRX cycle is shorter than SMTC period; and what if the UE is configured also with MG and DRX length is not the longest among MGRP, SMTC, and DRX lengths?. |
| Apple: fine with MTK CR |
|  |
| R4-2016409 (38.133, Ericsson) | Huawei: The exact candidate SSB positions that UE is required to monitor related to Issue 1-3-1 and 1-4-1. |
| Apple: need to wait the conclusions from issue 1-3-1 and 1-4-1. |
| Qualcomm - Need to incorporate agreements from GTW and ongoing discussions |
| R4-2016410 (36.133, Ericsson) | Nokia: depends on ongoing discussions. |
| Apple: need to wait the conclusions from issue 1-3-1 and 1-4-1. |
| Qualcomm - Need to incorporate agreements from GTW and ongoing discussions |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 1-1, issue 1-1-1** | **Issue 1-1-1: Terminology updates for the case without DRX, MGRP, etc. for 38.133**  Companies’ views:  *Tentative agreements:*   * The terminology needs to be updated in the following sections of TS 38.133, to capture the agreements from R4-2012249:  |  |  |  | | --- | --- | --- | | **Section number/title as agreed in [1]** | **Section number in TS 38.133** | **Terminology updates needed in TS 38.133** | | 4.2A Cell Re-selection when CCA is used | Same as in [1] | Yes | | 6.1A Handover when CCA is used at least in the target cell | 6.1B | Yes | | 6.2.1A RRC Re-establishment with CCA | Same as in [1] | Yes | | 6.2.3A RRC Connection Release with Redirection with CCA | 6.2.3.2.3 | Yes | | 8.1A Radio Link Monitoring with CCA on target frequency | Same as in [1] | Yes | | 8.3A Activation and Deactivation Delay of SCell operating with CCA | Same as in [1] | Yes | | 8.5A Link Recovery Procedures when CCA is used on target frequency | Same as in [1] | Yes | | 8.10A Active TCI state switching delay when CCA is used on target frequency | Same as in [1] | Yes | | 9.2A NR intra-frequency measurements when CCA is used | Same as in [1] | Yes | | 9.3A NR inter-frequency measurements when CCA is used | Same as in [1] | Yes | | 9.5.4A L1-RSRP measurement requirements (with CCA on serving cell) | Same as in [1] | Yes |   *Recommendations for 2nd round:*  No separate further discussion is needed for this issue. Work on the revision of CR R4-2016409. |
| **Sub-topic 1-1, issue 1-1-2** | **Issue 1-1-2: Terminology updates for the case without DRX, MGRP, etc. for 36.133**  Companies’ views:  *Tentative agreements:*   * The terminology needs to be updated in the following sections of TS 36.133, to capture the agreements from R4-2012249 [1]:  |  |  |  | | --- | --- | --- | | **Section number/title as agreed in [1]** | **Section number in TS 36.133** | **Terminology updates needed in TS 36.133** | | 4.2.2.5.7 Measurements of NR cells operating with CCA (CCA requirements for interRAT reselection) | Same as in [1] | Yes | | 5.3.4A E-UTRAN - NR FR1 Handover when CCA is used in the target cell | Same as in [1] | Yes | | 6.3.2.4A RRC connection release with redirection to NR with CCA | 6.3.2.5 | Yes | | 7.31A Addition and Release Delay of NR PSCell operating with CCA for E-UTRA - NR Dual Connectivity | Same as in [1] | Yes | | 8.1.2.4.21A E-UTRAN FDD – NR measurements when CCA is used | Same as in [1] | Yes | | 8.17.2.2.a SFTD Measurement requirements with CCA on target frequency | Same as in [1] | Yes | | 8.17.4A E-UTRA Inter-RAT NR Measurements when Configured with E-UTRA-NR Dual Connectivity Operation when CCA is used | Same as in [1] | Yes |   *Recommendations for 2nd round:*  No separate further discussion is needed for this issue. Work on the revision of CR R4-2016409. |
| **Sub-topic 1-1, issue 1-1-3** | **Issue 1-1-3: Terminology updates for the case with DRX**  Companies’ views: Companies understand the reasoning behind the proposal from MediaTek, but it was pointed out that the solution is not complete and is not even valid in certain cases (e.g., when DRX cycle length is shorter than SMTC period or when MGs are configured).  *Tentative agreements: -*  *Agreements from GTW session: was not discussed*  *Recommendations for 2nd round:*   * Further discussion is needed. * MediaTek to provide an updated solution for the DRX case which is addressing the comments from the 1st round. |
| **Sub-topic 1-2, issue 1-2-1** | **Issue 1-2-1: Number of candidate SSBs for cell detection**  Companies’ views: Some companies were proposing at least 1 candidate SSB position in one SSB block burst, others – at least the same number of candidate SSB positions as in other RRM requirements. Some companies could also accept option 1 but under additional condition that 1 candidate SSB position for detection should not be impacted by what UE us already monitoring.  Some agreement was reached in GTW session, but the exact wording needs to be discussed in the CR.  *Agreements from GTW session:*  Agreement:   * + For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.     - Note: 1 candidate SSB position for detection should not be impacted by what UE is already monitoring   *Recommendations for 2nd round:*   * Capture the agreement in the revised CRs (R4-2016409 and R4-2016410). No separate further discussion is needed for this issue. |
| **Sub-topic 1-3, issue 1-3-1** | **Issue 1-3-1: Exact candidate SSB positions**  Companies’ views: some companies want to specify the exact candidate SSB positions for UE to monitor, while other companies prefer to not fix them. An agreement was reach in the GTW session.  *Agreements from GTW session:*  Agreement: Do not fix exact SSB positions for cell detection  *Recommendations for 2nd round:*   * No further discussion is needed for this issue in the 2nd round. |
| **Sub-topic 1-4, issue 1-4-1** | **Issue 1-4-1: Further clarification on the set of candidate SSB positions**  Companies’ views: some companies want a clarification in the spec, while others did not see the need for this. An agreement was reach in the GTW session.  *Agreements from GTW session:*  Agreement: Except cell detection, RRM core requirements are defined under assumption what UE monitors the first 2 successive QCL’ed candidate SSB positions (i.e. N1 = N2 = 2). For a certain SSB index which has only one configured candidate SSB position in the SSB burst, UE monitors 1 candidate SSB position for this SSB in one SSB burst.  *Recommendations for 2nd round:*   * Capture the agreement in the revised CRs (R4-2016409 and R4-2016410). No separate further discussion is needed for this issue. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on NR-U RRM core | Ericsson |
|  |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2014868 (38.133, MediaTek) | Can be noted. If there is an agreement on issue 1-1-3, it will be captured in (the revisions of) R4-2016409 and R4-2016410. |
| R4-2016409 (38.133, Ericsson) | To be revised to account for the new agreements |
| R4-2016410 (36.133, Ericsson) | To be revised to account for the new agreements |

## Discussion on 2nd round

### Open issues

In the 2nd round, the companies are invited to discuss further the following issues:

**Issue 1-1-3: Terminology updates for the case with DRX**

* Proposal 1 (MediaTek Inc.): For the requirements with DRX in use, to add notes “X is the number of DRX cycles with at least one SMTC where there are no SSBs available at the UE during … period when DRX is used”, where
* X shall be replaced depending on the requirement with:
  + RLM-RS SSB in RLM requirements,
  + CBD-RS SSB in CBD requirements,
  + SSB in L1-RSRP measurement requirements,
  + SMTC in measurement requirements other than RSSI requirements and L1-RSRP,
* and … shall be replaced with what is appropriate:
  + evaluation,
  + detection,
  + identification,
  + measurement, etc.

*Recommendations for 2nd round:*

* Further discussion is needed.
* MediaTek to provide an updated solution for the DRX case which is addressing the comments from the 1st round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Sub topic 1-1, issue 1-1-3**: …  Others: … |
|  |  |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2017081 (Revision of R4-2016409,  38.133, Ericsson) | Company A |
| Company B |
|  |
| R4-2017082 (Revision of R4-2016410, 36.133, Ericsson) | Company A |
| Company B |
|  |

## Summary on 2nd round

TBD

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2017080 |  |
| R4-2017081 |  |
| R4-2017082 |  |

# Topic #2: Cell re-selection

Contributions from AI 7.1.6.2 are discussed here.

## Companies’ contributions summary

No submitted contributions under this AI. No discussion in the 1st round.

# Topic #3: Handover requirements

Contributions from AI 7.1.6.3 are discussed here.

## Companies’ contributions summary

No submitted contributions under this AI. No discussion in the 1st round.

# Topic #4: RRC connection mobility control

Contributions from AI 7.1.6.4 are discussed here.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015202 | Nokia, Nokia Shanghai Bell | CR 38.133: Introducing NR-U random access requirements |
| R4-2015386 | Nokia, Nokia Shanghai Bell | **Observation 1**: RAN2 has modified the random-access procedure to handle LBT failures during both 2-step RA type and 4-step RA type. However, this modification was not discussed in RAN4, despite being agreed in the past to introduce a new clause in TS 38.133 with the modified requirements.  **Observation 2**: The UE behaviour during random access procedure will be different from baseline NR requirements, if the UE is blocked by LBT failure for the transmission of the preamble, in 4-step RA type, or for the transmission of msgA in 2-step RA type. Additionally, the behaviour is also different depending on the configuration of *lbt-FailureRecoveryConfig.*  Proposal 1: RAN4 to create a new clause in TS 38.133, 6.2.2A, which is based on 6.2.2, but has adapted content in clauses that describe the correct behaviour when transmitting signals, clarifying that transmissions are only possible if the UL CCA is successful.  Proposal 2: For the 4-step RA type, agree on the clauses and proposed modifications considering the NR random access requirements baseline as described in Table 1.  Proposal 3: For the 2-step RA type, agree on the clauses and proposed modifications considering the NR random access requirements baseline as described in Table 2.  Table 1 - Summary of clauses in TS 38.133 with 4-step RA type procedure description and differences to corresponding clauses in 4-step RA type in NR-U   |  |  |  | | --- | --- | --- | | Corresponding clause with RA requirements in NR | Proposed clause with RA requirements in NR-U | Comments / needed modification when compared to the baseline NR requirements | | 6.2.2 Random access with CCA | 6.2.2A Random access with CCA | Only the title needs to be adapted. | | 6.2.2.1 Introduction | 6.2.2A.1 Introduction | References to corresponding clauses with 4 step RA and 2 step RA type | | 6.2.2.2 Requirements for 4-step RA type | 6.2.2A.2 Requirements | Exclusion of references to FR2 accuracy, clarification that the requirements are applicable to carrier frequencies with CCA | | 6.2.2.2.1 Contention based random access | 6.2.2A.2.1 Contention based random access | - | | 6.2.2.2.1.1 Correct behaviour when transmitting Random Access Preamble | 6.2.2A.2.1.1 Correct behaviour when transmitting Random Access Preamble | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion. Include the expected behaviour when UL CCA is not successful on the next available PRACH occasion, when: *lbt-FailureRecoveryConfig* is configured and when *lbt-FailureRecoveryConfig* is not configured. | | 6.2.2.2.1.2 Correct behaviour when receiving Random Access Response | 6.2.2A.2.1.2 Correct behaviour when receiving Random Access Response | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion | | 6.2.2.2.1.3 Correct behaviour when not receiving Random Access Response | 6.2.2A.2.1.3 Correct behaviour when not receiving Random Access Response | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion | | 6.2.2.2.1.4 Correct behaviour when receiving an UL grant for msg3 retransmission | 6.2.2A.2.1.4 Correct behaviour when receiving an UL grant for msg3 retransmission | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion | | 6.2.2.2.1.5 SA: Correct behaviour when receiving a message over Temporary C-RNTI | 6.2.2A.2.1.5 SA: Correct behaviour when receiving a message over Temporary C-RNTI | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion | | 6.2.2.2.1.6 Correct behaviour when contention Resolution timer expires | 6.2.2A.2.1.6 Correct behaviour when contention Resolution timer expires | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion | | 6.2.2.2.2 Non-contention based random access | 6.2.2A.2.2 Non-contention based random access | - | | 6.2.2.2.2.1 Correct behaviour when transmitting Random Access Preamble | 6.2.2A.2.2.1 Correct behaviour when transmitting Random Access Preamble | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion. Include the expected behaviour when UL CCA is not successful on the next available PRACH occasion, when: *lbt-FailureRecoveryConfig* is configured and when *lbt-FailureRecoveryConfig* is not configured. | | 6.2.2.2.2.2 Correct behaviour when receiving Random Access Response | 6.2.2A.2.2.2 Correct behaviour when receiving Random Access Response | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion | | 6.2.2.2.2.3 Correct behaviour when not receiving Random Access Response | 6.2.2A.2.2.3 Correct behaviour when not receiving Random Access Response | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion | | 6.2.2.2.3 UE behaviour when configured with supplementary UL | - | Not needed, this scenario is not possible in NR-U. |   Table 2 - Summary of clauses in TS 38.133 with 2-step RA type procedure description and differences to corresponding clauses in 2-step RA type in NR-U   |  |  |  | | --- | --- | --- | | Corresponding clause with RA requirements in NR | Proposed clause with RA requirements in NR-U | Comments / needed modification when compared to the baseline NR requirements | | 6.2.2.3 Requirements for 2-step RA type | 6.2.2A.3 Requirements for 2-step RA type with CCA | Exclusion of references to FR2 accuracy, clarification that the requirements are applicable to carrier frequencies with CCA | | 6.2.2.3.1 Contention based random access | 6.2.2A.3.1 Contention based random access | - | | 6.2.2.3.1.1 Correct behaviour when transmitting MsgA | 6.2.2A.3.1.1 Correct behaviour when transmitting MsgA | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion.  Include the expected behaviour when UL CCA is not successful on the next available PRACH occasion, when:   * *lbt-FailureRecoveryConfig* is configured * *lbt-FailureRecoveryConfig* is not configured and *PREAMBLE\_TRANSMISSION\_COUNTER* < *preambleTransMax* + 1   For the MsgA PUSCH part, clarify that it can only be transmitted if the UL CCA is successful for the transmission of the MsgA PRACH, and if the UL CCA is also successful for the MsgA PUSCH part. | | 6.2.2.3.1.2 Correct behaviour when receiving MsgB | 6.2.2A.3.1.2 Correct behaviour when receiving MsgB | Clarify that the transmission is only possible when UL CCA is successful | | 6.2.2.3.1.3 Correct behaviour when not receiving MsgB | 6.2.2A.3.1.3 Correct behaviour when not receiving MsgB | Clarify that the transmission is only possible when UL CCA is successful | | 6.2.2.3.2 Non-contention based random access | 6.2.2A.3.2 Non-contention based random access | - | | 6.2.2.3.2.1 Correct behaviour when transmitting MsgA | 6.2.2A.3.2.1 Correct behaviour when transmitting MsgA | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion.  Include the expected behaviour when UL CCA is not successful on the next available PRACH occasion, when:   * *lbt-FailureRecoveryConfig* is configured * *lbt-FailureRecoveryConfig* is not configured and *PREAMBLE\_TRANSMISSION\_COUNTER* < *preambleTransMax* + 1   For the MsgA PUSCH part, clarify that it can only be transmitted if the UL CCA is successful for the transmission of the MsgA PRACH, and if the UL CCA is also successful for the MsgA PUSCH part. | | 6.2.2.3.2.2 Correct behaviour when receiving MsgB | 6.2.2A.3.2.2 Correct behaviour when receiving MsgB | Clarify that the transmission is only possible when UL CCA is successful | | 6.2.2.3.2.3 Correct behaviour when not receiving Random Access Response | 6.2.2A.3.2.3 Correct behaviour when not receiving MsgB | Clarify that the transmission is only possible when UL CCA is successful | | 6.2.2.3.3 UE behaviour when configured with supplementary UL | * not needed | This scenario is not possible in NR-U. | |
| R4-2016175 | Ericsson | **Observation 1:** When the serving cell SSB Ês/Iot < -8 dB, the UE typically searches unknown cell once every 20 ms.  **Proposal 1:** The cell search delay for unknown intra-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K1)  **Proposal 2:** The cell search delay for unknown inter-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K2,i) |
| R4-2016176 | Ericsson | CR 38.133: Requirements for known cell in RRC re-establishment with CCA |

## Open issues summary

### Sub-topic 4-1: RRC re-establishment

Contributions and proposals related to RRC re-establishment are discussed here.

**Issue 4-1-1: Cell search delay for unknown intra-frequency cell**

Proposals

* Proposal 1 (Ericsson): The cell search delay for unknown intra-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K1).

Recommended WF

* Can Proposal 1 be agreed?

**Issue 4-1-2: Cell search delay for unknown inter-frequency cell**

Proposals

* Proposal 1 (Ericsson): The cell search delay for unknown inter-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K2,i).

Recommended WF

* Can Proposal 1 be agreed?

### Sub-topic 4-2: Random Access requirements

Contributions and proposals related to RA are discussed here.

**Issue 4-2-1: RA requirements in TS 38.133 - general**

Proposals

* Proposal 1 (Nokia): RAN4 to create a new clause in TS 38.133, 6.2.2A, which is based on 6.2.2, but has adapted content in clauses that describe the correct behaviour when transmitting signals, clarifying that transmissions are only possible if the UL CCA is successful.

Recommended WF

* Can Proposal 1 be agreed?

Agreements from GTW

* No agreement, further discussion is needed

**Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**

Proposals

* Proposal 1 (Nokia): For the 4-step RA type, agree on the clauses and proposed modifications considering the NR random access requirements baseline as described in Table 1.

Recommended WF

* Can Proposal 1 be agreed?

Agreements from GTW

* No agreement, further discussion is needed

Table 1 - Summary of clauses in TS 38.133 with 4-step RA type procedure description and differences to corresponding clauses in 4-step RA type in NR-U

|  |  |  |
| --- | --- | --- |
| Corresponding clause with RA requirements in NR | Proposed clause with RA requirements in NR-U | Comments / needed modification when compared to the baseline NR requirements |
| 6.2.2 Random access with CCA | 6.2.2A Random access with CCA | Only the title needs to be adapted. |
| 6.2.2.1 Introduction | 6.2.2A.1 Introduction | References to corresponding clauses with 4 step RA and 2 step RA type |
| 6.2.2.2 Requirements for 4-step RA type | 6.2.2A.2 Requirements | Exclusion of references to FR2 accuracy, clarification that the requirements are applicable to carrier frequencies with CCA |
| 6.2.2.2.1 Contention based random access | 6.2.2A.2.1 Contention based random access | - |
| 6.2.2.2.1.1 Correct behaviour when transmitting Random Access Preamble | 6.2.2A.2.1.1 Correct behaviour when transmitting Random Access Preamble | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion. Include the expected behaviour when UL CCA is not successful on the next available PRACH occasion, when: *lbt-FailureRecoveryConfig* is configured and when *lbt-FailureRecoveryConfig* is not configured. |
| 6.2.2.2.1.2 Correct behaviour when receiving Random Access Response | 6.2.2A.2.1.2 Correct behaviour when receiving Random Access Response | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion |
| 6.2.2.2.1.3 Correct behaviour when not receiving Random Access Response | 6.2.2A.2.1.3 Correct behaviour when not receiving Random Access Response | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion |
| 6.2.2.2.1.4 Correct behaviour when receiving an UL grant for msg3 retransmission | 6.2.2A.2.1.4 Correct behaviour when receiving an UL grant for msg3 retransmission | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion |
| 6.2.2.2.1.5 SA: Correct behaviour when receiving a message over Temporary C-RNTI | 6.2.2A.2.1.5 SA: Correct behaviour when receiving a message over Temporary C-RNTI | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion |
| 6.2.2.2.1.6 Correct behaviour when contention Resolution timer expires | 6.2.2A.2.1.6 Correct behaviour when contention Resolution timer expires | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion |
| 6.2.2.2.2 Non-contention based random access | 6.2.2A.2.2 Non-contention based random access | - |
| 6.2.2.2.2.1 Correct behaviour when transmitting Random Access Preamble | 6.2.2A.2.2.1 Correct behaviour when transmitting Random Access Preamble | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion. Include the expected behaviour when UL CCA is not successful on the next available PRACH occasion, when: *lbt-FailureRecoveryConfig* is configured and when *lbt-FailureRecoveryConfig* is not configured. |
| 6.2.2.2.2.2 Correct behaviour when receiving Random Access Response | 6.2.2A.2.2.2 Correct behaviour when receiving Random Access Response | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion |
| 6.2.2.2.2.3 Correct behaviour when not receiving Random Access Response | 6.2.2A.2.2.3 Correct behaviour when not receiving Random Access Response | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion |
| 6.2.2.2.3 UE behaviour when configured with supplementary UL | - | Not needed, this scenario is not possible in NR-U. |

**Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type**

Proposals

* Proposal 1 (Nokia): For the 2-step RA type, agree on the clauses and proposed modifications considering the NR random access requirements baseline as described in Table 2.

Recommended WF

* Can Proposal 1 be agreed?

Agreements from GTW

* No agreement, further discussion is needed

Table 2 - Summary of clauses in TS 38.133 with 2-step RA type procedure description and differences to corresponding clauses in 2-step RA type in NR-U

|  |  |  |
| --- | --- | --- |
| Corresponding clause with RA requirements in NR | Proposed clause with RA requirements in NR-U | Comments / needed modification when compared to the baseline NR requirements |
| 6.2.2.3 Requirements for 2-step RA type | 6.2.2A.3 Requirements for 2-step RA type with CCA | Exclusion of references to FR2 accuracy, clarification that the requirements are applicable to carrier frequencies with CCA |
| 6.2.2.3.1 Contention based random access | 6.2.2A.3.1 Contention based random access | - |
| 6.2.2.3.1.1 Correct behaviour when transmitting MsgA | 6.2.2A.3.1.1 Correct behaviour when transmitting MsgA | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion.  Include the expected behaviour when UL CCA is not successful on the next available PRACH occasion, when:   * *lbt-FailureRecoveryConfig* is configured * *lbt-FailureRecoveryConfig* is not configured and *PREAMBLE\_TRANSMISSION\_COUNTER* < *preambleTransMax* + 1   For the MsgA PUSCH part, clarify that it can only be transmitted if the UL CCA is successful for the transmission of the MsgA PRACH, and if the UL CCA is also successful for the MsgA PUSCH part. |
| 6.2.2.3.1.2 Correct behaviour when receiving MsgB | 6.2.2A.3.1.2 Correct behaviour when receiving MsgB | Clarify that the transmission is only possible when UL CCA is successful |
| 6.2.2.3.1.3 Correct behaviour when not receiving MsgB | 6.2.2A.3.1.3 Correct behaviour when not receiving MsgB | Clarify that the transmission is only possible when UL CCA is successful |
| 6.2.2.3.2 Non-contention based random access | 6.2.2A.3.2 Non-contention based random access | - |
| 6.2.2.3.2.1 Correct behaviour when transmitting MsgA | 6.2.2A.3.2.1 Correct behaviour when transmitting MsgA | Clarify that the transmission is only possible when UL CCA is successful on the next available PRACH occasion.  Include the expected behaviour when UL CCA is not successful on the next available PRACH occasion, when:   * *lbt-FailureRecoveryConfig* is configured * *lbt-FailureRecoveryConfig* is not configured and *PREAMBLE\_TRANSMISSION\_COUNTER* < *preambleTransMax* + 1   For the MsgA PUSCH part, clarify that it can only be transmitted if the UL CCA is successful for the transmission of the MsgA PRACH, and if the UL CCA is also successful for the MsgA PUSCH part. |
| 6.2.2.3.2.2 Correct behaviour when receiving MsgB | 6.2.2A.3.2.2 Correct behaviour when receiving MsgB | Clarify that the transmission is only possible when UL CCA is successful |
| 6.2.2.3.2.3 Correct behaviour when not receiving Random Access Response | 6.2.2A.3.2.3 Correct behaviour when not receiving MsgB | Clarify that the transmission is only possible when UL CCA is successful |
| 6.2.2.3.3 UE behaviour when configured with supplementary UL | * not needed | This scenario is not possible in NR-U. |

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 4-1-1: Cell search delay for unknown intra-frequency cell**: …  **Issue 4-1-2: Cell search delay for unknown inter-frequency cell**: …  **Issue 4-2-1: RA requirements in TS 38.133 - general**: …  **Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**: …  **Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type**: …  **Others**: … |
| Huawei | **Issue 4-1-1: Cell search delay for unknown intra-frequency cell**: …  We are fine with proposal 1.  **Issue 4-1-2: Cell search delay for unknown inter-frequency cell**: …  We are fine with proposal 1. |
| MTK | **Issue 4-1-1: Cell search delay for unknown intra-frequency cell**: …  We are fine with proposal 1.  **Issue 4-1-2: Cell search delay for unknown inter-frequency cell**: …  We are fine with proposal 1.  **Issue 4-2-1: RA requirements in TS 38.133 - general**: …  OK to clarify as Proposal 1  **Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**: …  4 step RACH is same as R15. Clarification on the common section would be also ok.  **Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type**: …  There is a separate WI for 2-step RA and it is not only for NR-U. The same requirement can be applied for NR-U and licensed band. It seems no need to specify the NR-U-specific requirements. |
| Ericsson | Issue 4-1-1: Support option 1  Issue 4-1-2: Support option 1  Issue 4-2-1 : Support option 1  Issue 4-2-2 : We need to agree on basic principles first, eg on how 2 step and 4 step RACH will be addressed in requirements.  Issue 4-2-3 : Impact on other requirements where 2-step RA is used may be more severe. There are rules related to switching between 2-step and 4-step linked to LBT failures etc. This may have to be addressed in the next meeting. |
| Nokia | **Issue 4-2-1: RA requirements in TS 38.133 - general**: we support Option 1. The random access procedure was modified in RAN2 as discussed in our paper, and this change should be taken into account in RAN4 specification. Furthermore, it was already agreed in the past that a new clause would be created in TS 38.133 with the requirements for random access in CCA.  **Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**: We support the proposal. This change is also reflected in CR R4-2015202.We do not agree that the requirements are the same as in Rel-15, since the procedure was modified by RAN2, to include LBT failures.  **Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type**: We support the proposal. This change is also reflected in CR R4-2015202.The proposed changes are based on the agreements / CRs of the 2-step RA type Work Item. |
| Apple | **Issue 4-1-1: Cell search delay for unknown intra-frequency cell**: …  Fine with option 1  **Issue 4-1-2: Cell search delay for unknown inter-frequency cell**: …  Fine with option 1  **Issue 4-2-1: RA requirements in TS 38.133 - general**: …  fine with the proposal.  **Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**: …  fine with the proposal.  **Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type**: …  For 2 step RACH, we may not combine R16 feature with NR-U, since we did not define other R16 feature requirement in NR-U either.  **Others**: … |
| Qualcomm | **Issue 4-1-1: Cell search delay for unknown intra-frequency cell**:  Okay with option 1  **Issue 4-1-2: Cell search delay for unknown inter-frequency cell**:  Okay with option 1  **Issue 4-2-1: RA requirements in TS 38.133 - general**: …  Okay with the proposal  **Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**: …  Okay with the proposal |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015202 (38.133, Nokia) | Ericsson : Further discussion is needed |
| Apple: same comment as to issue 4-2-3. |
|  |
| R4-2016176 (38.133, Ericsson) | Nokia: depends on ongoing discussions. |
| Company B: |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 4-1, issue 4-1-1** | **Issue 4-1-1: Cell search delay for unknown intra-frequency cell**  *Companies’ views:* The proposal is agreeable to all companies.  *Tentative agreements:*   * The cell search delay for unknown intra-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K1).   *Recommendations for 2nd round:* No further discussion is needed. |
| **Sub-topic 4-1, issue 4-1-2** | **Issue 4-1-2: Cell search delay for unknown inter-frequency cell**  *Companies’ views:* The proposal is agreeable to all companies.  *Tentative agreements:*   * The cell search delay for unknown inter-frequency cell when serving cell SSB Ês/Iot < -8 dB is (800+ 20 x K2,i).   *Recommendations for 2nd round:* No further discussion is needed. |
| **Sub-topic 4-2, issue 4-2-1** | **Issue 4-2-1: RA requirements in TS 38.133 - general**  *Companies’ views:* Having a separate section 6.2.2A (Random access with CCA) has been already agreed earlier in R4-1914628 (Outline specification structure for 36.133 and 38.133 NR-U requirements, Nov. 2019), no need to re-discuss. The proposed contents of this new section was brought for the first time in this meeting, so further discussion is needed to come up with more general agreements first.  *Tentative agreements: -*  *Agreements from GTW session: -*  *Recommendations for 2nd round:* No need to further discuss this issue (having a separate section 6.2.2A has been already agreed earlier in R4-1914628). Focus on issues 4-2-2 and 4-2-3. |
| **Sub-topic 4-2, issue 4-2-2** | **Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**  *Tentative agreements: -*  *Agreements from GTW session: -*  *Recommendations for 2nd round:*  Please answer the following questions:   * **Q1**: Do you agree with the specification structure for section 6.2.2A:   6.2.2A Random access with CCA  6.2.2A.1 Introduction  6.2.2A.2 Requirements  FFS: whether 6.2.2A.2 covers only 4-step RA or (if RAN4 will specify requirements for 2-step for NR-U) 6.2.2A.2 is further split to cover 4-step and 2-step RA or a separate section on the same level (e.g. 6.2.2A.3) is introduced for 2-step RA requirements   * **Q2**: Further discuss on how to address the RA requirements in TS 38.133 for 4-step RA type. Is Option 1 agreeable?   **Option 1**: the requirements are not the same as in Rel-15  **Option 2**: the requirements are the same as in Rel-15   * **Q3**: Do you agree:   the requirements for 4-step RA for NR-U will include the requirements for contention-based and non-contention based RA?   * **Q4**: Do you agree:   the requirements for 4-step RA for NR-U will not cover supplementary UL? |
| **Sub-topic 4-2, issue 4-2-3** | **Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type**  *Tentative agreements: -*  *Agreements from GTW session: -*  *Recommendations for 2nd round:*   * Down select between the options:   Option 1: RAN4 will define in Rel-16 NR-U RA requirements for 2-step RA access  Option 2: RAN4 will not define in Rel-16 NR-U RA requirements for 2-step RA access  Can Option 1 be agreed?   * In case of Option 1,   What are the other impacted requirements/sections, in addition to section 6.2.2A? |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2015202 (38.133, Nokia) | Can be noted in this meeting |
| R4-2016176 (38.133, Ericsson) | Can be agreed |

## Discussion on 2nd round

### Open issues

In the 2nd round, the companies are invited to discuss further the following issues:

**Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**

*Recommendations for 2nd round:*

Please answer the following questions:

* **Q1**: Do you agree with the specification structure for section 6.2.2A:

6.2.2A Random access with CCA

6.2.2A.1 Introduction

6.2.2A.2 Requirements

FFS: whether 6.2.2A.2 covers only 4-step RA or (if RAN4 will specify requirements for 2-step for NR-U) 6.2.2A.2 is further split to cover 4-step and 2-step RA or a separate section on the same level (e.g. 6.2.2A.3) is introduced for 2-step RA requirements

* **Q2**: Further discuss on how to address the RA requirements in TS 38.133 for 4-step RA type. Is Option 1 agreeable?

**Option 1**: the requirements are not the same as in Rel-15

**Option 2**: the requirements are the same as in Rel-15

* **Q3**: Do you agree:

the requirements for 4-step RA for NR-U will include the requirements for contention-based and non-contention based RA?

* **Q4**: Do you agree:
  + the requirements for 4-step RA for NR-U will not cover supplementary UL?

**Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type**

*Tentative agreements: -*

*Agreements from GTW session: -*

*Recommendations for 2nd round:*

* Down select between the options:

Option 1: RAN4 will define in Rel-16 NR-U RA requirements for 2-step RA access

Option 2: RAN4 will not define in Rel-16 NR-U RA requirements for 2-step RA access

Can Option 1 be agreed?

* In case of Option 1,

What are the other impacted requirements/sections, in addition to section 6.2.2A?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 4-2-2: RA requirements in TS 38.133 – 4-step RA type**: …  **Issue 4-2-3: RA requirements in TS 38.133 – 2-step RA type**: …  **Others**: … |
|  |  |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
|  | Company A |
| Company B |
|  |

## Summary on 2nd round (if applicable)

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
|  |  |

# Topic #5: SCell Activation and Deactivation

Contributions from AI 7.1.6.5.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014013 | ZTE Corp. | **Proposal 1**: For inter-band CA, the interruption is not the same as for intra-band case and a single interruption applies. |
| R4-2014284 | Apple | **Observation 1**: if a UE is provided CSI-RS-ValidationWith-DCI-r16, is not provided CO-DurationPerCell-r16, and is not provided SlotFormatIndicator, and if the UE is configured by higher layers to receive a CSI-RS in a set of symbols of a slot on an deactivated SCell for CSI reporting for SCell activation, it unclear whether or not the UE cancels the CSI-RS reception in the set of symbols of the slot.  **Observation 2**: if a UE is configured by higher layers to receive a CSI-RS and the UE is provided CO-DurationPerCell-r16 and is not provided SlotFormatIndicator, it’s unclear if UE would decode DCI format 2\_0 to validate P/SP CSI-RS for the to-be-activated SCell.  **Proposal**: UE always attempts to measure P/SP CSI-RS for CSI reporting during the activation period regardless of the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16. No need to consider the requirement applicability associated with the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16. |
| R4-2014285  (Not available) | Apple | Draft CR 38.133: SCell activation requirement for NR-U |
| R4-2015203 | Nokia, Nokia Shanghai Bell | CR 38.133: NR-U SCell activation and deactivation requirements |
| R4-2015385 | Nokia, Nokia Shanghai Bell | **Observation 1**: If the sCellDeactivationTimer is not configured, the UE applies the value infinity, and the SCell can only be deactivated by receiving the MAC CE with the deactivation command.  **Observation 2**: For the purpose of SCell activation, the difference between NR and NR-U is that NR-U is subject to LBT, and LBT failures, which may cause the SCell activation to be delayed.  **Observation 3**: RAN4 has already discussed how to define taking into account the possible UL and DL LBT failures during the activation procedures, and decided that if the number of UL LBT failures is larger than the maximum allowed number, the UE will abandon the activation procedure [4].  **Observation 4**: In both NR and NR-U, the SCell activation delay requirement does not depend on the configuration of the *sCellDeactivationTimer*.  **Observation 5**: In NR, the requirements for the activation delay apply regardless of the *sCellDeactivationTimer* being configured or not.  **Observation 6**: The actions related to the *sCellDeactivationTimer* are applied after the UE transmits the HARQ-ACK for the MAC CE activation command, according to TS 38.213. Therefore, if the UE is blocked by UL LBT failure and cannot send the HARQ-ACK, the timer, if configured, will not be started, and there is no difference in the UE behaviour between the cases in which the *sCellDeactivationTimer* is configured, or is not configured.  **Observation 7**: In both NR and NR-U, the SCell deactivation delay requirement does not depend on the configuration of the *sCellDeactivationTimer*, if the timer is not configured. If the timer is configured, the impact is on the starting slot of the deactivation procedure.  **Observation 8**: If the gNB is blocked by DL LBT failure and cannot send the SCell deactivation command, the expected behaviour is that the SCell continues active. If the problem persists, there are existing mechanisms defined by RAN2 to control the connection between the serving cell and the UE.  **Observation 9**: If the gNB can send the MAC CE with the SCell deactivation command, but the UE cannot send the HARQ-ACK for this command, the gNB will be aware of this, and will retransmit the deactivation command. If the problem persists, there are existing mechanisms defined by RAN2 to identify and recover from persistent UL LBT failures.   1. In NR-U, the sCell activation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. 2. Remove the editor’s notes in clause 8.3A.2 in TS 38.133corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured. 3. In NR-U, the sCell deactivation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. 4. Remove the editor’s notes in clause 8.3A.3 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured. |
| R4-2015516 | Huawei, HiSilicon | CR 38.133: SCell activation and deactivation requirements for NR-U |
| R4-2015517 | Huawei, HiSilicon | **Proposal 1**: For inter-band CA when there is at least one active serving Cell in the band where the SCell is being activated, it will cause two interruption windows for each AGC failure.  **Proposal 2**: For the interruptions to the serving cells in the same band, whether to include the addition RF tuning should be further discussed.  **Proposal 3**: When there is no active serving Cell in the band where the SCell is being activated, whether to consider the additional RF tuning should be further discussed.  **Observation 1**: The benefits to clear to guarantee that the timer is configured in the activation and deactivation process, as the self-terminated mechanism is needed when the re-schedule of NW is not reliable with high LBT failure possibility.  **Observation 2**: The existing requirements don’t define the exact time the UE should stop sCellDeactivationTimer, which means when UE receives the deactivation command, UE would choose to stop the timer even the timer has not expired. Under this case, there is no benefit to force NW to configured the timer.  **Proposal 4**: If RAN4 is to define requirements only when sCellDeactivationTimer is configured, necessary clarification is needed that UE shall not stop sCellDeactivationTimer before UE successfully transmits the HARQ feedback for the deactivation command when sCellDeactivationTimer has not expired.  **Proposal 5**: For intra-band CA, while the SCell being activated is known or unknown with measurement cycle greater than 160ms, up to 1+L interruption windows are allowed during SCell activation, where L = L2,1 for known SCell and L = 1+L3,1 for unknown SCell. For a single interruption (L=0), interruption window length at SCell activation does not depend on DL CCA failures. |
| R4-2016411 | Ericsson | **Proposal 1**: For inter-band CA, the interruption is not the same as for intra-band case and a single interruption applies.  **Observation 1**: When sCellDeactivationTimer is not configured, the UE may get stuck in one of the phases of the sCell activation procedure until the network realizes this, without being able to stop the procedure or to move to another phase of the SCell activation procedure. This results in wasting the UE power, delaying the SCell activation, and degrading the network performance in general.  **Observation 2**: Some smarter UE may fail the SCell activation requirements, when sCellDeactivationTimer is not configured.  **Proposal 2**: The SCell activation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured.  **Proposal 3**: The SCell deactivation requirements for NR-U do not apply when the sCellDeactivationTimer is not configured. |
| R4-2016412 | Ericsson | CR 38.133: Updates in SCell activation in NR-U |
| R4-2016565 | Qualcomm Inc. | **Observation 1**. RF re-tuning in SCell activation may happen any time between   * Earliest: UE finishes MAC CE processing for the activation command, and * Latest: the first SSB burst UE is going to use.   **Observation 2**. AGC in SCell activation may happen at   * The first SSB burst. * Note: AGC is only needed for FR1/FR2 unknown case and FR1 known case with measurement cycle > 160ms. * Note: AGC interruption only applies to intra-band active serving cells.   **Proposal 1**. For inter-band CA, a single interruption window is allowed during the SCell activation.  **Proposal 2**. For intra-band CA, while the SCell being activated is known with measurement cycle <160ms, a single interruption window is allowed during SCell activation.  **Observation 3**. For a single interruption (L=0), interruption window length at SCell activation does not depend on DL CCA failures.  **Observation 4**. UE always perform RF re-tuning at or before the first scheduled SSB burst.  **Observation 5**. The starting point of an interruption should not depend on DL LBT failures in case of a single interruption that happens due to RF re-tuning only, i.e. when AGC is not required.  **Proposal 3**. For intra-band CA, the starting point of an interruption window on SpCell or any activated SCell as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:   * TFirstSSB , for known SCell activation when SCell measurement cycle is equal to, or smaller than, 160ms * TFirstSSB\_MAX + L2,1\* TSMTC-MAX , for known SCell activation when SCell measurement cycle is greater than 160ms * TFirstSSB\_MAX + L3,1\* TSMTC-MAX , for unknown SCell activation.   **Proposal 4**. For inter-band CA, the starting point of an interruption window on SpCell or any activated SCell as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:   * TFirstSSB , for known SCell activation when SCell measurement cycle is equal to, or smaller than, 160ms.   **Proposal 5**. The SCell activation requirements for NR-U do not apply when the *sCellDeactivationTimer* is not configured.  **Proposal 6a**. No new specification is needed for SCell deactivation requirements when *SCellDeactivationTimer* is not configured.  **Proposal 6b**. The SCell deactivation requirements for NR-U do not apply when the *SCellDeactivationTimer* is not configured.  **Proposal 7**. No such clarification is needed, even if the requirements apply only when *sCellDeactivationTimer* is configured. |
| R4-2016591 | Qualcomm Inc. | CR 38.133: Interruption windows and applicability of Scell activation and deactivation requirements for NR-U |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 5-1: Interruptions for inter-band CA

**Issue 5-1-1: Interruption for inter-band CA**

Proposals

* Proposal 1 (ZTE, Ericsson, Qualcomm): For inter-band CA, the interruption is not the same as for intra-band case and a single interruption applies.
* Proposal 2 (Huawei/HiSilicon): For inter-band CA when there is at least one active serving Cell in the band where the SCell is being activated, it will cause two interruption windows for each AGC failure.

Recommended WF

* Can Proposal 1 be agreed?

Agreements from GTW

Agreement:

For inter-band CA,

* + - For the case when there is no already activated SCell, a single interruption applies.
    - For the case when there is already activated SCell, interruption is FFS.

Recommended WF

* Further discuss the case when there is already activated SCell

**Issue 5-1-2: The interruption window location for inter-band CA**

Proposals

* Proposal 1 (Qualcomm): For inter-band CA, the starting point of an interruption window on SpCell or any activated SCell as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:

TFirstSSB.

Recommended WF

* Can Proposal 1 be agreed?

### Sub-topic 5-2: Interruptions for intra-band CA

**Issue 5-2-1: Interruption length for intra-band CA**

Proposals

* Proposal 1 (Huawei/HiSilicon): For the interruptions to the serving cells in the same band, whether to include the addition RF tuning should be further discussed.

Recommended WF

* Can Proposal 1 be agreed?

Agreements from GTW

* No agreement, further discussion is needed

**Issue 5-2-2: Number of interruption windows for intra-band CA**

Proposals

* Proposal 1 (Huawei/HiSilicon): For intra-band CA, while the SCell being activated is known or unknown with measurement cycle greater than 160ms, up to 1+L interruption windows are allowed during SCell activation, where L = L2,1 for known SCell and L = 1+L3,1 for unknown SCell. For a single interruption (L=0), interruption window length at SCell activation does not depend on DL CCA failures.
* Proposal 2 (Qualcomm): For intra-band CA, while the SCell being activated is known with measurement cycle <160ms, a single interruption window is allowed during SCell activation.

Recommended WF

* Discuss the proposals

**Issue 5-2-3: The interruption window location for intra-band CA**

Proposals

* Proposal 1 (Qualcomm): For intra-band CA, the starting point of an interruption window on SpCell or any activated SCell as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:
  + TFirstSSB , for known SCell activation when SCell measurement cycle is equal to, or smaller than, 160ms
  + TFirstSSB\_MAX + L2,1\* TSMTC-MAX , for known SCell activation when SCell measurement cycle is greater than 160ms
  + TFirstSSB\_MAX + L3,1\* TSMTC-MAX , for unknown SCell activation.

.

Recommended WF

* Can Proposal 1 be agreed?

### Sub-topic 5-3: Additional RF tuning with no active serving cells

**Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**

Proposals

* Proposal 1 (Huawei/HiSilicon): When there is no active serving Cell in the band where the SCell is being activated, whether to consider the additional RF tuning should be further discussed.

Recommended WF

* Can Proposal 1 be agreed?

### Sub-topic 5-4: Measuring CSI-RS during SCell activation

**Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**

Proposals

* Proposal 1 (Apple): UE always attempts to measure P/SP CSI-RS for CSI reporting during the activation period regardless of the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16. No need to consider the requirement applicability associated with the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16.

Recommended WF

* Can Proposal 1 be agreed?
* Do we need to send the LS to RAN1?

Agreements from GTW

No agreement. Continue discussion. Send LS to RAN1 if further clarifications on RAN1 assumptions are needed.

### Sub-topic 5-5: SCell activation/deactivation when *sCellDeactivationTimer* is NOT configured

**Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**

Proposals

* Option 1 (Qualcomm, Ericsson): The SCell activation requirements for NR-U do not apply when the *sCellDeactivationTimer* is not configured.
  + Observation (Ericsson): When sCellDeactivationTimer is not configured, the UE may get stuck in one of the phases (in DL or UL) of the sCell activation procedure until the network realizes this, without being able to stop the procedure or to move to another phase of the SCell activation procedure. Smarter UEs may not be able meet the current requirements.
* Option 2 (Nokia): In NR-U, the SCell activation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. Remove the editor’s notes in clause 8.3A.2 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured.

Recommended WF

* Can Option 1 be agreed?

Agreements from GTW

* No agreement. Continue discussion. Aim to identify scenario where “no timer” requirements may work. Consider to send LS to RAN2 if needed in case issues with procedure are identified.

**Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**

Proposals

* Proposal 1a (Qualcomm, Ericsson): The SCell deactivation requirements for NR-U do not apply when the *sCellDeactivationTimer* is not configured.
* Proposal 1b (Qualcomm): No new specification is needed for SCell deactivation requirements when SCellDeactivationTimer is not configured.
* Proposal 2 (Nokia): In NR-U, the sCell deactivation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. Proposal 4: Remove the editor’s notes in clause 8.3A.3 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured.

Recommended WF

* Can Proposal 1a or 1b be agreed?

### Sub-topic 5-6: SCell activation/deactivation when *sCellDeactivationTimer* IS configured

**Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**

Proposals

* Option 1 (Huawei/HiSilicon): If RAN4 is to define requirements only when *sCellDeactivationTimer* is configured, necessary clarification is needed that UE shall not stop *sCellDeactivationTimer* before UE successfully transmits the HARQ feedback for the deactivation command when *sCellDeactivationTimer* has not expired.
* Option 2 (Qualcomm): No such clarification is needed, even if the requirements apply only when *sCellDeactivationTimer* is configured

Recommended WF

* Discuss the options

Agreements from GTW

* No agreements. Further discuss the technical issue raised by Huawei. Consider to send LS to RAN2 to fix the issue if there is consensus

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 5-1-1: Interruption for inter-band CA**: …  **Issue 5-1-2: The interruption window location for inter-band CA**: …  **Issue 5-2-1: Interruption length for intra-band CA**: …  **Issue 5-2-2: Number of interruption windows for intra-band CA**: …  **Issue 5-2-3: The interruption window location for intra-band CA**: …  **Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**: …  **Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**: …  **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**: …  **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**: …  **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**: …  **Others**: … |
| Huawei | **Issue 5-1-1: Interruption for inter-band CA**: …  We support option 2. It is related to the RF tuning for intra-band CA. If there is an activated Cell within the same band of the Cell being activated, the typical implementation is to tuning RF before next SMTC for AGC, and if the SMTC not available, UE should tuning the RF back. The interruption for AGC (SMTC duration) may not need for inter-band Cell, and the RF tuning will cause interruption to inter-band CA.  **Issue 5-1-2: The interruption window location for inter-band CA**: …  We think it is related to whether there will be multiple interruptions for inter-band CA.  **Issue 5-2-1: Interruption length for intra-band CA**: …  As analysed in our paper. Cases are different when there is activated SCell in the same band. If there is no activated SCell in the same band, it the next SMTC is not available, UE may choose not to tuning the RF back and just waiting for the next SMTC for AGC, which will not cause addition interruption due to RF tuning back.  **Issue 5-2-2: Number of interruption windows for intra-band CA**: …  We support both option 1 and option 2, which are not precluded by each other.  **Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**: …  As commented in issue 5-1-1, if there is activated SCell within the same band, UE may tuning the RF back after an unavailable SMTC for AGC. Thus it will cause addition interruptions.  **Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**: …  We agree with option 1. But how to define L4 in the requirements is not clear. It has not been discussed whether UE could identify the unavailable CSI-RS.  **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**: …  We support option 1. The benefits to let NW configure the timer is clear in NR-U as UE could terminate the process by itself when the timer expires.  **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**: …  We support option 1 and we think Issue 5-5-1 and 5-5-2 should be considered jointly.  **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**:  We support option 1 if issue 5-5-2 option 1 is to be agreed. As analysed in our paper, according to the current RAN2 spec, the case when the timer expires and receiving the deactivation command is not differentiated, UE could stop the timer when receives the deactivation command even the timer is till running. For NR-U, such clarification is necessary, otherwise, UE could still get stuck even the timer is configured. |
| MTK | **Issue 5-1-1: Interruption for inter-band CA**: …  More discussion is needed. We see the benefit of Proposal 2 from the power saving perspective. 2x interruptions will allow UE to switch its BW back to save power.  Besides, we would have a clarification question for Proposal 2. In the Tdoc, the motivation is given as below:  *For inter-band CA, the AGC is not needed but the RF tuning will cause interruption to activated inter-band SCells. But what is different from legacy UE, when UE fails to adjust AGC due to unavailable SMTC, UE need to re-tuning its RF back, otherwise, it will cause interruption to the activated serving cells in the same band.*  Why it is inter-band CA scenario while it will cause interruption to the activated serving cells in the same band.  **Issue 5-1-2: The interruption window location for inter-band CA**: …  Agree with Option 1.  **Issue 5-2-1: Interruption length for intra-band CA**: …  Related to issue 5-1-1. The including addition RF will be meaningful only if it assumes UE can switch back its BW, and 2x interruptions should be allowed.  **Issue 5-2-2: Number of interruption windows for intra-band CA**: …  We would have a clarification for Proposal 1. Why the # of interruption windows should be at least 2 for unknown SCell activation?  **Issue 5-2-3: The interruption window location for intra-band CA**: …  Disagree with Proposal 1. For intra-band case, AGC interruption should be also considered. And the ending point of interruption will be impacted by the LBT failure and be reflected in Tx.  Thus, we should keep the current requirement. I.e.  where TX is:   * TFirstSSB + (L1)\* Trs, for known SCell activation when SCell measurement cycle is equal to, or smaller than, 160ms   <2nd time comment>  With Qualcomm’s clarification, we are fine with this proposal.  **Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**: …  Related to issue 5-1-1. The including addition RF will be meaningful only if it assumes UE can switch back its BW, and 2x interruptions should be allowed.  **Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**: …  More discussion would be needed for Proposal 1, and we prefer to keep the current wording as it clarifies that UE is not required to perform CSI-RS detection.  What happens if CSI-RS is absent due to LBT failure? Is UE allowed to report anything, e.g. CSI0? It should assume UE is NOT performing detection on CSI-RS, according to RAN1 LS.  <2nd time comment>  @Apple: remove the current L/Lmax would solve our concern, as in current spec it states exceeding Lmax UE shall ….. but UE will not know the value of L while no detection on CSI-RS and no higher layer indication regarding the presence of CSI-RS.  Besides, it should still clarify that the time point for verifying valid CQI report should be delayed if the CSI-RS resource is not successfully transmitted. |
| Ericsson | **Issue 5-1-1: Interruption for inter-band CA**: … support Proposal 1  **Issue 5-1-2: The interruption window location for inter-band CA**: … ok to align with Rel-15  **Issue 5-2-1: Interruption length for intra-band CA**: …additional delay due to RF retuning is not needed  **Issue 5-2-2: Number of interruption windows for intra-band CA**: … Proposal 1: no need to change. Proposal 2: Ok, but “is allowed” may be too vague, prefer “no more than/up to one interruption window is allowed”.  **Issue 5-2-3: The interruption window location for intra-band CA**: … Ok to align with Rel-15  **Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**: … additional delay due to RF retuning is not needed  **Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**: …Prefer to keep as it is in 38.133 now.  **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**: option 1  **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**: option 1a  **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**: …no such clarification is needed |
| Nokia | **Issue 5-1-1: Interruption for inter-band CA**: Proposal 1.  **Issue 5-1-2: The interruption window location for inter-band CA**: The proposal seems incomplete.  **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**: Option 2. In our view, as we have said for the past meetings, the requirements should always apply, also when the timer is Not configured. Many reasons for why the SCell activation delay should apply regardless of the configuration of the sCellDeactivationTimer are given in our paper R4-2015385.  1) **The SCell activation requirements do not depend on the sCellDeactivationTimer**  2) If configured, the timer is only started after the HARQ-ACK is sent; i.e., after there is a LBT success. Therefore, for the purpose of sCell activation delay requirement, there is no difference between the SCell activation when the timer is configured or not.  3) RAN4 has already extended the activation delay to account for LBT failures during the activation process (DL&UL), except for the HARQ-ACK. After reaching the maximum extension, the UE abandons the activation procedure: so there is no difference between the case in which sCellDeactivationTimer is configured or not.  Furthermore, the reason given in R4-2016565 for supporting option 1 is that it “enforces proper configuration by the NW”. If that is the case, the configuration of the timer should not be optional, as it is today, and this discussion should take place in RAN2, not in RAN4.  **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**: Proposal 2: If the timer is not configured, the only way to deactivate an SCell is to send the deactivation MAC CE. In this case, as in the SCell activation, RAN4 has already discussed procedures to extend the requirements. Therefore, in our view, no other change is needed, and the requirements should apply.  However, we also have a question for clarification of Proposal 1b: When Qualcomm proposes that no new specification is needed, does it imply that the SCell deactivation requirements apply when the timer is NOT configured? Because the requirements applied in Rel-15, and in the specification, it is not mentioned otherwise, except for the Editor notes and FFS. If our understanding is right, we can compromise to Proposal 1b.  **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**: We can agree to “no such clarification is needed”. The requirements are already defined by RAN4. The conditions for stopping the timer are already defined in RAN2. If RAN4 proposes to change the conditions for stopping the timer, this discussion should take place in RAN2. |
| Apple | **Issue 5-1-1: Interruption for inter-band CA**: …  [Apple]: we are fine with proposal 2 if UE tunes back RF to the original active serving CC after AGC settling failure due to LBT.  **Issue 5-1-2: The interruption window location for inter-band CA**: …  [Apple]: this issue is relevant to issue 5-1-1. We think in the worst case, UE may tune back to the original active serving CC after AGC settling failure due to LBT; and then it might cause multiple interruptions to inter-band serving cell(s).  **Issue 5-2-1: Interruption length for intra-band CA**: …  [Apple]: fine with Huawei proposal.  **Issue 5-2-2: Number of interruption windows for intra-band CA**: …  [Apple]: both of proposals are fine. The proposal 1 wording needs a little revision to “while the SCell being activated is unknown or known with measurement cycle greater than 160ms” in the final CR.  **Issue 5-2-3: The interruption window location for intra-band CA**: …  [Apple]: fine with the proposal.  **Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**: …  [Apple]: fine with the proposal.  **Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**: …  [Apple]: support. It’s unclear to us when at least one of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16 is configured, what do we expect UE to do? Will UE do the self-detection of CSI-RS or not? The validation parameters are configured to UE for CSI-RS validation and they shall work together with DCI indication, but we are unclear if UE shall decode DCI for this deactivated SCell; and if UE does not monitor DCI for this deactivated SCell, then what shall UE do with those validation configurations? One possibility is UE may keep measuring CSI-RS without any validation/detection, which is same as the case of “ none of of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16 is configured to UE”. If that’s the case, could we remove the current L/Lmax extension of CSI-RS from the requirement, because in all the scenarios UE is not required to do blind detection of CSI-RS for LBT status confirmation. Or we stated in spec that if LBT failure happens on CSI-RS for CSI reporting for SCell activation, no activation requirement is applied because CSI-RS validation is out of scope of R16 NR-U RRM requirement.  ----further comments------  To MTK:  Yes, we agree with your second comment. We also think the L4 and L4,max is meaningless since the CSI-RS validation cannot be done in this case. We can add one sentence in the spec that in case LBT failure happens on the CSI-RS for CSI report, the longer delay would be expected.  **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**: …  [Apple]: support option1.  **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**: …  [Apple]: support option 1a.  **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**: …  [Apple]: fine with option 1  **Others**: … |
| Huawei (further comments after GTW) | **Issue 5-1-1: Interruption for inter-band CA**: …  During the discussion in the GTW session, companies have concerns about the joint consideration of inter-band CA and intra-band CA. When we talking about inter-band CA, we are talking about the interruption on the Cell in different band from the band where the SCell is being activated, and the cases are further divided into when there is already activated Cell in the band where the SCell is being activated and no activated SCell in that band.  **Issue 5-2-1: Interruption length for intra-band CA**: …  When there is already activated SCell in the band, if the RF is remain opening after the AGC failure, it will damage the throughput of the activated SCell in the same band not only for power saving purpose.  **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**: …  **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**: …  **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**:  We could understand the concern from companies that if the applicability is related to whether the timer is configured, NW may never leave the timer undefined which mean infinite. But we think the benefit of configuring the timer is clear which can help UE from get stuck in the activation/deactivation procedure when the LBT is dropped and UE could only waiting for rescheduling from NW.  Thus, we should at least allow UE determine the process by itself when the timer is configured. We paste the RAN2 spec as follows when UE stops the timer:   |  | | --- | | **TS 38.321**  1> else if an SCell Activation/Deactivation MAC CE is received deactivating the SCell; or  1> if the *sCellDeactivationTimer* associated with the activated SCell expires:  2> deactivate the SCell according to the timing defined in TS 38.213 [6];  2> stop the *sCellDeactivationTimer* associated with the SCell; |   It could be observed that when deactivation command is received, UE could just stop the timer even it is still running. The two cases are considered together because the dropping of HARQ feedback is rarely happened. But for NR-U, it is quite common that the HARQ feedback is blocked due to LBT. When the timer is configured, if UE is waiting (Tharq), UE could abandon the purpose when the timer expires. So the benefit is clear that for NR-U, the two case should be distinguished instead of “… or…”.  We agree that it should be clarified in RAN2 spec, so we suggest to send LS to RAN2 about the concern and observation and the benefit to clarify the behaviour for NR-U from RAN4’s perspective. |
| Qualcomm | **Issue 5-1-1: Interruption for inter-band CA**:  We believe the case of activating a SCell in a band which already has activated SCells should be treated as intra-band CA case and not inter-band CA case.  @Huawei mentioned in their comment above – “When we talking about inter-band CA, we are talking about the interruption on the Cell in different band from the band where the SCell is being activated, and the cases are further divided into when there is already activated Cell in the band where the SCell is being activated and no activated SCell in that band”.  We agree with the first half of the comment about inter-band CA, but the second half contradicts this. We don’t have to consider the case when there is already an active Scell in that band, this would be considered as intra-band CA scenario from the point of view of the victim cell.  **Issue 5-1-2: The interruption window location for inter-band CA**  With the above understanding of the inter-band CA, we support Proposal 1.  @Nokia We believe the proposal is complete as there is no need to have separate conditions on known/unknown cells. The interruption depends only on the RF re-tuning.  **Issue 5-2-1: Interruption length for intra-band CA**:  We believe that additional delay due to RF Re-tuning is not required in intra-band scenario as the interruption length is extended up-to 5ms for intra-band cases (See TS 38.133 section 8.2.1.2.4). This is sufficient to incorporate RF retuning interruption at the end of SMTC period in case of LBT failure.  We do not support Proposal 1 and believe that additional delay due to RF tuning is not required.  **Issue 5-2-2: Number of interruption windows for intra-band CA**:  Proposal 1 and 2 are unrelated and should be treated separately.  We do not support Proposal 1 and believe that additional interruption during unknown Scell activation is not required.  We support Proposal 1 based on our arguments for a single interruption due to RF re-tuning.  **Issue 5-2-3: The interruption window location for intra-band CA**:  We support Option 1 based on our argument for a single interruption due to RF re-tuning which must happen on/before the first configured SSB.  @Mediatek There is no AGC required for a known Scell activation case when Scell measurement cycle is equal to, or smaller than, 160 ms.  **Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**:  We do not support Proposal 1 and believe that additional delay due to RF tuning is not required  **Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**:  We think it would be better to send LS to RAN1 seeking clarification on the topic.  **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**:  The SCell activation process is deemed complete when the UE sends a valid CSI report. While the LBT failures were considered in the computation of Tactivation\_time\_withCCA, the LBT failures are not considered in the calculation of TCSI\_ReportingDelay. So, the activation process may not be complete if UE encounters consistent UL LBT failures in sending the CSI reports and keep burning power. Having the *sCellDeactivationTimer* configured would allow the UE to stop the activation process and not get stuck in activation state for unknown time.  *TCSI\_ReportingDelay is the additional delay in transmission of CSI reporting due to CCA failure in UL. If there are no uplink resources for reporting the valid CSI, then the UE shall use the next available opportunities for reporting the corresponding valid CSI as specified in TS 38.213 [3].*  **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**:  We prefer Option 1b, Option 1a is acceptable as a compromise.  @Nokia – In our view, this can also happen in R15 NR SCell activation and is neither specific to NR-U nor it requires defining new UE behavior or requirements in RAN4. From TS 38.331:  In the absence of configuration of this timer, UE applies the value of infinity, similar to R15, and follows the procedure outlined in TS 38.321. No new specification is needed for NR-U in RAN4.  **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**:  Option 2. No such clarification is needed. |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2014285  (38.133, Apple) | Moderator: not available |
| Apple: withdawn. |
| Company B |
| R4-2015203 (38.133, Nokia) | Huawei: The CR depends on the conclusion of the pending issues. |
| Ericsson : We have concern on removing the note. Smarter UEs may fail the requirements, or otherwise be forced to burn power while being stuck with DL or UL LBT failures until the network realizes this, when the timer is not configured |
| Apple: up to conclusion in issue 5-5-1/5-5-2 |
| R4-2015516 (38.133, Huawei/HiSilicon) | Ericsson : CR is not needed. We agreed L2 and L3, there is no need to further increment L |
| Apple: up to the conclusion in this section |
|  |
| R4-2016412 (38.133, Ericsson) | Huawei: The CR depends on the conclusion of the pending issues. |
| Apple: up to the conclusion in this section |
|  |
| R4-2016591 (38.133, Qualcomm) | Huawei: The CR depends on the conclusion of the pending issues. |
| Ericsson : Need to resolve overlap with Ericsson's CR in R4-2016409. |
| Apple: up to the conclusion in this section |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 5-1, issue 5-1-1** | **Issue 5-1-1: Interruption for inter-band CA**  *Companies’ views:* agreement in GTW session for the case without already activated SCell, but the case with an already activated SCell is still open.  *Agreements from GTW session:*  Agreement:  For inter-band CA,   * + - For the case when there is no already activated SCell, a single interruption applies.     - For the case when there is already activated SCell, interruption is FFS.   *Candidate options:*   * Proposal 1 (ZTE, Ericsson, Qualcomm): For inter-band CA, the interruption is not the same as for intra-band case and a single interruption applies. * Proposal 2 (Huawei/HiSilicon): For inter-band CA when there is at least one active serving Cell in the band where the SCell is being activated, it will cause two interruption windows for each AGC failure.   *Recommendations for 2nd round:* Further discussion is needed for the case when there is already activated SCell. |
| **Sub-topic 5-1, issue 5-1-2** | **Issue 5-1-2: The interruption window location for inter-band CA**  *Companies’ views:* Further discussion is needed.  *Tentative agreements: -*  *Agreements from GTW session: -*  *Candidate options:*   * Proposal 1 (Qualcomm): For inter-band CA, the starting point of an interruption window on SpCell or any activated SCell as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:   TFirstSSB.  *Recommendations for 2nd round:*   * **Q1**: For the case without any SCell already activated, do you agree with Proposal 1? * **Q2**: For the case when there is already activated SCell, do you agree with Proposal 1? |
| **Sub-topic 5-2, issue 5-2-1** | **Issue 5-2-1: Interruption length for intra-band CA**  *Companies’ views:* Further discussion is needed  *Tentative agreements: -*  *Agreements from GTW session: -*  *Candidate options:*   * Proposal 1 (Huawei/HiSilicon): For the interruptions to the serving cells in the same band, whether to include the addition RF tuning should be further discussed.   *Recommendations for 2nd round:* Further discuss |
| **Sub-topic 5-2, issue 5-2-2** | **Issue 5-2-2: Number of interruption windows for intra-band CA**  *Companies’ views:* Proposal 2 is almost agreeable with some clarification requested. Proposal 1 needs more discussion. Proposals 1 and 2 are not related, and will be further discussed separately in the 2nd round.  *Tentative agreements: -*  *Agreements from GTW session: -*  *Candidate options:*   * Proposal 1 (Huawei/HiSilicon): For intra-band CA, while the SCell being activated is known or unknown with measurement cycle greater than 160ms, up to 1+L interruption windows are allowed during SCell activation, where L = L2,1 for known SCell and L = 1+L3,1 for unknown SCell. For a single interruption (L=0), interruption window length at SCell activation does not depend on DL CCA failures. * Proposal 2 (Qualcomm): For intra-band CA, while the SCell being activated is known with measurement cycle <160ms, a single interruption window is allowed during SCell activation.   *Recommendations for 2nd round:* Please answer the questions:  **Q1**: For measurement cycle >160 ms, can Proposal 1 be agreed?   * Proposal 1 (Huawei/HiSilicon): For intra-band CA, while the SCell being activated is known or unknown with measurement cycle greater than 160ms, up to 1+L interruption windows are allowed during SCell activation, where L = L2,1 for known SCell and L = 1+L3,1 for unknown SCell. For a single interruption (L=0), interruption window length at SCell activation does not depend on DL CCA failures.   **Q2**: For measurement cycle <160 ms:   * Proposal 2 (Qualcomm): For intra-band CA, while the SCell being activated is known with measurement cycle <160ms, a single interruption window is allowed during SCell activation. * Proposal 2a (Ericsson): For intra-band CA, while the SCell being activated is known with measurement cycle <160ms, no more than one interruption window is allowed during SCell activation. |
| **Sub-topic 5-2, issue 5-2-3** | **Issue 5-2-3: The interruption window location for intra-band CA**  *Companies’ views:* All companies are fine with the proposal, including MediaTek (after a clarification from Qualcomm).  *Tentative agreements:*  For intra-band CA, the starting point of an interruption window on SpCell or any activated SCell as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:   * + TFirstSSB , for known SCell activation when SCell measurement cycle is equal to, or smaller than, 160ms   + TFirstSSB\_MAX + L2,1\* TSMTC-MAX , for known SCell activation when SCell measurement cycle is greater than 160ms   + TFirstSSB\_MAX + L3,1\* TSMTC-MAX , for unknown SCell activation.   *Agreements from GTW session:* not discussed  *Recommendations for 2nd round:* No need to further discuss in the 2nd round. |
| **Sub-topic 5-3, issue 5-3-1** | **Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**  *Companies’ views:* Further discussion is needed  *Tentative agreements: -*  *Agreements from GTW session: -*  *Candidate options:*   * Proposal 1 (Huawei/HiSilicon): When there is no active serving Cell in the band where the SCell is being activated, whether to consider the additional RF tuning should be further discussed.   *Recommendations for 2nd round:* Further discuss the proposal. |
| **Sub-topic 5-4, issue 5-4-1** | **Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**  Companies’ views: Further discussion is needed  *Tentative agreements: -*  *Agreements from GTW session:* No agreement. Continue discussion. Send LS to RAN1 if further clarifications on RAN1 assumptions are needed.  *Candidate options:*   * **Option 1** (Apple): UE always attempts to measure P/SP CSI-RS for CSI reporting during the activation period regardless of the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16. No need to consider the requirement applicability associated with the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16. * **Option 2**: Keep the current text in the specification. * **Option 3**: Send LS to RAN1 to inform about the current RAN4 assumption regarding CSI-RS measurements during the SCell activation procedure. Unless RAN1 responds with something different, keep the current text in the specification.   *Recommendations for 2nd round:*   * + - * Down select among the three options above. * Draft an LS for Option 3 and send the LS if Option 3 is the preferred option by all companies. |
| **Sub-topic 5-5, issue 5-5-1** | **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**  Companies’ views: The majority (all except only one company) agrees to Option 1 and see the need for it. The same discussion continues for several meetings.  *Tentative agreements: -*  *Agreements from GTW session:* No agreement. Continue discussion. Aim to identify scenario where “no timer” requirements may work. Consider to send LS to RAN2 if needed in case issues with procedure are identified.  *Candidate options:*   * Option 1 (Qualcomm, Ericsson, Huawei, Apple): The SCell activation requirements for NR-U do not apply when the *sCellDeactivationTimer* is not configured. * Option 2 (Nokia): In NR-U, the SCell activation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. Remove the editor’s notes in clause 8.3A.2 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured.   *Recommendations for 2nd round:* The companies’ concern is that the total time the UE spends in SCell activation is currently unlimited in the requirements, when the *sCellDeactivationTimer* is not configured, since the UL LBT impact is not considered in the current requirements? This was not an issue for Rel-15, since there was no LBT. The requirements shall not mandate or assume that the UE will infinitely stay in SCell activation, but this is what Option 2 is suggesting.  To Nokia:   * + - how does Option 2 addresses the concern from all other companies?     - Can Nokia accept Option 1? |
| **Sub-topic 5-5, issue 5-5-2** | **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**  Companies’ views: No conclusion. All companies but one support option 1  *Tentative agreements:* -  *Agreements from GTW session:* -  *Candidate options:*   * Proposal 1a (Qualcomm, Ericsson, Huawei, Apple): The SCell deactivation requirements for NR-U do not apply when the *sCellDeactivationTimer* is not configured. * Proposal 1b (Qualcomm): No new specification is needed for SCell deactivation requirements when SCellDeactivationTimer is not configured. * Proposal 2 (Nokia): In NR-U, the sCell deactivation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. Proposal 4: Remove the editor’s notes in clause 8.3A.3 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured.   *Recommendations for 2nd round:* further discuss the issue together with 5-5-1. |
| **Sub-topic 5-6, issue 5-6-1** | **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**  Companies’ views: No conclusion. Further discussion is needed.  *Tentative agreements: -*  *Agreements from GTW session: -*  *Candidate options:*   * Option 1 (Huawei/HiSilicon): If RAN4 is to define requirements only when *sCellDeactivationTimer* is configured, necessary clarification is needed that UE shall not stop *sCellDeactivationTimer* before UE successfully transmits the HARQ feedback for the deactivation command when *sCellDeactivationTimer* has not expired. * Option 2 (Qualcomm): No such clarification is needed, even if the requirements apply only when *sCellDeactivationTimer* is configured   *Recommendations for 2nd round:* Further discussion is needed. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | LS to RAN1 on measuring CSI-RS during SCell activation. | Apple |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2014285  (38.133, Apple) | withdrawn |
| R4-2015203 (38.133, Nokia) | Can be noted. All agreements on SCell activation/deactivation are to be captured in the revision of R4-2016591 (Qualcomm was responsible for providing CRs on SCell activation/deactivation in previous meeting). |
| R4-2015516 (38.133, Huawei/HiSilicon) | Can be noted, if there is a conclusion on 5-2-2 requiring a change. All agreements on SCell activation/deactivation are to be captured in the revision of R4-2016591 (Qualcomm was responsible for providing CRs on SCell activation/deactivation in previous meeting). |
| R4-2016412 (38.133, Ericsson) | Can be noted. All agreements on SCell activation/deactivation are to be captured in the revision of R4-2016591 (Qualcomm was responsible for providing CRs on SCell activation/deactivation in previous meeting). |
| R4-2016591 (38.133, Qualcomm) | To be revised, to account for the comments and new agreements.  All agreements on SCell activation/deactivation are to be captured in the revision of R4-2016591 (Qualcomm was responsible for providing CRs on SCell activation/deactivation in previous meeting). |

## Discussion on 2nd round

### Open issues

In the 2nd round, the companies are invited to discuss further the following issues:

**Issue 5-1-1: Interruption for inter-band CA**

*Agreements from GTW session:*

Agreement:

For inter-band CA,

* + - For the case when there is no already activated SCell, a single interruption applies.
    - For the case when there is already activated SCell, interruption is FFS.

*Recommendations for 2nd round:*

Further discussion is needed for the case when there is already activated SCell:

* Proposal 1 (ZTE, Ericsson, Qualcomm): For inter-band CA, the interruption is not the same as for intra-band case and a single interruption applies.
* Proposal 2 (Huawei/HiSilicon): For inter-band CA when there is at least one active serving Cell in the band where the SCell is being activated, it will cause two interruption windows for each AGC failure.

**Issue 5-1-2: The interruption window location for inter-band CA**

Proposals

* Proposal 1 (Qualcomm): For inter-band CA, the starting point of an interruption window on SpCell or any activated SCell as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+ , where TX is:

TFirstSSB.

*Recommendations for 2nd round:* Please answer the questions:

* **Q1**: For the case without any SCell already activated, do you agree with Proposal 1?
* **Q2**: For the case when there is already activated SCell, do you agree with Proposal 1?

**Issue 5-2-1: Interruption length for intra-band CA**

Proposals

* Proposal 1 (Huawei/HiSilicon): For the interruptions to the serving cells in the same band, whether to include the addition RF tuning should be further discussed.

*Recommendations for 2nd round:*

* Further discuss the proposal

**Issue 5-2-2: Number of interruption windows for intra-band CA**

*Recommendations for 2nd round:*

Please answer the questions:

**Q1**: For measurement cycle >160 ms, can Proposal 1 be agreed?

* Proposal 1 (Huawei/HiSilicon): For intra-band CA, while the SCell being activated is known or unknown with measurement cycle greater than 160ms, up to 1+L interruption windows are allowed during SCell activation, where L = L2,1 for known SCell and L = 1+L3,1 for unknown SCell. For a single interruption (L=0), interruption window length at SCell activation does not depend on DL CCA failures.

**Q2**: For measurement cycle <160 ms, can Proposal 2a be agreed?

* Proposal 2 (Qualcomm): For intra-band CA, while the SCell being activated is known with measurement cycle <160ms, a single interruption window is allowed during SCell activation.
* Proposal 2a (Ericsson): For intra-band CA, while the SCell being activated is known with measurement cycle <160ms, no more than one interruption window is allowed during SCell activation.

**Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**

Proposals

* Proposal 1 (Huawei/HiSilicon): When there is no active serving Cell in the band where the SCell is being activated, whether to consider the additional RF tuning should be further discussed.

*Recommendations for 2nd round:* Further discuss the proposal.

**Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**

*Recommendations for 2nd round:*

* Down select among the options:
  + **Option 1** (Apple): UE always attempts to measure P/SP CSI-RS for CSI reporting during the activation period regardless of the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16. No need to consider the requirement applicability associated with the configuration of CO-DurationPerCell-r16, SlotFormatIndicator, or CSI-RS-ValidationWith-DCI-r16.
  + **Option 2**: Keep the current text in the specification.
  + **Option 3**: Send LS to RAN1 to inform about the current RAN4 assumption regarding CSI-RS measurements during the SCell activation procedure. Unless RAN1 responds with something different, keep the current text in the specification.
    - Draft an LS for Option 3 and send the LS if Option 3 is the preferred option by all companies.
  + **Option 4**: remove L4 and L4,max from the NR-U SCell activation requirement. Add one sentence in the spec that in case LBT failure happens on the CSI-RS for CSI report during SCell activation, the longer activation delay would be expected.

**Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**

*Recommendations for 2nd round:* The companies’ concern is that the total time the UE spends in SCell activation is currently unlimited in the requirements, when the *sCellDeactivationTimer* is not configured, since the UL LBT impact is not considered in the current requirements? This was not an issue for Rel-15, since there was no LBT. The requirements shall not mandate or assume that the UE will infinitely stay in SCell activation, but this is what Option 2 is suggesting.

* Option 1 (Qualcomm, Ericsson, Huawei, Apple): The SCell activation requirements for NR-U do not apply when the *sCellDeactivationTimer* is not configured.
* Option 2 (Nokia): In NR-U, the SCell activation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. Remove the editor’s notes in clause 8.3A.2 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured.

To Nokia:

* + - how does Option 2 addresses the concern from all other companies?
    - Can Nokia accept Option 1?

**Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**

*Recommendations for 2nd round:*

further discuss:

* Proposal 1a (Qualcomm, Ericsson, Huawei, Apple): The SCell deactivation requirements for NR-U do not apply when the *sCellDeactivationTimer* is not configured.
* Proposal 1b (Qualcomm): No new specification is needed for SCell deactivation requirements when SCellDeactivationTimer is not configured.
* Proposal 2 (Nokia): In NR-U, the sCell deactivation delay requirement applies regardless of the *sCellDeactivationTimer* being configured or not. Proposal 4: Remove the editor’s notes in clause 8.3A.3 in TS 38.133 corresponding to the applicability of the requirements and UE behaviour when the *sCellDeactivationTimer* is not configured.

**Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**

*Recommendations for 2nd round:*

Further discuss:

* Option 1 (Huawei/HiSilicon): If RAN4 is to define requirements only when *sCellDeactivationTimer* is configured, necessary clarification is needed that UE shall not stop *sCellDeactivationTimer* before UE successfully transmits the HARQ feedback for the deactivation command when *sCellDeactivationTimer* has not expired.
* Option 2 (Qualcomm): No such clarification is needed, even if the requirements apply only when *sCellDeactivationTimer* is configured

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 5-1-1: Interruption for inter-band CA**: …  **Issue 5-1-2: The interruption window location for inter-band CA**: …  **Issue 5-2-1: Interruption length for intra-band CA**: …  **Issue 5-2-2: Number of interruption windows for intra-band CA**: …  **Issue 5-3-1: Additional RF tuning time when there is no active serving cell in the same band with SCell being activated**: …  **Issue 5-4-1: Conditions for measuring CSI-RS during SCell activation**: …  **Issue 5-5-1: Applicability of SCell activation requirements when *sCellDeactivationTimer* is NOT configured**: …  **Issue 5-5-2: Applicability of SCell deactivation requirements when *sCellDeactivationTimer* is NOT configured**: …  **Issue 5-6-1: UE behaviour with respect to the timer when *sCellDeactivationTimer* IS configured**: …  Others: |
|  |  |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2017084 (Revision of R4-2016591, 38.133, Qualcomm) | Company A |
| Company B |
|  |

## Summary on 2nd round

TBD

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2017084 (revision of R4-2016591, 38.133, Qualcomm) |  |
| R4-2017083 (LS to RAN1 on measuring CSI-RS during SCell activation, Apple) |  |

# Topic #6: Active TCI state switching

Contributions from AI 7.1.6.6 are discussed here.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014190 | ZTE Corp | **Observation 1**: Once a RS is not transmitted due to DL LBT failure, the UE and the network all know that even without signalling.  **Observation 2**: In R16, the UE only performs omni-directional LBT, which means the LBT result will only depend on the channel occupancy. Changing the Rx or Tx beam of UE won’t change LBT result.  **Proposal 1**: Do not introduce enhancement into R16 specifications. Further study how to handle TCI state switching failures in R17. |
| R4-2015518 | Huawei/HiSilicon | CR 38.133: TCI state switching requirements for NR-U |
| R4-2016585 | Qualcomm Inc. | CR 38.133: MAC-CE based TCI State Switching requirements for NR-U |
| R4-2015792  (added upon chairman request in 2nd round) | ZTE | CR 38.133: Specify RRC processing delay in TCI state switching delay for R16 NR-U |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 6-1: Enhancements in Rel-17

**Issue 6-1-1: TCI state switching enhancements in Rel-17**

Proposals

* Proposal 1 (ZTE): Do not introduce enhancement into R16 specifications. Further study how to handle TCI state switching failures in R17.

Recommended WF

* Rel-17 scope is a separate discussion, not under this WI. No need to further discuss the proposal.

Agreements from GTW

Do not further discuss this proposal under this Rel-16 WI, consider bringing the proposal in the plenary instead.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 6-1-1: TCI state switching enhancements in Rel-17**: …  **Others**: … |
| MTK | **Issue 6-1-1: TCI state switching enhancements in Rel-17**: …  Agree with the Recommended WF. That would be a RANP discussion. |
| Ericsson | **Issue 6-1-1: TCI state switching enhancements in Rel-17** : Agree with recommended way forward |
| Nokia | **Issue 6-1-1:** Agree with the recommended WF. |
| Apple | **Issue 6-1-1: TCI state switching enhancements in Rel-17**: …  fine with recommend WF |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015518 (38.133, Huawei/HiSilicon) | Ericsson : OK in principle but prefer to renumber L2 as L1 now that existing L1 is gone |
| Nokia: we agree with the need to change the text so that it is consistent with the Rel-15 recent agreements, but we believe that the reason for change in the CR is wrong. Reading the reason for change, it looks like the CR is proposing to remove all L1-RSRP related requirements in NR-U, when it just proposes to remove the L1-RSRP requirements related to RX beam refinement because it is only defined for FR2, as agreed in R4-2012239. We also think that, in order to increase the clarity in the specification, a note could be added in clause 8.10A, commenting that. |
| Apple: fine with the CR |
| Huawei (further comments):  To Ericsson: Thanks for the comments. Indeed we had the L1/2 issue in mind when drafting the CR, our concern is that it may create some misalignment between the spec and previous agreements. But we are fine to fix it.  To Nokia: Thanks for the comments. Yes the reason for change looks a little bit ambiguous now. We could clarify it in the revised version and we are also fine to add the note for necessary clarification. |
| R4-2016585 (38.133, Qualcomm) | Ericsson : L1-RSRP should also be removed for RRC-based switching, not only MAC-CE based. So we prefer to use Huawei CR as the baseline to get to an agreeable CR |
| Apple: fine with the CR |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 6-1, issue 6-1-1** | **Issue 6-1-1: TCI state switching enhancements in Rel-17**  Companies’ views: All companies agree with the proposed WF.  *Agreements from GTW session:*  Do not further discuss this proposal under this Rel-16 WI, consider bringing the proposal in the plenary instead.  *Recommendations for 2nd round:*  No further discussion for this issue under this WI is needed in the 2nd round and next meetings. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |
|  |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2015518 (38.133, Huawei/HiSilicon) | To be revised to address the comments. Also consider merging R4-2015518 into R4-2015518. |
| R4-2016585 (38.133, Qualcomm) | Merged with R4-2015518. |

## Discussion on 2nd round

### Open issues

No open issues to discuss, focus on the CR.

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2017085 (Revision of R4-2015518, 38.133, Huawei/HiSilicon) | Company A |
| Company B |
|  |
| R4-2015792  (38.133, ZTE) | Company A |
| Company B |
|  |

## Summary on 2nd round

TBD

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| Revision of R4-2015518 (38.133, Huawei/HiSilicon) |  |
| R4-2015792  (38.133, ZTE) |  |

# Active BWP switching

Contributions from AI 7.1.6.7 are discussed here.

## Companies’ contributions summary

No submitted contributions under this AI. No discussion in the 1st round.

# Topic #8: RLM

Contributions from AI 7.1.6.8 are discussed here.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015519 | Huawei/HiSilicon | CR 38.133: CR on RLM requirements for NR-U |
| R4-2016413 | Ericsson | CR 38.133: Updates in RLM requirements for NR-U |

## Open issues summary

No open issues. Comments on the CR are collected in section 8.3.2.

## Companies views’ collection for 1st round

### Open issues

No open issues

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015519 (38.133, Huaei/HiSilicon) | Ericsson: Change 1: we prefer the way UE behavior is specified in Ericsson's RLM CR (R4-2016413). Change 2 (removing the transition requirements with CSI-RS): Ok. Change 3 (T310): not Ok, we had the same for (e)LAA. |
| Nokia: there are overlapping changes with R4-2016413, on how to capture the agreement about the exceeding Lin,max. We prefer the version on R4-2016413 regarding this topic. For the other changes, we agree with the need to remove the mentions to CSI-RS configured for RLM and also agree with the removal (or clarification) of the text mentioning that the UE shall not perform CCA after the expiry of T310. |
| Huawei (further comments): Regarding that UE shall not perform CCA after T310, for LAA it could only be added as SCell, but for NR-U, after T310 expire, UE may perform Re-establish also on the shared spectrum. So the statement may not comply with what we have in NR-U now. |
| R4-2016413 (38.133, Ericsson) | Huawei: We agree with changes on UE behavior when exceeding Lin,max, and we have made similar changes in our CR. But for the changes for COT duration clarification, we think it is not needed to capture it in the spec. It is the principle during the discussion, and based on the assumption, we have defined clear requirements and definition of unavailable SSB using SINR condition. The added clarification seems that other requirements apart from RLM may have relationships with the COT configuration. |
| Nokia: we are Ok with the change, but needs to be evaluated together with the changes proposed by R4-2015519. |
| Apple: NR-U only focus on SSB based RLM, why need to mention CO-DurationPerCell as a condition in the spec? |

## Summary for 1st round

### Open issues

No open issues.

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
|  |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2015519 (38.133, Huaei/HiSilicon) | Merge into R4-2016413. |
| R4-2016413 (38.133, Ericsson) | To be revised, considering the comments. |

## Discussion on 2nd round

### Open issues

No open issues.

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2017086 (Revision of R4-2016413, 38.133, Ericsson) | Company A |
| Company B |
|  |

## Summary on 2nd round

TBD

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2017086 (Revision of R4-2016413, 38.133, Ericsson) |  |
|  |  |

# Topic #9: Beam management

Contributions from AI 7.1.6.9 are discussed here.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015389 | Nokia, Nokia Shanghai Bell | **Observation 1**: The reply LS to RAN4 was extensively discussed in RAN1 102-e, but no conclusion was reached in that group regarding the expected UE behaviour when the HARQ-ACK for the MAC-CE deactivation command for SP-CSI is blocked by UL LBT failure. The issue will continue to be discussed in RAN1 103e.  **Proposal 1**: RAN4 to wait for the reply LS from RAN1 on the UE behaviour when the transmission of HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting is blocked by UL LBT failure. |
| R4-2015520 | Huawei, HiSilicon | CR 38.133: CR on Beam management requirements for NR-U |
| R4-2015818 | Ericsson | **Proposal 1**: Introduce new clause 9.5A in TS38.133 for L1-RSRP reporting under CCA.  **Proposal 2**: RAN4 should wait for LS response from RAN1 on the UE behavior when UE cannot transmit HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting. Once RAN4 receives the LS response from RAN1, RAN4 should restart the discussion and capture the UE behavior in TS38.133 if necessary. |
| R4-2015819 | Ericsson | CR 38.133: Beam management requirements with CCA |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 9-1: L1-RSRP

**Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**

Proposals

* Proposal 1 (Ericsson): Introduce new clause 9.5A in TS38.133 for L1-RSRP reporting under CCA.

Recommended WF

* Can proposal 1 be agreed?

**Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting**

Proposals

* Proposal 1 (Nokia): RAN4 to wait for the reply LS from RAN1 on the UE behaviour when the transmission of HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting is blocked by UL LBT failure.
* Proposal 2 (Ericsson): RAN4 should wait for LS response from RAN1 on the UE behavior when UE cannot transmit HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting. Once RAN4 receives the LS response from RAN1, RAN4 should restart the discussion and capture the UE behavior in TS38.133 if necessary.
* Proposal 3 (ZTE, R4-2014012 in AI 7.1.6.10): If UE cannot transmit HARQ-ACK on MAC-CE deactivation due to UL CCA failure, UE continues to be in its previous state, i.e., it should measure and report L1-RSRP until it successfully transmits HARQ-ACK.
* Proposal 4 (Qualcomm, R4-2016564 in AI 7.1.6.10): At least from MAC (RAN2) layer perspective, UE follows the actions related to MAC-CE activation/deactivation command immediately after decoding the MAC-CE command regardless of whether UE is able to send HARQ-ACK feedback or not.

Recommended WF

* RAN4 should wait for LS response from RAN1 on the UE behavior when UE cannot transmit HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting due to UL LBT failure.
* Once RAN4 receives the LS response from RAN1, RAN4 should resume the discussion and capture the UE behavior in TS 38.133 if necessary.

Agreements from GTW

Wait for RAN1 LS response

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**: …  **Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting**: …  **Others**: … |
| Huawei | **Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**: …  Agree with proposal 1  **Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting**: …  Agree with the recommended WF. |
| MTK | **Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**: …  Agree with proposal 1  **Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting**: …  Agree with the recommended WF. |
| Ericsson | **Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**: Since the new clause is our proposal we support it  **Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting**: …: Agree with the recommended WF and to wait on the reply LS |
| Nokia | **Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**: Proposal 1. We are ok to introduce a new clause.  **Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting**We support the WF. **Others**: … |
| Apple | **Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**: …  [Apple]: fine with proposal  **Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting**: …  [Apple]: agree with recommended WF. |
| Qualcomm | **Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**:  Agree with the proposal. |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015520 (38.133, Huawei/HiSilicon) | Ericsson: Propose to merge this correction to our CR R4-2015819. |
| Nokia: in general, we are OK with the changes. But there are ongoing discussions on the wording in the RLM clause in the CR below, that need to be taken into account here as well, so that the language in the specification is consistent. |
|  |
| R4-2015819 (38.133, Ericsson) | Apple: We have comments about the applicability with *CO-DurationPerCell,* so far the requirement is only for SSB based BFD, we may not need this CSI-RS validation condition. |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 9-1, issue 9-1-1** | **Issue 9-1-1: A new clause for L1-RSRP reporting under CCA in TS 38.133**  Companies’ views: All companies agree with the recommended WF  *Tentative agreements:* Introduce new clause 9.5A in TS38.133 for L1-RSRP reporting under CCA.  *Agreements from GTW session:* was not discussed  *Recommendations for 2nd round:* no further discussion is needed in the 2nd round. |
| **Sub-topic 9-1, issue 9-1-2** | **Issue 9-1-2: UE behavior when UE cannot transmit HARQ-ACK for MAC-CE deactivation of semi-persistent CSI reporting**  Companies’ views: All companies agree with the proposed WF  *Agreements from GTW session:* Wait for RAN1 LS response  *Tentative agreements:*  Since all companies are fine with the proposed WF which is a bit more detailed than the agreement from GTW session, the moderator suggests to mark the tentative agreement also as agreed (even though we had a shorter agreement in GTW):   * RAN4 should wait for LS response from RAN1 on the UE behavior when UE cannot transmit HARQ-ACK for MAC CE deactivation for semi-persistent CSI reporting due to UL LBT failure. * Once RAN4 receives the LS response from RAN1, RAN4 should resume the discussion and capture the UE behavior in TS 38.133 if necessary.   *Recommendations for 2nd round:* No further discussion is needed in the 2nd round. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |
|  |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2015520 (38.133, Huawei/HiSilicon) | Can be merged into R4-2015819, which is covering this and other issues on BM, to have a single CR on the topic. |
| R4-2015819 (38.133, Ericsson) | To be revised, to account for the received comments. |

## Discussion on 2nd round

### Open issues

No open issues, focus on the CR.

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2017087 (Revision of R4-2015819, 38.133, Ericsson) | Company A |
| Company B |
|  |

## Summary on 2nd round

TBD

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2017087 (Revision of R4-2015819, 38.133, Ericsson) |  |
|  |  |

# Topic #10: Measurement requirements

Contributions from AI 7.1.6.10 are discussed here.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014012 | ZTE Corp. | **Proposal 1** (discussed under sub-topic 12-1): Confirm the definition that a reference cell is available at the UE provided at least one SSB is available at the UE during the last 160 ms; otherwise it is unavailable at the UE.  **Proposal 2** (discussed under email thread #206): The RSSI measurement bandwidth shall be the LBT bandwidth.  **Proposal 3** (discussed under issue 9-1-2): If UE cannot transmit HARQ-ACK on MAC-CE deactivation due to UL CCA failure, UE continues to be in its previous state, i.e., it should measure and report L1-RSRP until it successfully transmits HARQ-ACK. |
| R4-2014869 | MediaTek inc. | **Observation 1**: For the UEs which supporting NR-U SCell (Scenario A) but not NR-U PCell/PSCell (Scenario B, C), it is pointless when the measurement target NR-U cells are asynchronized to NR PCell/PSCell. Where the ‘asynchronized’ is as defined as MRTD of CA scenarios.  **Proposal 1**: For the UEs which supporting NR-U SCell but not NR-U PCell/PSCell, the requirements of NR intra-/inter- frequency measurements with CCA are not applicable if the measurement target NR-U cells are asynchronized to the UE’s NR PCell/PSCell.  **Observation 2**: The target cell for SFTD measurement will not be configured as SCells.  **Proposal 2**: Add an optional UE capability for supporting SFTD measurement for NR neighbor cell in unlicensed band.  **Proposal 3**: CSSF outside gaps (CSSFoutside\_gap,i ) should be additionally increased if one MO configured both for RSSI measurement with gap and SSB-based measurement gap.  **Proposal 4**: CSSF within measurement gaps (CSSFwithin\_gap,i ) needs also to be adapted to account for inter-frequency RSSI/CO measurements and intra-frequency RSSI/CO measurements with gaps.  **Proposal 5**: Regarding the CSSF within measurement gaps (CSSFwithin\_gap,i ), a MO should be counted twice, if the MO with both SSB based measurerment and RSSI/CO measurement which are candidates to be measured in gap j where the measurement object i is also a candidate  **Proposal 6**: It is not necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC.  **Proposal 7**: Add clarification for UL scheduling restriction as “The UE is not expected to transmit PUCCH/PUSCH/SRS on the UL symbols which are overlapping in time with the RSSI measurement symbols configured by RMTC”. |
| R4-2014870 | MediaTek inc. | CR 38.133: intra-frequency and inter-frequency measurement with CCA and RSSI measurements |
| R4-2015205 | Nokia, Nokia Shanghai Bell | CR 38.133: NR-U intra-frequency measurements |
| R4-2015387 | Nokia, Nokia Shanghai Bell | **Observation 1**: The gNB has no control on the candidate position that will be used for transmission, since it depends on the channel access conditions. It is not possible to guarantee that the same SSB index will be always transmitted at the same candidate position.  **Observation 2**: During baseline NR cell detection, the UE measures all SSBs. If RAN4 cannot agree that all candidate positions should be monitored, at least the same number of candidate positions as in other RRM measurements should be monitored.  **Proposal 1 (**discussed under sub-topic 1-2**)**: For cell detection, UE is required to monitor at least the same number of candidate SSB positions as in other RRM measurements.  **Observation 3**: In intra-frequency RSSI measurements, the UE performs the measurement using the numerology of the active DL bandwidth part.  **Proposal 2**: For RSSI measurements, it is not necessary to extend the scheduling restriction for 1 data symbol before the RMTC, and for 1 data symbol after the RMTC. |
| R4-2015521 | Huawei, HiSilicon | CR 38.133: intra-frequency measurement requirements for NR-U |
| R4-2015522 | Huawei, HiSilicon | **Proposal 1**: In FR1 inter-band CA, the scheduling restriction due to one CC shall not apply to other CCs on the other bands.  **Proposal 2**: It is suggested not to include the scheduling restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC |
| R4-2016419 | Ericsson | CR 38.133: Measurement requirements for NR-U |
| R4-2016564 | Qualcomm Incorporated | **Proposal 1 (**discussed under sub-topic 1-2**)**: For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst.  **Observation 1**: When inter-band carrier aggregation within FR1 is configured, there are no scheduling restrictions on FR1 serving cell(s) configured in other bands than the bands in which PCell or PSCell is configured during Radio Link Monitoring and Link Recovery Procedures.  **Observation 2**: When inter-band carrier aggregation within FR1 is configured, there are no scheduling restrictions on FR1 serving cell(s) configured in other bands than the bands in which the serving cell where L1-SINR or L1-RSRP measurement is performed is configured.  **Proposal 2**: In FR1 inter-band CA, the scheduling restriction due to one CC shall not apply to other CCs on the other bands.  **Proposal 3** (discussed under issue 9-1-2): At least from MAC (RAN2) layer perspective, UE follows the actions related to MAC-CE activation/deactivation command immediately after decoding the MAC-CE command regardless of whether UE is able to send HARQ-ACK feedback or not.  **Proposal 4a**: It is necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC.  **Proposal 4b**: It is not necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC if the reference timing for intra-frequency RSSI/CO measurements in unlicensed spectrum is based on UE serving cell’s timing. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 10-1: RSSI measurements

**Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**

Proposals

* Proposal 1 (MediaTek): It is not necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC.
* Proposal 2 (Nokia): For RSSI measurements, it is not necessary to extend the scheduling restriction for 1 data symbol before the RMTC, and for 1 data symbol after the RMTC.
* Proposal 3 (Huawei): It is suggested not to include the scheduling restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC.
* Proposal 4 (Qualcomm):
  + A) It is necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC.
  + B) It is not necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC if the reference timing for intra-frequency RSSI/CO measurements in unlicensed spectrum is based on UE serving cell’s timing.

Recommended WF

* Discuss the proposals

**Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133**

Proposals

* Proposal 1 (MediaTek): Add clarification for UL scheduling restriction as “The UE is not expected to transmit PUCCH/PUSCH/SRS on the UL symbols which are overlapping in time with the RSSI measurement symbols configured by RMTC”.

Recommended WF

* Can proposal 1 be agreed?

### Sub-topic 10-2: Intra- and inter-frequency measurements

**Issue 10-2-1: Applicable time difference between the target NR-U cell and PCell/PSCell**

Proposals

* Proposal 1 (MediaTek): For the UEs which supporting NR-U SCell but not NR-U PCell/PSCell, the requirements of NR intra-/inter- frequency measurements with CCA are not applicable if the measurement target NR-U cells are asynchronized to the UE’s NR PCell/PSCell.

Recommended WF

* Discuss the proposal.

**Issue 10-2-2: Scheduling restrictions for inter-band CA**

Proposals

* Proposal 1 (Huawei, Qualcomm): In FR1 inter-band CA, the scheduling restriction due to one CC shall not apply to other CCs on the other bands.

Recommended WF

* Can Proposal 1 be agreed?

### Sub-topic 10-3: SFTD measurements

**Issue 10-3-1: SFTD capability**

Proposals

* Proposal 1 (MediaTek): Add an optional UE capability for supporting SFTD measurement for NR neighbor cell in unlicensed band.

Recommended WF

* Discuss the proposal

**Issue 10-3-2: SFTD measurement for NR neighbor cell (issue 1-6 in Rel-16 UE feature list discussed from Main session)**

Proposals

* Option 1 (MediaTek):

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **( 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD diff. | Need of FR1/FR2 diff. | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory  /Optional |
| 4-6 | SFTD measurement for NR neighbor cell | Support of SFTD measurement with and without measurement gaps between the NR Pcell/PSCell and NR neighbor cells in a band where shared spectrum channel access must be used | sftd-MeasNR-Neigh | Yes | N/A | Network cannot configure SFTD measurement between the NR Pcell/PSCell and NR neighbor cells in a band where shared spectrum channel access must be used | Per band | Yes | N/A | N/A |  | Optional with capability signaling |

Recommended WF

* Companies please provide your comments on whether to add new feature “SFTD measurement for NR neighbor cell” as NR-U UE feature, and the details of the feature description.

### Sub-topic 10-4: CSSF

**Issue 10-4-1: CSSF outside gap**

Proposals

* Proposal 1 (MediaTek): CSSF outside gaps (CSSFoutside\_gap,i) should be additionally increased if one MO configured both for RSSI measurement with gap and SSB-based measurement gap.

Recommended WF

* Can Proposal 1 be agreed?

**Issue 10-4-2: CSSF within gap- general**

Proposals

* Proposal 1 (MediaTek): CSSF within measurement gaps (CSSFwithin\_gap,i ) needs also to be adapted to account for inter-frequency RSSI/CO measurements and intra-frequency RSSI/CO measurements with gaps.

Recommended WF

* Can Proposal 1 be agreed?

**Issue 10-4-3: CSSF within gap**

Proposals

* Proposal 1 (MediaTek): Regarding the CSSF within measurement gaps (CSSFwithin\_gap,i ), a MO should be counted twice, if the MO with both SSB based measurerment and RSSI/CO measurement which are candidates to be measured in gap j where the measurement object i is also a candidate

Recommended WF

* Can Proposal 1 be agreed?

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**: …  **Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133**: …  **Issue 10-2-1: Requirements applicability for target NR-U cells asynchronized to PCell/PSCell**: …  **Issue 10-2-2: Scheduling restrictions for inter-band CA**: …  **Issue 10-3-1: SFTD capability**: …  **Issue 10-3-2: SFTD measurement for NR neighbor cell (issue 1-6 in Rel-16 UE feature list discussed from Main session)**: …  **Issue 10-4-1: CSSF outside gap**: …  **Issue 10-4-2: CSSF within gap- general**: …  **Issue 10-4-3: CSSF within gap**: …  **Others**: … |
| Huawei | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**: …  We think option 1/2/3/4b are actually same.  **Issue 10-2-1: Requirements applicability for target NR-U cells asynchronized to PCell/PSCell**: …  We could understand the motivation behind, but an further question: whether to consider the async CA defined in MR-DC.  **Issue 10-2-2: Scheduling restrictions for inter-band CA**: …  Support proposal 1.  **Issue 10-3-1: SFTD capability**: …  Similar comments in issue 10-2-1, whether to consider the async CA defined in MRDC.  **Issue 10-4-1: CSSF outside gap**: …  Can MTK further explain the proposal? Is it for the case when RMTC and SMTC are overlapped or when RMTC are fully overlapped within MG?  <2nd time comment>  **Issue 10-3-1: SFTD capability**: …  To MTK:  We still not very clear about the scenario of the proposed feature. Is it only for UE which could only support scenario A? If the feature is supported, does it mean the UE should be able to perform SFTD measurement between async SCell? And if the feature is not supported, UE could only do SFTD measurement between sync PCell and SCell or UE could not do SFTD between licensed band PCell and unlicensed band SCell at all?  Maybe some clarifications may help. |
| MTK | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**: …  Proposal 1/2/3 are identical.  Proponent of Proposal 4 seems accepting proposal 1/2/3 if the clarification is made regarding the reference timing.  We are fine with the clarification of the timing reference. It could further discuss whether to capture this clarification in spec or to be captured as an agreement is sufficient.  **Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133**: …  Support Proposal 1 as the proponent. The intention is to clarify the scenario when the symbol boundary between DL/UL are not aligned due to TA.  **Issue 10-2-1: Requirements applicability for target NR-U cells asynchronized to PCell/PSCell**: …  Support Proposal 1 as the proponent. The intention is to clarify the requirement applicability for the UEs which supporting NR-U SCell. The CA measurement should be synchronized.  <2nd time comment>  @Ericsson: For the UE which is supporting only NR-U CA, the measurement on async NR-U cell will be less meaningful for the current PCell, since the target cell cannot be configured as SCell. If the NW would change PCell, the measurement can be performed after HO under the sync condition.  @ Apple: Yes, we agree with that no NR-U RRM requirement shall apply for scenario A with async CA. This proposal further clarifies the measurement target should not be asyc. cells, as it will not be configured as SCell.  **Issue 10-2-2: Scheduling restrictions for inter-band CA**: …  Agree with Proposal 1.  **Issue 10-3-1: SFTD capability**: …  Support Proposal 1 as the proponent. The CA measurement should be synchronized, so this capability will be required by the UE which supporting NR-U SCell but not NR-U PCell/PSCell. The intention of this proposal is to generally include inter-frequency SFTD and intra-frequency neighboring cell SFTD  We understand RAN4 currently has no corresponding requirement, but we think it is necessary to add a capability to avoid mis-understanding between network and UE. Otherwise, one interpretation would be that for UE who support R15 inter-freq SFTD will also support inter-freq SFTD in NR-U with the same requirement. Or network can still ask UE to do it, although how long it takes by UE to finish the measurement is up to UE implementation.  <2nd time comment>  @Ericsson: One UE could support (CA+SFTD+ licensed) and (CA+ unlicensed), because the UE behaviour in unlicensed band is different for as in licensed band, e.g. UE may not find the target cell when LBT failure occurs.  The scenarios are clarified in 10-3-2. The intention is to include inter-freq. and intra-freq. SFTD, while we don’t have strong view on inter-RAT SFTD.  @ Apple: If the cell is not going to be configured as a SCell, what is the point to asking UE measure that cell.  **Issue 10-3-2:**  <2nd time comment>  We support to add new feature “SFTD measurement for NR neighbor cell” as NR-U UE feature.  The motivated is as given in Issue 10-3-1, for the UE which supporting R15 *sftd-MeasNR-Neigh* and supporting only NR-U SCell, it will be ambiguous that whether the UE is also supporting *sftd-MeasNR-Neigh* on unlicensed band or not. However, because the the UE only supporting NR-U SCell, the UE may not be able to measure SFTD on the aync target cell.  The feature will cover these scenarios:   * Inter-freq. SFTD measurement * Intra-freq. SFTD measurement, e.g. PCell in licensed band, SCell in unlicensed band and SFTD measure on the unlicensed band.   @ Qualcomm: One possible way would be just as what we did for mobility enhancement, e.g. adding it in RAN4 UE feature list, and inform RAN2 to add the corresponding feature in R2 list. RAN2 may not have the knowledge to know what would be the difference in PHY layer for UE to perform SFTD measurement in licensed and unlicensed band. We think this is more like a RAN4 expertise. So it should be fine to initiate from RAN4.  **Issue 10-4-1: CSSF outside gap**: …  Support Proposal 1 as the proponent. If one MO is configured both RSSI and SSB-based measurement, it should assume UE perform measurement for RSSI or SSB one by one (not at the same time) as the baseline UE behaviour.  <2nd time comment>  @ Ericsson: The limitation is not coming from RF but processing unit. Because RSSI and SSB are different measurement targets, it should be considered as 2 measurements.  @ Huawei: It is for the case when RMTC and SMTC are overlapped.  @ Nokia: It assume UE is not doing RSSI & SSB-based measurements at the same time when the RMTC is overlapping with the SMTC.  @ Apple: Yes, the assumed scenario is for one MO which is configured with both RSSI measurement without MG and SSB based RSRP/RSRQ measurement without MG.  **Issue 10-4-2: CSSF within gap- general**: …  Support Proposal 1 as the proponent. Similar to CSSF outside gap, the CSSF within gap should also be taken into account. There could be MO configured with RSSI and with/without SSB-based measurement.  **Issue 10-4-3: CSSF within gap**: …  Support Proposal 1 as the proponent. If one MO is configured both RSSI and SSB-based measurement, it should assume UE perform measurement for RSSI or SSB one by one (not at the same time) as the baseline UE behaviour. |
| Ericsson | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol** Think the UE can use the serving cell as the timing reference for RSSI measurement and hence no need for additional symbols before/after the last RSSI measurement symbol  **Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133**: Since RAN4 agreed to prioritise SMTC over UL transmission in licenced NR, RMTC should also be prioritized as per proposal 1 in NR-U  **Issue 10-2-1: Requirements applicability for target NR-U cells asynchronized to PCell/PSCell**:One problem is that the definition of asyncronised is proposed to be based on MRTD, but MRTD considers only serving cells, even in a synchronous deployment the MRTD of a neighbor cell could exceed MRTD. However, more generally a comment is that we see this whole assumption as too limiting and not really motivated. For example, the NW action related to detection of an asynchronous neighbor on NR-U could be to change the PCell to one that can operate synchronously with the newly found cell.  **Issue 10-2-2: Scheduling restrictions for inter-band CA**: …Agree on the proposal, similar principles as between FR1 licenced bands should apply  **Issue 10-3-1: SFTD capability**: …Unclear whether this is for inter-frequency SFTD only (we also have inter-RAT SFTD in 36.133), but in either case if the UE supports CA, supports SFTD, it then must support CA+SFTD, and if it supports CA+SFTD and supports unlicensed operation, it must support CA+SFTD+unlicensed all together too  **Issue 10-4-1: CSSF outside gap**: … We want to further discuss why there is a limitation that the UE cannot concurrently measure RSSI and SSB. For measurement outside MG both signals are within the active BWP so there is no RF limitation why they could not be processed on the same received signal.  **Issue 10-4-2: CSSF within gap- general**: …Similar view to CSSF outside gap, further discussion necessary if concurrent RSSI/CO and SSB measurement is feasible  **Issue 10-4-3: CSSF within gap**: …Need to discuss issue 10-4-2 before commenting on specific details of counting  <2nd time comment>  Issue 10-3-1/10-3-2 : We think that SFTD is a RAN2 feature, and discussion on whether to add an NR-U specific SFTD capability should take place in RAN2. Depending on the conclusion of RAN2 discussion, our view for RAN4 is that if the conclusion is to have an NR-U specific capability then RAN4 should revisit the inter-frequency requirements and define interfrequency SFTD requirements for the case of NR PCell + NR-U interfreq neighbour. For instance, such measurement could provide the network with information that a particular UE is within the synchronous time window and can be configured with NR-U CA and if we wanted to use it like that, there should be RAN4 requirements. Please note that we are not expressing a view that such a capability is needed, we are simply saying that if the capability is introduced, we would then see a need to revisit the RAN4 requirements discussion. |
| Nokia | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**: We believe that it is not necessary to include the restriction on 1 data symbol before/after the RMTC, because RAN1 has already decided that: “At least for RSSI measurement confined within the active DL BWP, UE performs RSSI measurement using the numerology of the active DL bandwidth part during the derived measurement duration. Otherwise, the numerology used by the UE for measurements is up to UE implementation.”  **Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133**: It is ok to clarify.  **Issue 10-4-1: CSSF outside gap**: we need to clarify for which cases the CSSF would be increased. Can the UE measure RSSI & SSB-based measurements at the same time? Is the proposal for when the RMTC is overlapping with the SMTC? We agree with the comments of Ericsson as well. |
| Apple | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**: …  [Apple]: Agree with proposal 1/2/3.  **Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133**: …  [Apple]: agree with MTK proposal  **Issue 10-2-1: Requirements applicability for target NR-U cells asynchronized to PCell/PSCell**: …  [Apple]: not fully understand the proposal. The async CA is not in the scope of NR-U discussion so far, so we can say no NR-U RRM requirement shall apply for scenario A with async CA.  **Issue 10-2-2: Scheduling restrictions for inter-band CA**: …  [Apple]: fine with proposal 1.  **Issue 10-3-1: SFTD capability**: …  [Apple]: We do not fully understand the motivation. SFTD measurement results collection is utilized by network, but it does not necessarily mean the target inter-freq cell from SFTD measurement result will be directly configured to this UE as a SCell. But we are fine to consider a new optional capability for NR-U inter-freq SFTD measurement.  ----further comments----  To MTK:  The SFTD measurement may not be directly used for this UE because it’s like a help to network to figure out the time difference in certain coverage, but the SFTD information can also be used for other UEs in this area.  **Issue 10-4-1: CSSF outside gap**: …  [Apple]: Does this proposal mean RSSI measurement without MG and SSB based RSRP/RSRQ measurement without MG are in the same MO? We agree to count them as 2 MOs because the measurement target are different.  **Issue 10-4-2: CSSF within gap- general**: …  [Apple]: fine with the proposal.  **Issue 10-4-3: CSSF within gap**: …  [Apple]: fine with the proposal.  **Others**: … |
| Qualcomm | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**:  We could agree to proposal 1/2/3 if the group agree to capture that the reference timing for intra-frequency RSSI/CO measurements in unlicensed spectrum is based on UE serving cell’s timing. This is also our second proposal (Option 4b).  **Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133**:  We are okay with the proposal.  **Issue 10-3-1: SFTD capability:**  SFTD is a RAN2 feature, not a RAN4 feature. The discussion should take place in RAN2.  We do not support the proposal.  **Issue 10-3-2: SFTD measurement for NR neighbor cell (issue 1-6 in Rel-16 UE feature list discussed from Main session)**:  SFTD is a RAN2 feature, not a RAN4 feature. The discussion should take place in RAN2.  We do not support adding the new feature on SFTD measurement. |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2014870 (38.133, MediaTek) | Moderator: depends at least on the outcome of sub-topics 10-2, 10-4. Overlaps with R4-2015523 in AI 7.1.6.11 (Topic #11) |
| Ericsson: need to discuss and conclude on the related issues first |
| Company B |
| R4-2015205 (38.133, Nokia) | Moderator: depends at least on the outcome of sub-topic 10-1. Overlaps with R4-2015521. |
| Ericsson: need to discuss and conclude on the related issues first |
| Company B |
| R4-2015521 (38.133, Huawei, HiSilicon) | Moderator: depends at least on the outcome of sub-topic 10-1. Overlaps with R4-2015205. |
| Ericsson: need to discuss and conclude on the related issues first |
| Company B |
| R4-2016419 (38.133, Ericsson) | Nokia: depends on a CR submitted in the e-mail discussion [206]. |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 10-1, issue 10-1-1** | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**  Companies’ views: The discussion is more between option 1 and option 2 below.  *Tentative agreements:* -  *Agreements from GTW session:* -  *Candidate options:*   * Option 1: It is *not necessary* to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC. * Option 2: It is *not necessary* to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC if the reference timing for intra-frequency RSSI/CO measurements in unlicensed spectrum is based on UE serving cell’s timing. * Option 3: It is necessary to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC.   *Recommendations for 2nd round:* Further discussion is needed.  Is the below agreeable:   * It is *not necessary* to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC * FFS: The reference timing for intra-frequency RSSI/CO measurements in unlicensed spectrum.   For the reference timing for RSSI/CO measurements, please answer the questions:   * **Q1**: do we really need to clarify this in the spec or state the RAN4 assumption in the WF? * **Q2**: what is the difference compared e.g. to how MGs are configured? * **Q3**: can the “serving cell” in Qualcomm’s proposal be any serving cell, e.g., PCell, SCell, or PSCell? * **Q4**: should it be linked to the reference timing for pTAG and sTAG? |
| **Sub-topic 10-1, issue 10-1-2** | **Issue 10-1-2: Scheduling restrictions – clarification in TS 38.133**  Companies’ views: all companies are Ok with the proposal  *Tentative agreements:*   * Add clarification for UL scheduling restriction as “The UE is not expected to transmit PUCCH/PUSCH/SRS on the UL symbols which are overlapping in time with the RSSI measurement symbols configured by RMTC”.   *Agreements from GTW session:* not discussed  *Recommendations for 2nd round:* no further discussion is needed |
| **Sub-topic 10-2, issue 10-2-1** | **Issue 10-2-1: Requirements applicability for target NR-U cells asynchronized to PCell/PSCell**  Companies’ views: diverse views  *Tentative agreements: -*  *Agreements from GTW session:* not discussed  *Candidate options:*   * Proposal 1 (MediaTek): For the UEs which supporting NR-U SCell but not NR-U PCell/PSCell, the requirements of NR intra-/inter- frequency measurements with CCA are not applicable if the measurement target NR-U cells are asynchronized to the UE’s NR PCell/PSCell.   *Recommendations for 2nd round:* Continue the discussion, addressing the questions and concerns. |
| **Sub-topic 10-2, issue 10-2-2** | **Issue 10-2-2: Scheduling restrictions for inter-band CA**  Companies’ views: All companies agree on option 1  *Tentative agreements:*  In FR1 inter-band CA, the scheduling restriction due to one CC shall not apply to other CCs on the other bands.  *Agreements from GTW session:* not discussed  *Recommendations for 2nd round:* no further discussion is needed |
| **Sub-topic 10-3, issue 10-3-1** | **Issue 10-3-1: SFTD capability**  Companies’ views: diverse views  *Tentative agreements:* -  *Agreements from GTW session:* not discussed  *Candidate options:*   * Option 1: RAN4 agrees to have the NR-U specific SFTD capability * Option 2: Leave the decision to RAN2 (this is RAN2 feature, not RAN4 feature) * Depending on the conclusion of RAN2 discussion, if the conclusion is to have an NR-U specific capability, RAN4 should revisit the inter-frequency SFTD requirements and define inter-frequency SFTD requirements for the case of NR PCell + NR-U inter-frequency neighbour.   *Recommendations for 2nd round:*  Further discuss the options. |
| **Sub-topic 10-3, issue 10-3-2** | **Issue 10-3-2: SFTD measurement for NR neighbor cell (issue 1-6 in Rel-16 UE feature list discussed from Main session)**  Companies’ views: diverse views  *Tentative agreements: -*  *Agreements from GTW session: -*  *Recommendations for 2nd round:* use the agreement from issue 10-3-1. In case Option 1 is agreed for issue 10-3-1, check whether the feature description is agreeable. |
| **Sub-topic 10-4, issue 10-4-1** | **Issue 10-4-1: CSSF outside gap**  Companies’ views: there are questions to answer to the proponent. Further discussion is needed  *Tentative agreements: -*  *Candidate options:*   * Proposal 1 (MediaTek): CSSF outside gaps (CSSFoutside\_gap,i) should be additionally increased if one MO configured both for RSSI measurement with gap and SSB-based measurement gap.   *Recommendations for 2nd round:* Further discussion is needed |
| **Sub-topic 10-4, issue 10-4-2** | **Issue 10-4-2: CSSF within gap- general**  Companies’ views: the discussion depends also on 10-4-1. there are questions to answer to the proponent. Further discussion is needed  *Tentative agreements: -*  *Candidate options:*   * Proposal 1 (MediaTek): CSSF within measurement gaps (CSSFwithin\_gap,i ) needs also to be adapted to account for inter-frequency RSSI/CO measurements and intra-frequency RSSI/CO measurements with gaps.   *Recommendations for 2nd round:* further discussion is needed |
| **Sub-topic 10-4, issue 10-4-3** | **Issue 10-4-3: CSSF within gap**  Companies’ views: the discussion depends also on 10-4-1 and 10-4-2. there are questions to answer to the proponent. Further discussion is needed  *Tentative agreements: -*  *Candidate options:*   * Proposal 1 (MediaTek): Regarding the CSSF within measurement gaps (CSSFwithin\_gap,i ), a MO should be counted twice, if the MO with both SSB based measurerment and RSSI/CO measurement which are candidates to be measured in gap j where the measurement object i is also a candidate   *Recommendations for 2nd round:* further discussion is needed |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |
|  |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2014870 (38.133, MediaTek) | Postpone. Need the agreements first |
| R4-2015205 (38.133, Nokia) | Can be noted. The proposed change is covered by Huawei’s CR R4-2015521. |
| R4-2015521 (38.133, Huawei, HiSilicon) | Return to. |
| R4-2016419 (38.133, Ericsson) | Return to. |

## Discussion on 2nd round

### Open issues

In the 2nd round, the companies are invited to discuss further the following issues:

**Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**

*Recommendations for 2nd round:*

Is the below agreeable:

* It is *not necessary* to include the restriction on 1 data symbol before the first RSSI measurement symbol configured by RMTC, and 1 data symbol after the last RSSI measurement symbol configured by RMTC
* FFS: The reference timing for intra-frequency RSSI/CO measurements in unlicensed spectrum.

To further discuss the issue on the reference timing for RSSI/CO measurements, please answer the questions:

* **Q1**: do we really need to clarify this in the spec or state the RAN4 assumption in the WF?
* **Q2**: what is the difference compared e.g. to how MGs are configured?
* **Q3**: can the “serving cell” in Qualcomm’s proposal be any serving cell, e.g., PCell, SCell, or PSCell?
* **Q4**: should it be linked to the reference timing for pTAG and sTAG?

**Issue 10-2-1: Requirements applicability for target NR-U cells asynchronized to PCell/PSCell**

*Recommendations for 2nd round:*

Continue the discussion, addressing the questions and concerns.

* Proposal 1 (MediaTek): For the UEs which supporting NR-U SCell but not NR-U PCell/PSCell, the requirements of NR intra-/inter- frequency measurements with CCA are not applicable if the measurement target NR-U cells are asynchronized to the UE’s NR PCell/PSCell.

**Issue 10-3-1: SFTD capability**

*Recommendations for 2nd round:*

Try to down select between the options:

* Option 1: RAN4 agrees to have the NR-U specific SFTD capability
* Option 2: Leave the decision to RAN2 (this is RAN2 feature, not RAN4 feature)
* Depending on the conclusion of RAN2 discussion, if the conclusion is to have an NR-U specific capability, RAN4 should revisit the inter-frequency SFTD requirements and define inter-frequency SFTD requirements for the case of NR PCell + NR-U inter-frequency neighbour.

Is option 2 agreeable?

**Issue 10-3-2: SFTD measurement for NR neighbor cell (issue 1-6 in Rel-16 UE feature list discussed from Main session)**

Recommendations for 2nd round:

* use the agreement from issue 10-3-1
  + In case Option 1 is agreed for issue 10-3-1, check whether the feature description is agreeable.

**Issue 10-4-1: CSSF outside gap**

*Recommendations for 2nd round:*

Further discussion is needed:

* FFS: CSSF outside gaps (CSSFoutside\_gap,i) should be additionally increased if one MO configured both for RSSI measurement with gap and SSB-based measurement gap.

**Issue 10-4-2: CSSF within gap- general**

*Recommendations for 2nd round:*

further discussion is needed

* FFS: CSSF within measurement gaps (CSSFwithin\_gap,i ) needs also to be adapted to account for inter-frequency RSSI/CO measurements and intra-frequency RSSI/CO measurements with gaps.

**Issue 10-4-3: CSSF within gap**

*Recommendations for 2nd round:*

further discussion is needed

* FFS: Regarding the CSSF within measurement gaps (CSSFwithin\_gap,i ), a MO should be counted twice, if the MO with both SSB based measurement and RSSI/CO measurement which are candidates to be measured in gap j where the measurement object i is also a candidate

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 10-1-1: Scheduling restrictions – 1 symbol before the first/after the last RSSI measurement symbol**: …  **Issue 10-2-1: Requirements applicability for target NR-U cells asynchronized to PCell/PSCell**: …  **Issue 10-3-1: SFTD capability**: …  **Issue 10-3-2: SFTD measurement for NR neighbor cell (issue 1-6 in Rel-16 UE feature list discussed from Main session)**: …  **Issue 10-4-1: CSSF outside gap**: …  **Issue 10-4-2: CSSF within gap- general**: …  **Issue 10-4-3: CSSF within gap**: …  Others: … |
|  |  |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015521 (38.133, Huawei, HiSilicon) | Company A |
| Company B |
|  |
| Revision of R4-2016419 (38.133, Ericsson) | Company A |
| Company B |
|  |

## Summary on 2nd round

TBD

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2015521 (38.133, Huawei, HiSilicon) |  |
| Revision of R4-2016419 (38.133, Ericsson) |  |

# Topic #11: Measurement capability and reporting criteria

Contributions from AI 7.1.6.11 are discussed here.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014283 | Apple | **Observation**: for a certain SSB index which has only one single candidate SSB position in the SSB burst, UE cannot monitor 2 candidate SSB position for this SSB in one SSB burst.  **Proposal 1 (**discussed under sub-topic 1-4, together with other papers on the same issue**)**: Except cell detection, RRM core requirements are defined under assumption what UE monitors the first 2 successive QCL’ed candidate SSB positions (i.e. N1 = N2 = 2). For a certain SSB index which has only one single candidate SSB position in the SSB burst, UE monitors 1 candidate SSB position for this SSB in one SSB burst.  **Proposal 2 (**discussed under sub-topic 1-2, together with other papers on the same issue**)**: For cell detection the requirements are defined under assumption that UE monitors at least 1 candidate SSB position in one SSB block burst. |
| R4-2015523 | Huawei, HiSilicon | CR 38.133: on CSSF RSS and CO measurement for NR-U |
| R4-2016414 | Ericsson | CR 38.133: Clause numbering correction |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

The proposals from R4-2014283 are discussed under Topic #1.

Comments on both CRs are collected in sections 11.3.2.

## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015523 (38.133, Huawei/HiSilicon) | Moderator: depends on the outcome in sub-topic 10-4 |
| Ericsson: need to discuss and conclude on the related issues first. |
| Company B |
| R4-2016414 (CR, 38.133, Ericsson) | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2015523 (38.133, Huawei/HiSilicon) | Can be noted.  Overlaps with MediaTek’s CR in R4-2014870 (Topic #11 where the entire CSSF discussion takes place). Suggest to merge this CR into MediaTek’s CR (provided there is an agreement on issue 10-4). |
| R4-2016414 (CR, 38.133, Ericsson) | Can be agreed |

## Discussion on 2nd round

### Open issues

No open issues or CRs for further discussion in the 2nd round.

# Topic #12: Timing

Contributions from AI 7.1.6.12 are discussed here.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014014 | ZTE Corp. | **Proposal 1**: Confirm the definition that a reference cell is available at the UE provided at least one SSB is available at the UE during the last 160 ms; otherwise it is unavailable at the UE. |
| R4-2015204 | Nokia, Nokia Shanghai Bell | CR 38.133: Clarification of NR-U timing requirements |
| R4-2015388 | Nokia, Nokia Shanghai Bell | **Observation 1**: The baseline NR requirements clarify that the Te requirements should be met provided that at least one SSB is available at the UE at the last 160 ms.  **Observation 2**: In the paragraphs related to NR-U in clause 7.1.2, there is no clarification that an SSB should be available at the UE at the last 160 ms, which can bring confusion when interpreting the specification.  **Proposal 1**: For NR-U, as in NR, a reference cell is available at the UE provided at least one SSB is available at the UE during the last 160 ms; otherwise it is unavailable at the UE.  **Proposal 2**: Clarify in the specification the definition of an available reference timing cell in carrier frequencies with CCA.  **Proposal 3**: If the proposed clarification is agreed, remove the Editor Note in clause 7.1.2 in TS 38.133. |
| R4-2015524 | Huawei/HiSilicon | **Proposal 1**: The available reference cell shall be defined based on the same conclusion for RLM/RRM. |
| R4-2016177 | Ericsson | Draft CR 38.133: Correction to timing requirements in NR-U |
| R4-2016563 | Qualcomm Inc. | **Proposal 1**: The availability/unavailability of a reference cell for timing purposes should be treated similar to the availability/unavailability of ‘X’s as in other RRM/RLM cases. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 12-1: Reference cell definition

**Issue 12-1-1: Reference cell definition**

Proposals

* Proposal 1 (ZTE): a reference cell is available at the UE provided at least one SSB is available at the UE during the last 160 ms; otherwise it is unavailable at the UE.
* Proposal 2 (Nokia): a reference cell is available at the UE provided at least one SSB is available at the UE during the last 160 ms; otherwise it is unavailable at the UE.
  + Clarify in the specification the definition of an available reference timing cell in carrier frequencies with CCA
* Proposal 3 (Ericsson, CR R4-2016409 under Topic #1): 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 the 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 corresponding identification period; otherwise the reference cell on the carrier frequency subject to CCA is considered as available at the UE.
* Proposal 4 (Qualcomm): The availability/unavailability of a reference cell for timing purposes should be treated similar to the availability/unavailability of ‘X’s as in other RRM/RLM cases.

Recommended WF

* Clarify in TS 38.133, section 7.1.1:
  + 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 160 ms**; otherwise the reference cell on the carrier frequency subject to CCA is considered as available at the UE.
* The agreement is to be captured in CR R4-2016409 under Topic #1, together with the “X is available” terminology clarification in other requirements.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 12-1-1: Reference cell definition**: …  **Others**: … |
| Huawei | **Issue 12-1-1: Reference cell definition**: …  We are generally fine with the clarification in the recommended WF, but it is also related to issue 1-3-1 and issue 1-4-1. |
| MTK | **Issue 12-1-1: Reference cell definition**: …  Disagree with the Recommended WF/Proposal 1 &2, while the “during the last 160 ms” is not acceptable. It will mandate UE to wake up to check every SMTC during 160 ms before UL transmission.  Agree with Proposal 3 or 4.  <2nd time comment>  @Nokia: We understood the last 160ms is also present in NR, but when LBT failures occur, the situation will be different. E.g. During 160 ms, if one SSB is successfully transmitted in the gap but no SSB can be transmitted outside the gap. From UE perspective there is no available SSBs, but from NW perspective, it could be considered there is one SSB available.  Another example is when DRX in use. If there is no available SSB during ON duration, it will be ambiguous how to determine there is one available SSB during the OFF duration. |
| Ericsson | **Issue 12-1-1: Reference cell definition**:Support recommended WF |
| Nokia | **Issue 12-1-1: Reference cell definition.** In general, we agree with the recommended WF. For MTK: the requirement of availability of SSB during the last 160ms is also present in NR. The decision of this issue should also consider whether RAN4 will agree on the clarification proposed in Issue: 1-4-1. |
| Apple | **Issue 12-1-1: Reference cell definition**: …  [Apple]: fine with recommended WF. |
| Qualcomm | **Issue 12-1-1: Reference cell definition**:  Fine with the WF |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015204 (38.133, Nokia) | Company A |
| Company B |
|  |
| R4-2016177 (draft CR, 38.133, Ericsson) | Nokia: depends on issue 12-1-1  Moderator: it is not related to issue 12-1-1. Was the comment meant to be for R4-2016409 (Topic #1) where we clarify the available terminology for timing and other requirements? |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 12-1, issue 12-1-1** | **Issue 12-1-1: Reference cell definition**  Companies’ views: The recommended WF is acceptable to all companies, except one.  *Tentative agreements: -*  *Agreements from GTW session:* not discussed  *Candidate options:*   * **Option 1 (recommended WF for the 1st round):** 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 160 ms**; otherwise the reference cell on the carrier frequency subject to CCA is considered as available at the UE. * **Option 1** (Proposal 3 (Ericsson, CR R4-2016409 under Topic #1)): 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 the 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 corresponding identification period; otherwise the reference cell on the carrier frequency subject to CCA is considered as available at the UE.   *Recommendations for 2nd round:*   * Further discuss Option 1 and Option 2 and try to come up with the final wording, focus on non-DRX case * DRX case: FFS, unless this can also be solved in this meeting * The agreement on this issue is to be captured in the revision of CR R4-2016409 under Topic #1, together with the “X is available” terminology clarification in other requirements. |

*Recommendations on WF/LS assignment*

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| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |
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### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2015204 (38.133, Nokia) | Merged into the revision of R4-2016409 (Topic #1). |
| R4-2016177 (draft CR, 38.133, Ericsson) | To be revised with a CR number (Nokia confirmed off-line that their comment was meant for another CR, so the CR is agreeable but it was submitted as a draft CR so it needs also a CR number which is the reason for revision) |

## Discussion on 2nd round

### Open issues

In the 2nd round, the companies are invited to discuss further the following issues:

**Issue 12-1-1: Reference cell definition**

*Recommendations for 2nd round:*

* Further discuss Option 1 and Option 2 and try to come up with the final wording, focus on non-DRX case:
  + **Option 1 (recommended WF for the 1st round):** 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 160 ms**; otherwise the reference cell on the carrier frequency subject to CCA is considered as available at the UE.
  + **Option 1** (Proposal 3 (Ericsson, CR R4-2016409 under Topic #1)): 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 the 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 corresponding identification period; otherwise the reference cell on the carrier frequency subject to CCA is considered as available at the UE.
  + DRX case: FFS, unless this can also be solved in this meeting
* The agreement on this issue is to be captured in the revision of CR R4-2016409 under Topic #1, together with the “X is available” terminology clarification in other requirements.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Company A | **Issue 12-1-1: Reference cell definition**: …  Others: … |
|  |  |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2017088 (Revision of R4-2016177, CR 38.133, Ericsson) | Company A |
| Company B |
|  |

## Summary on 2nd round

TBD

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2017088 (Revision of R4-2016177, CR 38.133, Ericsson) |  |
|  |  |

# Topic #13: Other requirements

Contributions from AI 7.1.6.13 are discussed here.

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015170 | Ericsson | CR 38.133: Updates to general section for NR-U in 38.133 |

## Open issues summary

No open issues. Comments on the CR are collected in section 13.3.2.

## Companies views’ collection for 1st round

### Open issues

No open issues

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015170 (38.133, Ericsson) | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

No open issues.

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
|  |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2015170 (38.133, Ericsson) | Can be agreed |

## Discussion on 2nd round

No discussion is need in the 2nd round on topic #13.