**3GPP TSG-RAN WG4 Meeting # 99-e R4-210XXXX**

**Electronic Meeting, 19th – 27th May, 2021**

**Agenda item:** 6.1.6

**Source:** Moderator (Nokia, Nokia Shanghai Bell)

**Title:** Email discussion summary for [99-e][210] NR\_unlic\_RRM\_2

**Document for:** Information

# Introduction

This is the document for the email discussion of the following items under the NR-U RRM performance agenda (email discussion with the flag [99-e][210] NR\_unlic\_RRM\_2):

6.1.6 RRM performance requirements (38.133)

6.1.6.1 General

6.1.6.2 Measurement accuracy requirements

6.1.6.3 Test cases

6.1.6.3.1 General

\* Include test case list, common test configuration, CCA models, requirements applicability

6.1.6.3.2 RRC IDLE cell re-selection

6.1.6.3.3 HO (delay and interruptions)

6.1.6.3.4 RRC Re-establishment

6.1.6.3.5 RRC Connection Release with Redirection

6.1.6.3.6 Random access

6.1.6.3.7 Timing (transmit timing and TA)

6.1.6.3.8 BWP switching delay and interruptions

6.1.6.3.9 PSCell addition/release (delay and interruption)

6.1.6.3.10 SCell activation/deactivation (delay and interruption)

6.1.6.3.11 Other interruptions

6.1.6.3.12 RLM

6.1.6.3.13 Beam management (BFD and link recovery)

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

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

6.1.6.3.16 SFTD measurement procedure

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

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

6.1.6.3.19 SFTD measurement accuracy

6.1.6.3.20 Other

The discussion on this thread is organized in the following topics:

* Topic #1: NR-U RRM test configuration
* Topic #2: CCA models
* Topic #3: Test case specific details
* Topic #4: Test case list and work split

Because of the massive number of contributions and proposals under the agenda items discussed in this document, the moderator proposes the following prioritization for the discussion:

**First round:** Concentrate on the discussion on technical issues. Comments on Draft CRs are welcome, but no decision on Draft CRs is expected in the first round.

**Second round:** Conclusion for finalizing the technical agreements, and revision of the Draft CRs.

This work is organized using the Big CR approach, and a Big CR is to be agreed after the meeting as described in the chairman’s meeting’s arrangements document.

# Topic #1: NR-U RRM test configuration

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| T-doc number | Company | Proposals / Observations |  |
| [**R4-2111516**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111516.zip) | Qualcomm | Remaining issues on RRM performance requirements    Proposal 1: SI decoding time, TSI,CCA, is kept at 1280ms in NR-U test cases  Proposal 2: If proposal 1 is accepted, remove the following editor’s note from section 6.2.1A.2.1 of TS 38.133  *Editor’s note: The actual value for TSI-NR\_CCA is to be discussed in the performance part, considering LBT failures and receiver assumptions, etc.* | Issue 1-2-1  Issue 1-2-1 |
| [**R4-2109852**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109852.zip) | MediaTek | Discussion on RRM test cases in NR-U     Proposal 1: Add a note in each NR-U test case for verifying the legacy requirements as follows:   * + In EN-DC test: The UE supporting EN-DC only on NR band(s) with shared spectrum access is required to be tested.   + In SA test: The UE supporting SA operation only on NR band(s) with shared spectrum access is required to be tested. * Above the NR-U tests include:   + Handover     - NR-U -> NR(FR1)     - NR-U - > E-UTRAN (FDD,TDD)   + Timing advance   + Legacy DCI/timer/RRC-based BWP switching on NR-U SCell   + Interruption     - Due to inter-RAT SFTD measurements     - Due to NR-U PSCell addition/release   Proposal 2: SI decoding time, TSI,CCA, is kept at 1280ms during RRC re-establishment and RRC release with re-direction in NR-U networks | Issue 1-1-1  Issue 1-2-1 |

## Open issues summary

### Sub-topic 1-1 Applicability rules

*Sub-topic description*

*Open issues and candidate options before e-meeting:*

**Issue 1-1-1: How to handle legacy tests for UEs supporting only NR bands with CCA**

Considering legacy test cases for UEs supporting only NR bands with CCA, evaluate the proposals below.

Candidate proposals:

* Proposal 1a ([R4-2109852](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109852.zip)): Add a note in each NR-U test case for verifying the legacy requirements as follows:
  + In EN-DC test: The UE supporting EN-DC only on NR band(s) with shared spectrum access is required to be tested.
  + In SA test: The UE supporting SA operation only on NR band(s) with shared spectrum access is required to be tested.
* Proposal 1b ([R4-2109852](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109852.zip)): Above the NR-U tests include:
  + Handover
    - NR-U -> NR(FR1)
    - NR-U - > E-UTRAN (FDD,TDD)
  + Timing advance
  + Legacy DCI/timer/RRC-based BWP switching on NR-U SCell
  + Interruption
    - Due to inter-RAT SFTD measurements
    - Due to NR-U PSCell addition/release

Recommended WF:

* Please discuss if Proposal 1a and Proposal 1b above can be agreed.

### Sub-topic 1-2 General configuration of the RRM tests

**Issue 1-2-1: SI decoding time**

During the last RAN4 meeting, a discussion regarding SI reading time was started for NR-U in the RRM core and RRM performance email threads. An agreement was reached in the RRM core and is reflected in the WF R4-2105700. Having in mind the agreement reached in RRM core, please consider how to proceed for the RRM performance with the following proposed options.

Candidate options:

* Option 1 ([R4-2109852](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109852.zip)): SI decoding time, TSI,CCA, is kept at 1280ms during RRC re-establishment and RRC release with re-direction in NR-U networks
* Option 2 ([R4-2111516](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111516.zip)): SI decoding time, TSI,CCA, is kept at 1280ms in NR-U test cases
  + remove the following editor’s note from section 6.2.1A.2.1 of TS 38.133
    - *Editor’s note: The actual value for TSI-NR\_CCA is to be discussed in the performance part, considering LBT failures and receiver assumptions, etc.*

Recommended WF:

* Please clarify if there is a practical difference apart from the editor’s note issue between options 1 and 2, and discuss if option 2 can be agreed.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub-topic 1-1 Applicability rules  Issue 1-1-1: How to handle legacy tests for UEs supporting only NR bands with CCA  …  Sub-topic 1-2 General configuration of the RRM tests  Issue 1-2-1: SI decoding time  … |
| Nokia | Sub-topic 1-1 Applicability rules  Issue 1-1-1: How to handle legacy tests for UEs supporting only NR bands with CCA  We agree with Proposal 1a,  As for Proposal 1b, we would like to clarify with the proponent why that would that apply to Handover NR-U->NR(FR1). Wouldn’t such a device not be supposed to support NR?  Additionally, the decision to include timing advance on the list should wait decision on Issue 3-5-1.  Sub-topic 1-2 General configuration of the RRM tests  Issue 1-2-1: SI decoding time  We are fine with the intention of Options 1 and 2. It is to be clarified if Option 1 is already covering every topic covered in Option 2. |
| MTK | Issue 1-1-1:  We agree with Proposal 1a and 1b.  In response to the comment from Nokia: “NR-U -> NR(FR1)” can be removed from the list, since the discussion is for UE supports only on NR band(s) with shared spectrum access.  Issue 1-2-1:  Both of Options 1 and 2 are fine. There are the same in our view. |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| CR/TP number | Comments collection |
| **6.1.6.1** | **General** |
| [**R4-2110962**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110962.zip)  **Ericsson**  **Draft CR** | **DraftCR 38.133 NR-U conditions** |
| Company A… |
| Company B… |
|  |
|  |
| [**R4-2110968**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110968.zip)  **Ericsson**  **CR** | **CR 36.133 Correction of accuracy requirements for NR-U bands** |
| Company A… |
| Company B… |
|  |
| 6.1.6.2 | Measurement accuracy requirements |
| [**R4-2110326**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110326.zip)  **Huawei**  **CR** | **CR on inter-RAT measurement accuracy for NR-U R16** |
| Company A… |
| Company B… |
|  |
|  |
| 6.1.6.3.1 | General |
| [**R4-2110781**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110781.zip)  **Ericsson**  **Draft CR** | **Draft CR: Update of RMC for NR-U test cases** |
| Company A… |
| Company B… |
|  |
|  |
| 6.1.6.3.20 | Other |
| [**R4-2109278**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109278.zip)  **Nokia**  **Draft CR** | **Requirement classification for statistical testing for TCs with CCA** |
| Company A… |
| Company B… |
|  |
|  |

# Topic #2: CCA models

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| T-doc number | Company | Proposals / Observations |  |
| [**R4-2109275**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109275.zip) | Nokia | On remaining details of NR-U RRM test configurations  Observation 1: For CCA success probability for LBE CCA model our preferred option is Option 2, i.e. P1 = P2 = 0.75. On the other hand, we would have no strong objection against Option 1 (P1 = 0.75, P2 = 0.5) if this is the preferred option in RAN4.  Observation 2: RAN5 specify that at least 33 test runs are used for performance requirements with statistical nature.  Observation 3: The minimum time interval used for most of the RRM tests is 200 ms.  Observation 4: With PCCA\_DL =0.95 there is a 90% probability that more than 15 out of 33 test runs do not experience any LBT failure in a 200 ms time interval.  Observation 5: With PCCA\_DL =0.9 there is a 10% probability that more than 15 out of 33 test runs do not experience any LBT failure in a 200 ms time interval.  Observation 6: For CCA success probability for FBE CCA model, our preferred option to allow CCA failures to be tested with a larger likelihood during the test cases is Option 1, i.e. P = 0.9.  Proposal 1: Define PCCA\_DL that results in a 90% probability that at least 15 out of 33 test runs will have one or more LBT failures in a 200 ms interval.  Proposal 2: Define PCCA\_DL =0.9 for FBE.  Observation 7: A high PCCA\_DL even when defined under high Es/Iot may reduce test coverage, since the probability of test runs to experience no LBT failure is larger.  Proposal 3: Define PCCA\_DL independently of Es/Iot.  Proposal 4: Define PCCA\_UL = 0.8 for both LBE and FBE modes.  Observation 8: Unlimited UL CCA failures might result in UE states that are not typically verified in RRM tests.  Proposal 5: Include limitation of the UL CCA failures LCCA\_UL on the UL CCA model.  Observation 9: For deterministic (single run) test cases, PCCA would have to be very low if we want to assure that at least one CCA failure is experienced during the test.  Proposal 6: Determine that TCs under CCA are subject to statistical testing. | Issue 2-1-1  Issue 2-2-1  Issue 2-1-2  Issue 2-4-1  Issue 2-3-2  Issue 2-1-3 |
| [**R4-2111516**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111516.zip) | Qualcomm | Remaining issues on RRM performance requirements    Proposal 3: RAN4 to adopt the following CCA success probabilities for DL CCA model in typical test cases   * For LBE: P1=0.75, P2=0.75, * For FBE: P = 0.95   Proposal 4: RAN4 to adopt the following CCA success probabilities for UL CCA model in typical test cases   * For LBE: P = 0.75 * For FBE: P = 0.95 | Issue 2-2-1  Issue 2-3-1 |
| [**R4-2108760**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2108760.zip) | ZTE | On CCA models and applicability rules in test cases for NR-U    Observation 1: Wrong UE behaviors will impact other UEs, the overall system performance as well as other technologies using unlicensed bands such as WiFi.  Proposal 1: Specifying one test case with UL CCA failure for each of the options 2a, 2b and 2c above. | Issue 2-3-3 |
| [**R4-2111304**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111304.zip) | Ericsson | Analysis of open issues related to DL and UL CCA models    Observation 1: Option 1 on CCA DL success probabilities is reasonable compromise between occurrence of sufficient number of DL CCA failures in the test case and the test time.  Observation 2: CCA may be used in a test in a cell subject to CCA at any Es/Iot value.  Observation 3: The test system cannot make any assumption about the discovery burst transmission windows in which the UE will measure in DRX or in non-DRX.  Observation 4: In DRX the measurement period is longer but number of samples are in same order as in non-DRX so statistically the UE is likely to encounter similar number of CCA failures over the measurement periods with DRX and without DRX.  Observation 5: In DRX the measurement period is longer but number of samples are in same order as in non-DRX. Therefore, statistically the UE is likely to encounter similar number of CCA failures over the measurement periods with DRX and without DRX.  Proposal 1: We support option 1 for CCA DL success probabilities i.e.   * For LBE: P1=0.75, P2=0.5, * For FBE: P = 0.9   Proposal 2: CCA DL success probabilities are applicable to any value of Es/Iot.  Proposal 3: The existing DL CCA model in non-DRX shall also apply when DRX is used.  Proposal 4: In proposal 3, regardless of whether DRX is used or not, prior to each DBT window, the test equipment shall determine whether the CCA attempt is successful.  Observation 6: Delay in CSI reporting due to UL CCA failure is less critical due to periodic CSI reporting.  Observation 7: Delay in event triggered reporting due to UL CCA failure may be more challenging to verify due to lack of quantified delay requirement as function of UL CCA failure.  Observation 8: HARQ delay has impact on scheduling is therefore more critical.  Proposal 5: OCNG pattern is used for noise generation during the UL CCA detection time (TCCA) within the UL resources where the UE needs to assess the UL CCA.  Proposal 6: During the UL CCA detection time the test equipment should generate energy level 3 dB above the energy detection threshold defined in TS 37.106.  Proposal 7: Typical value of the successful UL CCA probability is 75%.  Proposal 8: Verify the delay in sending HARQ feedback transmission under UL CCA failure in the MAC CE based TCI state switch delay test case. | Issue 2-2-1  Issue 2-1-2  Issue 2-2-2  Issue 2-2-2  Issue 2-3-4  Issue 2-3-4  Issue 2-3-1  Issue 2-3-3 |

## Open issues summary

### Sub-topic 2-1 Principles for CCA models

**Issue 2-1-1: Principle for defining PCCA**

The probabilities for CCA success in DL have been discussed for the past 3 meetings, and one discussion paper proposes principles that can be used for guiding the decision on this test parameter. This has been generalised here in order to cover both UL and DL. Please consider the following Proposals regarding the underlying principle used to define PCCA.

Candidate proposal:

* Proposal 1: Define PCCA that results in a large percentage of test runs with one or more CCA failures in each phase of a test run where CCA failures are modelled.
  + Proposal 1a ([R4-2109275](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109275.zip)): Define PCCA\_DL that results in a 90% probability that at least 15 out of 33 test runs will have one or more LBT failures in a 200 ms interval.
  + Proposal 1b ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define PCCA\_UL probabilities that ensure that at least 15 out of 33 test runs experience more than one CCA failure.

Recommended WF:

* Please discuss if Proposal 1 with Proposal 1a and 1b can be agreed.

**Issue 2-1-2: PCCA dependency on Es/Iot**

During the last RAN4 meeting, it was pointed out that PCCA might be modelled differently depending on Es/Iot. Two discussion papers have proposals on that topic, that can be combined in Proposal 1a and 1b.

Candidate proposal:

* Proposal 1a ([R4-2109275](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109275.zip), [R4-2111304](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111304.zip)) CCA DL success probabilities are applicable to any value of Es/Iot.
* Proposal 1b: CCA UL success probabilities are applicable to any value of Es/Iot.

Recommended WF:

* Please discuss if Proposals 1a and 1b can be agreed.

**Issue 2-1-3: Requirement classification for statistical testing**

A discussion paper brought up the issue that for deterministic test cases under CCA, there might be a significant chance that some test runs do not experience any CCA failure. Having in mind that issue, please consider the following proposal:

Candidate proposal:

* Proposal 1 ([R4-2109275](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109275.zip)): Determine that TCs under CCA are subject to statistical testing.

Recommended WF:

* Please discuss if Proposal 1 can be agreed.

### Sub-topic 2-2 CCA models in DL

**Issue 2-2-1: CCA success probabilities for DL CCA model in typical test cases**

The probabilities for CCA success in DL have been discussed for the past 3 meetings, please consider the candidate options below, having in mind also the discussion on the basic principles of Sub-topic 2-1.

Candidate options:

* Option 1 ([R4-2111516](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111516.zip))
  + For LBE: P1=0.75, P2=0.75
  + For FBE: P = 0.95
* Option 2 ([R4-2109275](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109275.zip), [R4-2111304](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111304.zip))
  + For LBE: P1=0.75, P2=0.5
  + For FBE: P = 0.9
* Option 3 ([R4-2109275](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109275.zip))
  + For LBE: P1=0.75, P2=0.75
  + For FBE: P = 0.9

Recommended WF:

* Please consider which of the option above can be agreed having in mind the discussion on Issue 2-1-1.

**Issue 2-2-2 DRX CCA model**

Consider the following proposals regarding the applicability of existing DL CCA models when DRX is used:

Candidate proposals:

* Proposal 1 (R4-2111304): The existing DL CCA model in non-DRX shall also apply when DRX is used.
* Proposal 2 (R4-2111304): Regardless of whether DRX is used or not, prior to each DBT window, the test equipment shall determine whether the CCA attempt is successful.

Recommended WF:

* Please discuss if Proposals 1 and 2 can be agreed.

### Sub-topic 2-3 CCA models in UL

**Issue 2-3-1: CCA success probability in UL**

The UL CCA success probability has not been discussed openly during the last meeting. On that topic, 3 discussion papers bring proposals. Please consider which of these options can be agreed.

Candidate options:

* Option 1 ([R4-2109275](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109275.zip)): Define PCCA\_UL = 0.8 for both LBE and FBE modes.
* Option 2 ([R4-2111516](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111516.zip)): RAN4 to adopt the following CCA success probabilities for UL CCA model in typical test cases
  + For LBE: P = 0.75
  + For FBE: P = 0.95
* Option 3 (R4-2111304): Typical value of the successful UL CCA probability is 75%.

Recommended WF:

* Please discuss which of the options above can be agreed.

**Issue 2-3-2: Limitation of CCA failures in UL**

On the last RAN4 meetings Lmax was included for limiting the CCA failures in DL. However one of the discussion papers identified that the same might be necessary in the UL direction as well. Having that in mind, please consider the following proposal.

Candidate Proposal:

* Proposal 1 ([R4-2109275](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109275.zip)): Include limitation of the UL CCA failures LCCA\_UL on the UL CCA model.

Recommended WF:

* Please discuss if the proposal above can be agreed.

**Issue 2-3-3 Test case list to include UL CCA failures**

Consider the following proposal regarding the test case list to include UL CCA failures:

Candidate Proposal:

* Proposal 1 (R4-2108760): Specifying one test case with UL CCA failure for each of the cases below:
  + Proposal 1a: SCell activation
    - Additional delay in transmission of CSI reporting due to CCA failure
  + Proposal 1b: Event triggered measurement reporting delay
    - Additional delay due to UL LBT failure not defined
    - FFS: Assume it similar to above-mentioned SCell activation case
  + Proposal 1c (R4-2111304): MAC CE based TCI state switch delay
    - Delay in sending HARQ feedback transmissions

Recommended WF:

* Please discuss if proposal 1 (with proposals 1a, 1b and 1c) can be agreed; if not, please discuss which of the proposal(s) 1a, 1b and 1c can be agreed.

**Issue 2-3-4 Noise pattern used for modeling UL CCA failures**

While defining the CCA model in UL during the last RAN4 meeting, it was discussed whether the OCNG is also applicable for generating CCA failures in UL. Considering the open issues regarding noise pattern for modeling UL CCA failures, consider the following proposals:

Candidate Proposals:

* Proposal 1 (R4-2111304): OCNG pattern is used for noise generation during the UL CCA detection time (TCCA) within the UL resources where the UE needs to assess the UL CCA.
* Proposal 2 (R4-2111304): During the UL CCA detection time the test equipment should generate energy level 3 dB above the energy detection threshold defined in TS 37.106.

Recommended WF:

* Considering that the issue regarding OCNG was already brought during the last meeting, it is proposed to agree with both proposals 1 and 2.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub-topic 2-1 Principles for CCA models  Issue 2-1-1: Principle for defining PCCA  …  Issue 2-1-2: PCCA dependency on Es/Iot  …  Issue 2-1-3: Requirement classification for statistical testing  …  Sub-topic 2-2 CCA models in DL  Issue 2-2-1: CCA success probabilities for DL CCA model in typical test cases  …  Issue 2-2-2 DRX CCA model  …  Sub-topic 2-3 CCA models in UL  Issue 2-3-1: CCA success probability in UL  …  Issue 2-3-2: Limitation of CCA failures in UL  …  Issue 2-3-3 Test case list to include UL CCA failures  …  Issue 2-3-4 Noise pattern used for modeling UL CCA failures  … |
| Nokia | Sub-topic 2-1 Principles for CCA models  Issue 2-1-1: Principle for defining PCCA  We agree with Proposal 1, 1a and 1b.  We believe that the PCCA should be defined such that most of the test runs have at least 1 CCA failure. The time of 200 ms on proposal 1a comes from the fact that most of the existing NR test cases have intervals that are larger than 200 ms, so if there is usually one LBT failure withing that 200 ms interval there will be a good test coverage.  As an example, if we have a test case with 3 intervals T1=1 s, T2=200ms, T3 = 5s, we would like to have PCCA such that there is a good chance of one LBT failure on this interval T2.  Issue 2-1-2: PCCA dependency on Es/Iot  We agree with Proposals 1a and 1b.  We believe that Proposal 1 is also in line with Proposal 1 in 2-1-1, and it guarantees that the PCCA is defined to guarantee a good test coverage, meaning that PCCA is defined such that most test runs have some LBT failures.  Issue 2-1-3: Requirement classification for statistical testing  We support Proposal 1.  In order to clarify that proposal, we would like to highlight that the classification of statistical testing determines the impact of the tests in RAN5. For requirements with statistical nature the tests are run at least 33 times as described in RAN5 spec 38.533 in case of no error. If we do not define something like that there is a chance that most of the “deterministic” requirements are very rarely affected by CCA failures, since they are run only once. The alternative to that proposal would be to define a fairly low PCCA, which is not the direction the discussions have been heading so far.  We think it is important to define clearly that all TCs under CCA are subject to statistical testing. The reason for that is that if a test case using CCA is considered as deterministic, we would need to define a very low PCCA to guarantee that there are at least few CCA failures on a test run.  Sub-topic 2-2 CCA models in DL  Issue 2-2-1: CCA success probabilities for DL CCA model in typical test cases  Our preference is option 3, but we may compromise with option 2.  We have strong concerns with Option 1 related to P(FBE) = 0.95; as shown in our contribution R4-2109275 with such value does not allow a good test coverage with DL CCA failures. With P=0.95 there is a large chance that most of the test runs do not experience any CCA failure, and that would question how effective that test case is on verifying the behaviour under CCA.  Issue 2-2-2 DRX CCA model  We are fine with proposals 1 and 2.  Sub-topic 2-3 CCA models in UL  Issue 2-3-1: CCA success probability in UL  We agree with proposal 1, but we may agree with proposal 3, assuming that such proposal is valid for both LBE and FBE modes.  As in issue 2-2-1 and for the same reason we have strong concerns with Option 2 related to P(FBE) = 0.95 since it would mean that most test runs do not experience LBT failure in UL. With this large probability the test case with CCA would be basically the same as the existing NR test case. P(LBE) = 0.75 is fine for us.  Issue 2-3-2: Limitation of CCA failures in UL  We agree with Proposal 1.  Taking the Random Access test case as an example, this limitation of LCCA\_UL is important to guarantee that the UE doesn’t reach a state of unsuccessful completion of RACH procedure due to UL LBT failures.  Issue 2-3-3 Test case list to include UL CCA failures  No strong views.  Issue 2-3-4 Noise pattern used for modeling UL CCA failures  We agree with both proposals 1 and 2. |
| MTK | Issue 2-2-1:  Our preference is option 3. P1=P2 is more realistic in our view. |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| CR/TP number | Comments collection |
| 6.1.6.3.1 | General |
| [**R4-2109276**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109276.zip)  **Nokia**  **Draft CR** | **Draft CR on CCA model for NR-U** |
| Company A… |
| Company B… |
|  |
|  |
| 6.1.6.3.20 | Other |
| [**R4-2111305**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111305.zip)  **Ericsson**  **Draft CR** | **Correction to DL/UL CCA models in 38.133** |
| Company A… |
| 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:* |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Topic #3: Test case specific details

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |  |
| 6.1.6.3.2 |  | RRC IDLE cell re-selection |  |
| [R4-2108772](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2108772.zip) | ZTE | Remianing issues on RRC IDLE cell re-selection tests in NR-U    Observation 1: Some UEs may support only NR-U and E-UTRAN but not NR in licensed mode.  Proposal 1: Define separate tests for the test cases mentioned in Options 1a and 1b. | Issue 3-1-1 |
| 6.1.6.3.3 |  | HO (delay and interruptions) |  |
| [R4-2108773](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2108773.zip) | ZTE | Remianing issues on handover tests in NR-U    Observation 1: Some UEs may support only NR-U and E-UTRAN but not NR in licensed mode.  Proposal 1: Specify test cases to verify correct UE behavior for all scenarios: E-UTRAN (FDD,TDD)->NR-U, NR-U -> E-UTRAN (FDD,TDD), NR(FR1) -> NR-U and NR-U -> NR(FR1). | Issue 3-2-1 |
| [R4-2110328](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110328.zip) | Huawei, HiSilicon | Discussion on HO test cases for NR-U    Observation 1: L3 shall be considered in Handover test cases as it is agreed that the addition delay in acquiring the PRACH resource due to UL LBT failure should be defined in handover test cases.  Proposal 1: Configure PCCA\_UL as 0.75 to model the addition delay in acquiring the PRACH resource.  Observation 2: TE is not able to avoid invalid handover test cases when T304 expires due to extension of LBT as there is not specific restrictions on number of L defined in the core requirements.  Proposal 2: Add a note in handover test cases to clarify that A test will not be considered in the statistics when T304 times expires considering the time extensions cause by L1, L1´, L2 , L3. | Issue 3-2-2  Issue 3-2-3 |
| 6.1.6.3.4 |  | RRC Re-establishment |  |
| 6.1.6.3.5 |  | RRC Connection Release with Redirection |  |
| [R4-2111306](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111306.zip) | Ericsson | RRC re-establishment tests from NR to NR-U    Proposal 1: At least the following NR to NR-U RRC re-establishment tests to verify core requirements in clause 6.2.1A, TS 38.133, are defined:   1. TC1: Intra-frequency RRC Re-establishment in FR1 with serving cell without CCA and known target cell subject to CCA 2. TC2: Inter-frequency RRC Re-establishment in FR1 with serving cell without CCA and with unknown target cell subject to CCA 3. TC3: Intra-frequency RRC Re-establishment in FR1 with serving cell without CCA, with unknown target cell subject to CCA and without serving cell timing.   Proposal 2: NR to NR-U RRC re-establishment tests are defined for the following configuration related to SSB SCS and BW for both serving and target cells:   |  |  |  | | --- | --- | --- | | Configuration | Source cell without CCA | Target cell with CCA | | 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD | | 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD | | 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD | | Note: The UE is only required to be tested in one of the supported test configurations | | |   Proposal 3: In the test under the following parameter settings (non-DRX, no gaps are used and SSB periodicity is 20 ms), the out of sync detection evaluation period = 480 ms when the serving cell is inactivated (RLM-RS SSB Es/Iot <-7 dB).  Proposal 4: NR to NR-U RRC re-establishment tests can be defined for the following DL LBT configuration/setting in the target cell during T3 (when UE detects the target cell):   * + For LBE: PCCA\_DL\_1 =0.75, PCCA\_DL\_2 =0.5   + For FBE: PCCA\_DL= 0.9   Proposal 5: UL LBT is not enabled in the target cell i.e. PCCA\_UL =1 in all test times. | Issue 3-3-1  Issue 3-3-2  Issue 3-3-3  Issue 3-3-4  Issue 3-3-5 |
| 6.1.6.3.6 |  | Random access |  |
| [R4-2108774](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2108774.zip) | ZTE Corporation | Remianing issues on random access tests in NR-U    Proposal 1: NR-U random access procedure tests do not need to configure DL LBT failure, i.e., set PCCA\_DL=1.0.  Proposal 2: Test equipment to configure *preambleReceivedTargetPower* for msg1 and *msgA-PreambleReceivedTargetPower* for msgA to the highest value for UL LBT test cases. | Issue 3-4-2  Issue 3-4-3 |
| [R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip) | Nokia, Nokia Shanghai Bell | Discussion on Random access TC parameters     Observation 1: Random access test cases were included on the list among the TCs that are used to differentiate LBE and FBE behaviour of UEs supporting both channel access modes.  Observation 2: If DL CCA failures are not configured in random access test cases, there will be nearly no difference on the test case when configured with LBE and FBE.  Proposal 1: Define configuration of random access test cases that help differentiating the UE behaviour when configured with semi-static and dynamic channel access modes.  Proposal 2: Configure DL CCA failures for the random access test cases for both semi-static and dynamic channel access configurations.  Observation 3: Random access procedure is considered unsuccessfully completed after the combination of retransmissions and UL LBT failures exceed preambleTransMax.  Observation 4: Random access test cases always include 5 transmissions of the preamble. RAR/MsgB retransmissions may be delayed following DL CCA failures, but in any case the Response Window duration must not be exceeded to avoid further PRACH/MsgA retransmissions.  Proposal 3: Define random access test cases that limit the number of CCA failures in UL and DL to prevent reaching preambleTransMax LBE and FBE configurations.  Proposal 4: Define preambleTransMax, LCCA\_DL and LCCA\_UL in random access test cases with CCA such that preambleTransMax > 5 + LCCA\_DL +LCCA\_UL LBE and FBE configurations  Proposal 5: Define preambleTransMax = n20, LCCA\_DL =4 and LCCA\_UL =5 in random access test cases with CCA for both LBE and FBE configurations.  Observation 5: If a single test run is considered with 5 retransmissions, there is a high probability of no CCA failures for PCCA>0.75.  Proposal 6: Define that random access test cases are subject to statistical testing.  Observation 6: RAN5 requirements for statistical testing include at least 33 test runs if no errors are observed.  Proposal 7: Define PCCA probabilities that ensure that at least 15 out of 33 test runs experience more than one CCA failure.  Observation 7: Assuming statistical testing is used for random access TCs, the conditions PCCA\_DL ≤ 0.8 and PCCA\_UL ≤ 0.8 are mandatory to ensure that at least 15 out of 33 test runs experience at least one CCA failure with a 96% probability.  Proposal 8: Define PCCA\_UL = 0.8 for both LBE and FBE modes in random access test cases.  Proposal 9: Define PCCA\_DL = 0.8 for FBE mode in random access test cases. | Issue 3-4-1  Issue 3-4-2  Issue 3-4-4  Issue 3-4-4  Issue 3-4-4  Issue 3-4-5  Issue 3-4-6  Issue 3-4-6  Issue 3-4-6 |
| 6.1.6.3.7 |  | Timing (transmit timing and TA) |  |
| [R4-2108770](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2108770.zip) | ZTE | Discussion on test cases for timing in NR-U    Proposal 1: UE timing advance adjustment accuracy tests are defined for the following LBT configuration/setting in SpCell: PCCA\_UL=1 and PCCA\_DL =1 in all test times. | Issue 3-5-1 |
| 6.1.6.3.8 |  | BWP switching delay and interruptions |  |
| [R4-2108775](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2108775.zip) | ZTE | Remianing issues on tests for BWP switch in NR-U    Proposal 1: Endorse the configurations in the WF [1]:   |  |  |  | | --- | --- | --- | | Active BWP in SpCell | PCCA\_UL | PCCA\_DL | | UL active BWP before active BWP switching (UL BWP-1) | 0 | 1 | | UL active BWP after active BWP switching (UL BWP-2) | 1 | 1 | | DL active BWP before active BWP switching (DL BWP-1) | 1 | 1 | | DL active BWP after active BWP switching (DL BWP-2) | 1 | 1 | | Issue 3-6-1 |
| 6.1.6.3.9 |  | PSCell addition/release (delay and interruption) |  |
| 6.1.6.3.10 |  | SCell activation/deactivation (delay and interruption) |  |
| 6.1.6.3.11 |  | Other interruptions |  |
| 6.1.6.3.13 |  | Beam management (BFD and link recovery) |  |
| [R4-2108776](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2108776.zip) | ZTE | On test cases for beam management in NR-U     Proposal 1: Agree on Option 1 in the WF [1].   * Option 1: Set the CCA parameters in the link recovery tests for NR-U as follows. For DL LBT parameters, RAN4 should wait for the conclusion of CCA models for NR-U RRM performance requirements.   **CCA parameters in link recovery tests for NR-U**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  |  | T1 | T2 | T3 | T4 | T5 | | PCCA,DL | semi-static channel access | 1.0 | FFS | FFS | FFS | FFS | | dynamic channel access | 1.0 | FFS | FFS | FFS | FFS | | PCCA,UL |  | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | Issue 3-7-1 |
| [R4-2110651](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110651.zip) | Ericsson | Open issues on link recovery and L1-RSRP reporting test cases for NR-U    Proposal 1: Set PCCA\_UL=1.0 (no UL CCA failures) for link recovery tests.  Proposal 2: Set PCCA\_UL=1.0 (no UL CCA failures) for L1-RSRP measurement reporting tests.  Proposal 3: For DL CCA success probabilities of link recovery and L1-RSRP reporting test cases, wait for the conclusion of the general principles of CCA modelling and the default probabilities.  Proposal 4: For the link recovery and L1-RSRP reporting tests with dynamic channel access configuration, configure two DL CCA probabilities: PDL,CCA,1 for the 1st SSB candidate position and PDL,CCA,2 for the 2nd SSB candidate position. | Issue 3-7-1  Issue 3-7-1  Issue 3-7-1  Issue 3-7-1 |
| 6.1.6.3.14 |  | SS-RSRP/SS-RSRQ/SS-SINR/L1-RSRP measurement procedure (intra-frequency, inter-frequency, inter-RAT) |  |
| 6.1.6.3.16 |  | SFTD measurement procedure |  |
| 6.1.6.3.17 |  | SS-RSRP/SS-RSRQ/SS-SINR/L1-RSRP measurement accuracy (intra-frequency, inter-frequency, inter-RAT) |  |
| [R4-2111244](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111244.zip) | Ericsson | Discussions on RSRP/RSRQ measurement accuracy test for NR-U in EN-DC    Proposal 1: NR-U RSRP and RSRQ measurement accuracy test cases are designed for following cases:   * Intra-frequency RSRP measurement accuracy * Inter-frequency RSRP measurement accuracy * Intra-frequency RSRQ measurement accuracy * Inter-frequency RSRQ measurement accuracy   Proposal 2: NR-U RSRP and RSRQ measurement accuracy test cases are designed for following test configuration:   |  |  | | --- | --- | | Config | Description | | 1 | LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode | | 2 | LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode | | Note: The UE is only required to be tested in one of the supported test configurations in each supported band | |   Proposal 3: Cell specific test parameters should contain following new or modified parameters to account for the LBT impact:   * DL CCA model * UL CCA model * DBT Window Configuration * DL CCA probability PCCA\_DL * UL CCA probability PCCA\_UL * SSB configuration * New RMCs | Issue 3-8-1  Issue 3-8-2  Issue 3-8-2 |
| 6.1.6.3.18 |  | RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT) |  |
| 6.1.6.3.19 |  | SFTD measurement accuracy |  |
| 6.1.6.3.20 |  | Other |  |
| [R4-2108777](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2108777.zip) | ZTE | On test cases for TCI state switch in NR-U    Proposal 1: Introduce the timing difference between the RS in the two TCI states in the TCI state switching test cases, where the exact value needs further discussion.  Proposal 2: Confirm on the testability on Option 1. | Issue 3-9-1  Issue 3-9-1 |

## Open issues summary

### Sub-topic 3-1: RRC IDLE cell re-selection

**Issue 3-1-1: How to introduce RRC IDDLE cell re-selection test cases**

This issue was discussed on the last RAN4 meeting, and one DP brought a proposal on the topic. Please consider the proposal below.

Candidate proposal:

* Proposal 1 (R4-2108772): Define separate tests for the test cases below:
  + Cell reselection for E-UTRAN (FDD,TDD)->NR-U and NR-U -> E-UTRAN (FDD,TDD).
  + Cell reselection for NR(FR1) -> NR-U and NR-U -> NR(FR1).

Recommended WF:

* During the last RAN4 meeting most of the companies had opinions in favour of Proposal 1. Can we agree on Proposal 1?

### Sub-topic 3-2: HO (delay and interruptions)

**Issue 3-2-1: HO scenarios**

Candidate proposals/options:

* Proposal 1 (R4-2108773): Specify test cases to verify correct UE behavior for all scenarios:
  + E-UTRAN (FDD,TDD)->NR-U,
  + NR-U -> E-UTRAN (FDD,TDD),
  + NR(FR1) -> NR-U
  + NR-U -> NR(FR1).

Recommended WF:

* During the last RAN4 meeting most of the companies had opinions in favour of Proposal 1. Can we agree on Proposal 1?

**Issue 3-2-2: HO CCA success probability in UL**

CCA success probability in UL is discussed here as well as in Topic #2. It should be decided if this probability should be defined specifically for HO or if it is enough to discuss that in a general way under Topic #2

Candidate options:

* Proposal 1 (R4-2110328): Configure PCCA\_UL as 0.75 to model the addition delay in acquiring the PRACH resource.

Recommended WF:

* Considering that Issue 2-3-1 discusses PCCA\_UL in a general way, it is recommended to focus the discussion of probabilities in the general case during the 1st round, and wait for the decision on PCCA\_UL in Issue 2-3-1 before discussing if a specific value for the HO TC is needed.

**Issue 3-2-3: HO test behaviour after T304 expires**

Candidate proposals/options:

* Proposal 1 (R4-2110328): Add a note in handover test cases to clarify that A test will not be considered in the statistics when T304 times expires considering the time extensions cause by L1, L1´, L2 , L3.

Recommended WF:

* Please discuss if Proposal 1 can be agreed?

### Sub-topic 3-3: RRC Re-establishment

**Issue 3-3-1: RRC re-establishment tests cases**

Considering the test cases list for RRC re-establishment, R4-2111306 brought the following proposal regarding new TCs to be included for RRC re-establishment with CCA.

Candidate proposals:

* Proposal 1 (R4-2111306): At least the following NR to NR-U RRC re-establishment tests to verify core requirements in clause 6.2.1A, TS 38.133, are defined:
  + TC1: Intra-frequency RRC Re-establishment in FR1 with serving cell without CCA and known target cell subject to CCA
  + TC2: Inter-frequency RRC Re-establishment in FR1 with serving cell without CCA and with unknown target cell subject to CCA
  + TC3: Intra-frequency RRC Re-establishment in FR1 with serving cell without CCA, with unknown target cell subject to CCA and without serving cell timing.

Recommended WF:

* Can we agree on Proposal 1?

**Issue 3-3-2: RRC re-establishment configurations**

Candidate proposals/options:

* Proposal 1 (R4-2111306): NR to NR-U RRC re-establishment tests are defined for the following configuration related to SSB SCS and BW for both serving and target cells:

|  |  |  |
| --- | --- | --- |
| Configuration | Source cell without CCA | Target cell with CCA |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | | |

Recommended WF:

* Can we agree on Proposal 1?

**Issue 3-3-3: Out of sync detection evaluation period in tests with CCA**

Candidate proposals/options:

* Proposal 1 (R4-2111306): In the test under the following parameter settings (non-DRX, no gaps are used and SSB periodicity is 20 ms), the out of sync detection evaluation period = 480 ms when the serving cell is inactivated (RLM-RS SSB Es/Iot <-7 dB).

Recommended WF:

* Can we agree on Proposal 1?

**Issue 3-3-4: CCA probabilities for RRC re-establishment test cases in DL**

Candidate proposals/options:

* Proposal 1 (R4-2111306): NR to NR-U RRC re-establishment tests can be defined for the following DL LBT configuration/setting in the target cell during T3 (when UE detects the target cell):
  + For LBE: PCCA\_DL\_1 =0.75, PCCA\_DL\_2 =0.5
  + For FBE: PCCA\_DL= 0.9

Recommended WF:

* Please consider if these probabilities have to be discussed in this issue, or if it is enough to discuss them under Topic #2.

**Issue 3-3-5: CCA probabilities for RRC re-establishment test cases in UL**

Candidate proposals/options:

* Proposal 1 (R4-2111306): UL LBT is not enabled in the target cell i.e. PCCA\_UL =1 in all test times.

Recommended WF:

* Can we agree on Proposal 1?

### Sub-topic 3-4: Random access

**Issue 3-4-1: Differentiation of FBE and LBE configurations in random access test cases**

Candidate proposals/options:

* Proposal 1 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define configuration of random access test cases that help differentiating the UE behaviour when configured with semi-static and dynamic channel access modes.

Recommended WF:

* Please discuss if proposal 1 can be agreed.

**Issue 3-4-2: Configuration of DL CCA for random access test cases**

Candidate options:

* Option 1 (R4-2108774): NR-U random access procedure tests do not need to configure DL LBT failure, i.e., set PCCA\_DL=1.0.
* Option 2 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Configure DL CCA failures for the random access test cases for semi-static channel access configuration.

Recommended WF:

* Please discuss which option can be agreed.

**Issue 3-4-3: Preamble received target power configuration**

Candidate proposals/options:

* Proposal 1 (R4-2108774): Test equipment to configure *preambleReceivedTargetPower* for msg1 and *msgA-PreambleReceivedTargetPower* for msgA to the highest value for UL LBT test cases.

Recommended WF:

* Please discuss if proposal 1 can be agreed.

**Issue 3-4-4: Limitation of CCA failures in UL for random access TCs**

This issue is also related to Issue 2-3-2, where this limitation is discussed in the general sense.

Candidate proposals/options:

* Proposal 1 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define random access test cases that limit the number of CCA failures in UL and DL to prevent reaching preambleTransMax for both LBE and FBE configurations.
* Proposal 2 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define preambleTransMax, LCCA\_DL and LCCA\_UL in random access test cases with CCA such that preambleTransMax > 5 + L LCCA\_DL + LCCA\_UL for both LBE and FBE configurations
* Proposal 3 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define preambleTransMax = n20, LCCA\_DL =4 and LCCA\_UL =5 in random access test cases with CCA for both LBE and FBE configurations.

Recommended WF:

* Please discuss which of these proposal(s) can be agreed.

**Issue 3-4-5: Requirement classification for statistical testing for random access TCs**

This issue is related to Issue 2-1-3. A discussion paper brought up the issue that for deterministic test cases under CCA, there might be a significant chance that some test runs do not experience any CCA failure. For random access TCs, that might be more relevant, since only 5 preamble retransmissions are expected in case there is no CCA failures. Having in mind that issue, please consider the following proposal:

Candidate proposal:

* Proposal 1 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define that random access test cases are subject to statistical testing.

Recommended WF:

* Please discuss if Proposal 1 can be agreed.

**Issue 3-4-6: CCA success probability in random access TCs**

This issue is related to Issue 2-1-3. A discussion paper brought up the issue that for deterministic test cases under CCA, there might be a significant chance that some test runs do not experience any CCA failure. For random access TCs, that might be more relevant, since only 5 preamble retransmissions are expected in case there is no CCA failures. Having in mind that issue, please consider the following proposal:

Candidate proposal:

* Proposal 1 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define PCCA probabilities that ensure that at least 15 out of 33 test runs experience more than one CCA failure.
* Proposal 2 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define PCCA\_UL = 0.8 for both LBE and FBE modes in random access test cases.
* Proposal 3 ([R4-2109282](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109282.zip)): Define PCCA\_DL = 0.8 for FBE mode in random access test cases.

Recommended WF:

* Please discuss which of these proposal(s) can be agreed.

### Sub-topic 3-5: Timing (transmit timing and TA)

**Issue 3-5-1: CCA configuration on timing test cases**

Please consider the following proposal on the configuration of CCA failures for timing test cases.

Candidate proposal:

* Proposal 1 (R4-2108770): UE timing advance adjustment accuracy tests are defined for the following LBT configuration/setting in SpCell: PCCA\_UL=1 and PCCA\_DL =1 in all test times.

Recommended WF:

* Please discuss if we can agree with Proposal 1.

### Sub-topic 3-6: BWP switching delay and interruptions

**Issue 3-6-1: Configurations for BWP switch test cases**

Candidate proposals/options:

* Proposal 1 (R4-2108775): Endorse the configurations:

|  |  |  |
| --- | --- | --- |
| Active BWP in SpCell | PCCA\_UL | PCCA\_DL |
| UL active BWP before active BWP switching (UL BWP-1) | 0 | 1 |
| UL active BWP after active BWP switching (UL BWP-2) | 1 | 1 |
| DL active BWP before active BWP switching (DL BWP-1) | 1 | 1 |
| DL active BWP after active BWP switching (DL BWP-2) | 1 | 1 |

Recommended WF:

* Please discuss if Proposal 1 can be agreed for BWP switch test cases.

### Sub-topic 3-7: Beam management (BFD and link recovery)

**Issue 3-7-1: CCA parameters for link recovery**

Candidate proposals/options:

* On the UL CCA success probability:
  + Proposal 1a ([R4-2110651](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110651.zip)): Set PCCA\_UL=1.0 (no UL CCA failures) for link recovery tests.
  + Proposal 1b ([R4-2110651](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110651.zip)): Set PCCA\_UL=1.0 (no UL CCA failures) for L1-RSRP measurement reporting tests.
* On the DL CCA success probability:
  + Proposal 2 ([R4-2110651](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110651.zip)): For DL CCA success probabilities of link recovery and L1-RSRP reporting test cases, wait for the conclusion of the general principles of CCA modelling and the default probabilities.
* On the consolidated CCA parameters for link recovery tests:
  + Proposal 3 (R4-2108776, [R4-2110651](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110651.zip)): Set the CCA parameters in the link recovery tests for NR-U as follows. For DL LBT parameters, RAN4 should wait for the conclusion of CCA models for NR-U RRM performance requirements.

**CCA parameters in link recovery tests for NR-U**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | T1 | T2 | T3 | T4 | T5 |
| PCCA\_DL | semi-static channel access | 1.0 | FFS | FFS | FFS | FFS |
| dynamic channel access (Note 1) | (1.0,1.0) | (FFS, FFS) | (FFS, FFS) | (FFS, FFS) | (FFS, FFS) |
| PCCA\_UL |  | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Note 1: For dynamic channel access, the probability (X,Y) indicates PCCA\_DL\_1=X and PCCA\_DL\_2=Y. | | | | | | |

Recommended WF:

* Please discuss if we can agree on Proposals 1a, 1b, 2, and the consolidated table of Proposal 3.

### Sub-topic 3-8: RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT)

**Issue 3-8-1: Test cases for RSRP and RSRQ**

Candidate proposals/options:

* Proposal 1 ([R4-2111244](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111244.zip)): NR-U RSRP and RSRQ measurement accuracy test cases are designed for following cases:
  + Intra-frequency RSRP measurement accuracy
  + Inter-frequency RSRP measurement accuracy
  + Intra-frequency RSRQ measurement accuracy
  + Inter-frequency RSRQ measurement accuracy

Recommended WF:

* Can we agree on Proposal 1?

**Issue 3-8-2: Configuration for RSRP and RSRQ test cases**

Candidate proposals/options:

* Proposal 1 ([R4-2111244](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111244.zip)): NR-U RSRP and RSRQ measurement accuracy test cases are designed for following test configuration:

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| 2 | LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations in each supported band | |

* Proposal 2 ([R4-2111244](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111244.zip)): Cell specific test parameters should contain following new or modified parameters to account for the LBT impact:
  + DL CCA model
  + UL CCA model
  + DBT Window Configuration
  + DL CCA probability PCCA\_DL
  + UL CCA probability PCCA\_UL
  + SSB configuration
  + New RMCs

Recommended WF:

* Can we agree on Proposals 1 and 2?

### Sub-topic 3-9: TCI state switching

**Issue 3-9-1: Timing difference between RSs in two TCI states**

Candidate proposals/options:

* Proposal 1 (R4-2108777): Introduce the timing difference between the RS in the two TCI states in the TCI state switching test cases, where the exact value needs further discussion.
* Proposal 2 (R4-2108777): Confirm on the testability of Proposal 1.

Recommended WF:

* Proposal1 has been discussed since the last RAN4 meeting. Can we agree on that?

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub-topic 3-1: RRC IDLE cell re-selection  Issue 3-1-1: How to introduce RRC IDDLE cell re-selection test cases  …  Sub-topic 3-2: HO (delay and interruptions)  Issue 3-2-1: HO scenarios  …  Issue 3-2-2: HO CCA success probability in UL  …  Issue 3-2-3: HO test behaviour after T304 expires  …  Sub-topic 3-3: RRC Re-establishment  Issue 3-3-1: RRC re-establishment tests cases  …  Issue 3-3-2: RRC re-establishment configurations  …  Issue 3-3-3: Out of sync detection evaluation period in tests with CCA  …  Issue 3-3-4: CCA probabilities for RRC re-establishment test cases in DL  …  Issue 3-3-5: CCA probabilities for RRC re-establishment test cases in UL  …  Sub-topic 3-4: Random access  Issue 3-4-1: Differentiation of FBE and LBE configurations in random access test cases  …  Issue 3-4-2: Configuration of DL CCA for random access test cases  …  Issue 3-4-3: Preamble received target power configuration  …  Issue 3-4-4: Limitation of CCA failures in UL for random access TCs  …  Issue 3-4-5: Requirement classification for statistical testing for random access TCs  …  Issue 3-4-6: CCA success probability in random access TCs  …  3.2.5 Sub-topic 3-5: Timing (transmit timing and TA)  Issue 3-5-1: CCA configuration on timing test cases  …  Sub-topic 3-6: BWP switching delay and interruptions  Issue 3-6-1: Configurations for BWP switch test cases  …  Sub-topic 3-7: Beam management (BFD and link recovery)  Issue 3-7-1: CCA parameters for link recovery  …  Sub-topic 3-8: RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT)  Issue 3-8-1: Test cases for RSRP and RSRQ  …  Issue 3-8-2: Configuration for RSRP and RSRQ test cases  …  Sub-topic 3-9: TCI state switching  Issue 3-9-1: Timing difference between RSs in two TCI states  … |
| Nokia | Sub-topic 3-1: RRC IDLE cell re-selection  Issue 3-1-1: How to introduce RRC IDDLE cell re-selection test cases  We are fine with Proposal 1.  Sub-topic 3-2: HO (delay and interruptions)  Issue 3-2-1: HO scenarios  Agree with Proposal 1.  Issue 3-2-2: HO CCA success probability in UL  We would prefer to wait for the decision on Issue 2-3-1.  In general we are fine with that probability, but we would rather make this decision in a general way, unless there is something special about the handover test case that would justify a different PCCA\_UL.  Issue 3-2-3: HO test behaviour after T304 expires  We prefer to avoid discarding test runs. Therefore we propose to consider LCCA\_DL and LCCA\_UL such that T304 is not expired due to CCA failures in the HO test case.  Considering the calculation of the HO delay as   * Intra-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA; known target cell   Tinterrupt = Tsearch + TIU + Tprocessing + T∆ + Tmargin  = 0 + (1+ L3)\*10 + 10 ms + 20 ms + (1+ L2) \*20 ms + 2 ms  = 72ms + L2\*20ms + L3\*10ms  Assuming the worst case scenario, where L2 = LCCA\_DL and L3 = LCCA\_UL, then  LCCA\_DL \*20ms + L3\*10ms <= T302 – 72ms  For LCCA\_DL = 5 and LCCA\_UL = 5, then  T302 >= 222ms   * Intra-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA; unknown target cell   Tinterrupt = Tsearch + TIU + Tprocessing + T∆ + Tmargin  = (1+L1)\* 20 ms + (1+ L3)\*10 + 10 ms + 20 ms + (1+ L2) \*20 ms + 2 ms  = 92ms+ L1\*20ms + L2\*20ms + L3\*10ms  Assuming the worst case where L1 + L2 = LCCA\_DL and L3 = LCCA\_UL, then  LCCA\_DL\*20ms + LCCA\_UL\*10ms <= T302 – 92ms  For LCCA\_DL = 5 and LCCA\_UL = 5, then  T302 >= 242ms   * Inter-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA; unknown target cell   Tinterrupt = Tsearch + TIU + Tprocessing + T∆ + Tmargin  = (3+L1’)\* 20 ms + (1+ L3)\*10 + 10 ms + 20 ms + (1+ L2) \*20 ms + 2 ms  = 132ms + L1’\*20 ms + L2\*20ms + L­\*10ms  Assuming the worst case where L1’ + L2 = LCCA\_DL and L3 = LCCA\_UL, then  LCCA\_DL \*20ms + LCCA\_UL \*10ms < T302 – 132ms  For LCCA\_DL = 5 and LCCA\_UL = 5, then  T302 >= 282ms  From that we derive the following proposal:  **Proposal 2: Configure LCCA\_DL and LCCA\_UL such that T304 is not expired due to CCA failures in the HO test case.**  **Proposal 3: Configure LCCA\_DL = LCCA\_UL = 5, WCCA =T304, and T304=500ms in the HO test case with CCA.**  Sub-topic 3-3: RRC Re-establishment  Issue 3-3-1: RRC re-establishment tests cases  We agree with Proposal 1.  Issue 3-3-2: RRC re-establishment configurations  Fine with Proposal 1.  Issue 3-3-3: Out of sync detection evaluation period in tests with CCA  We agree with Proposal 1.  Issue 3-3-4: CCA probabilities for RRC re-establishment test cases in DL  We prefer to wait for decision on general PCCA\_DL. We are in general in line with Proposal 1, but we rather discuss that on the general issue for PCCA, unless there is a technical reason to have different probabilities for re-establishment.  Issue 3-3-5: CCA probabilities for RRC re-establishment test cases in UL  We prefer to wait for the decision on general PCCA\_UL.  Same reason as previous issue.  Sub-topic 3-4  Issue 3-4-1: Differentiation of FBE and LBE configurations in random access test cases  We agree with the proposal.  Issue 3-4-2: Configuration of DL CCA for random access test cases  We agree with proposal 1 for dynamic channel access. For semi-static channel access we agree with proposal 2, given that for such a mode the UE is allowed to transmit only with a gNB-initiated COT.  Issue 3-4-3: Preamble received target power configuration  We don’t agree with the proposal.  In our view, the preamble target power should be tested with the same values as used for NR test cases, otherwise the UE power ramping will not be tested under CCA. There is a specific behavior that is to be tested here, because the UE is only supposed to do power ramping during retransmissions, but not when it has to transmit again due to CCA failure. By setting the perambleReceivedTargetPower to the highest value would mean that the UE will transmit PRACH with the same power for all the transmissions during the test.  Issue 3-4-4: Limitation of CCA failures in UL for random access TCs  We agree with all proposals.  Issue 3-4-5: Requirement classification for statistical testing for random access TCs  We agree with the proposal.  Issue 3-4-6: CCA success probability in random access TCs  We agree with all proposals.  Sub-topic 3-5: Timing (transmit timing and TA)  Issue 3-5-1: CCA configuration on timing test cases  We think we should adopt the PCCA\_DL as agreed for the general test cases.  We propose the following alternative option:   * Option 2: UE timing advance adjustment accuracy tests are defined for the following LBT configuration/setting in SpCell: PCCA\_UL=1 and the default PCCA\_DL value in all test times.   Sub-topic 3-6: BWP switching delay and interruptions  Issue 3-6-1: Configurations for BWP switch test cases  We agree with the proposal.  Sub-topic 3-7: Beam management (BFD and link recovery)  Issue 3-7-1: CCA parameters for link recovery  We agree with the proposal  Sub-topic 3-8: RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT)  Issue 3-8-1: Test cases for RSRP and RSRQ  We agree with Proposal 1  Issue 3-8-2: Configuration for RSRP and RSRQ test cases  We agree with Proposal 1 and 2 |
| MTK | Issue 3-1-1: fine with Proposal 1.  Issue 3-1-2: fine with Proposal 1.  Issue 3-2-3: fine with Nokia’s suggestion.  Issue 3-4-1: We agree with the proposal. |

### CRs/TPs comments collection

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| --- | --- |
| CR/TP number | Comments collection |
| 6.1.6.3.2 | RRC IDLE cell re-selection |
| [**R4-2111242**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111242.zip)  **Ericsson**  **Draft CR** | **Correction to cell reselection test cases for NR-U** |
| Company A… |
| Company B… |
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| 6.1.6.3.3 | HO (delay and interruptions) |
| [**R4-2109279**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109279.zip)  **Nokia**  **Draft CR** | **Draft TC NR-U Handover test cases** |
| Company A… |
| Company B… |
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| [**R4-2110329**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110329.zip)  **Huawei**  **Draft CR** | **Draft CR on HO test cases for NR-U** |
| Company A… |
| Company B… |
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| [**R4-2111243**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111243.zip)  **Ericsson**  **Draft CR** | **Correction to handover test cases for NR-U** |
| Company A… |
| Company B… |
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| 6.1.6.3.4 | RRC Re-establishment |
| [**R4-2109280**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109280.zip)  **Nokia**  **Draft CR** | **Draft TC RRC re-establishment with CCA** |
| Company A… |
| Company B… |
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| [**R4-2110330**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110330.zip)  **Huawei**  **Draft CR** | **Draft CR on RRC Re-establishment for NR-U from NR to NRU** |
| Company A… |
| Company B… |
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| 6.1.6.3.5 | RRC Connection Release with Redirection |
| [**R4-2110331**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110331.zip)  **Huawei**  **Draft CR** | **Draft CR on TC of RRC connection release with redirection for NR-U** |
| Company A… |
| Company B… |
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| [**R4-2111307**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111307.zip)  **Ericsson**  **Draft CR** | **RRC re-establishment tests from NR to NR-U in 38.133** |
| Company A… |
| Company B… |
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| 6.1.6.3.6 | Random access |
| [**R4-2109281**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109281.zip)  **Nokia**  **Draft CR** | **Random Access test cases with CCA** |
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| [**R4-2110653**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110653.zip)  **Ericsson**  **Draft CR** | **Draft CR: Random access procedure test cases for NR-U** |
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| 6.1.6.3.7 | Timing (transmit timing and TA) |
| [**R4-2111308**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111308.zip)  **Ericsson**  **Draft CR** | **Correction to UE transmit timing tests** |
| Company A… |
| Company B… |
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| 6.1.6.3.8 | BWP switching delay and interruptions |
| [**R4-2111309**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111309.zip)  **Ericsson**  **Draft CR** | **Correction to BWP switching with consistent UL LBT failures** |
| Company A… |
| Company B… |
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| 6.1.6.3.9 | PSCell addition/release (delay and interruption) |
| [**R4-2110332**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110332.zip)  **Huawei**  **Draft CR** | **Draft CR on PSCell addtion for NR-U** |
| Company A… |
| Company B… |
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| 6.1.6.3.10 | SCell activation/deactivation (delay and interruption) |
| [**R4-2110963**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110963.zip)  **Ericsson**  **Draft CR** | **NR-U SCell activation TC** |
| Company A… |
| Company B… |
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| 6.1.6.3.11 | Other interruptions |
| [**R4-2110964**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110964.zip)  **Ericsson**  **Draft CR** | **NR-U Other interruption TC** |
| Company A… |
| Company B… |
|  |
|  |
| 6.1.6.3.13 | Beam management (BFD and link recovery) |
| [**R4-2110652**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110652.zip)  **Ericsson**  **Draft CR** | **Draft CR: Update of beam management test cases for NR-U** |
| MTK:  We have concern on BFD tests 2, regarding SNR3 (SNR\_SSB of set q0)= -7dB during T3~T5.  The Qout\_LR was assumed as -6dB. Given the SNR3 = -7 dB, it means almost no margin (only 1 dB) for UE because the SNR estimated @ UE may be higher than -6dB and UE will not trigger the beam failure indication and fail the test. In R15, the SNR margin between Qout\_LR and SNR2/4 is 3dB.  Our understanding on the SINREST of -7dB is the estimated SINR at the UE side, as the agreement in R4-2008567 RAN4-94e (see slide 6), so it needs to consider sufficient SNR margin to make sure the SNR@UE will be higher to equal to -7dB. |
| Company B… |
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|  |
| 6.1.6.3.14 | SS-RSRP/SS-RSRQ/SS-SINR/L1-RSRP measurement procedure (intra-frequency, inter-frequency, inter-RAT) |
| [**R4-2109277**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109277.zip)  **Nokia**  **Draft CR** | **Draft TC NR-U inter-frequency measurements** |
| Company A… |
| Company B… |
|  |
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| [**R4-2109853**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109853.zip)  **Mediatek**  **Draft CR** | **Draft CR of test cases on measurement accuracy under CCA for inter-frequency SS-RSRP and L1-RSRP** |
| Company A… |
| Company B… |
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| [**R4-2110333**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110333.zip)  **Huawei**  **Draft CR** | **Draft CR of test cases for Inter-RAT measurement for NR-U** |
| Company A… |
| Company B… |
|  |
|  |
| 6.1.6.3.16 | SFTD measurement procedure |
| [**R4-2110965**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110965.zip)  **Ericsson**  **Draft CR** | **NR-U SFTD procedure TC** |
| Company A… |
| Company B… |
|  |
|  |
| 6.1.6.3.17 | SS-RSRP/SS-RSRQ/SS-SINR/L1-RSRP measurement accuracy (intra-frequency, inter-frequency, inter-RAT) |
| [**R4-2110334**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110334.zip)  **Huawei**  **Draft CR** | **Draft CR of test cases for Intra-frequency measurement accuracy for NR-U** |
| Company A… |
| Company B… |
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| [**R4-2111245**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2111245.zip)  **Ericsson**  **Draft CR** | **RSRP/RSRQ measurement accuracy test for NR-U in EN-DC** |
| Company A… |
| Company B… |
|  |
|  |
| 6.1.6.3.18 | RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT) |
| [**R4-2109302**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2109302.zip)  **Apple**  **Draft CR** | **TCs for RSSI and CO measurement accuracy in NR-U R16** |
| Company A… |
| Company B… |
|  |
|  |
| 6.1.6.3.19 | SFTD measurement accuracy |
| [**R4-2110966**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110966.zip)  **Ericsson**  **Draft CR** | **NR-U SFTD accuracy TC** |
| Company A… |
| 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:* |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Topic #4: Test case list and work split

### Sub-topic 4-2: Test case list

**Issue 4-1-1: Test case list**

* Companies are asked to provide feedback in the way explained in Table 4-1-1.1 to the test case list in Table 4-1-1.2.

**Table 4-1-1.1: Instructions on how to fill Table 4-1-1.2**

|  |  |
| --- | --- |
| Column | Required feedback (please use company name) |
| Volunteer | Please indicate if your company is willing to volunteer for any of the blue marked test cases |
| Volunteer | Please provide a CR based on the existing volunteering for the next RAN4 meeting, or remove your company name in the light blue marked test cases if volunteering no longer applies. |
| Test case should be included | Please indicate in this column your company support for including some of the FFS test cases marked orange. |
| Test case should NOT be included | Please indicate in this column your company objection for introducing some of the FFS test cases marked orange OR objection for any of the already agreed test cases. |

**Table 4-1-1.2: Test case list for volunteering and indicating company support/objection for FFS test cases**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Group of requirements** | **Test cases** | **Clarification** | **Requirements section** | **Agreed** | **Volunteer** | **Endorsed sections** |
| RRC\_IDLE, cell re-selection | NR-U -> NR-U | intra-frequency | 4.2A | Yes | Ericsson | A.11.1.1.1.1 |
| inter-frequency | Yes | A.11.1.1.1.2 |
| NR(FR1) -> NR-U |  | Yes | A.11.1.3 |
| NR-U -> NR(FR1) |  | Yes | A.11.1.2 |
| NR-U - > E-UTRAN (FDD,TDD) |  | Yes | A.11.1.4 |
| E-UTRAN (FDD,TDD) -> NR-U |  | TS 36.133 | Yes | Ericsson | A.12.1.1.1 |
| HO (delay and interruptions) | NR-U-> NR-U | intra-frequency, known | 6.1B | Yes | Huawei | A.11.2.1.1 |
| intra-frequency, unknown | Yes | A.11.2.1.2 |
| inter-frequency, unkown | Yes | A.11.2.1.3 |
| NR(FR1) -> NR-U | known | 6.1B | Yes | Ericsson |  |
| unkown | Yes |  |
| NR-U -> NR(FR1) | known |  | Yes | Nokia |  |
| unknown | 6.1.1.2 | Yes | A.12.2 |
| NR-U - > E-UTRAN (FDD,TDD) |  | 6.1.2.1 | Yes | Ericsson |  |
| E-UTRAN (FDD,TDD) -> NR-U |  | TS 36.133 | Yes | Nokia |  |
| RRC Re-establishment | NR-U-> NR-U |  | 6.2.1A | Yes | Nokia | A.11.2.2.1.1  A.11.2.2.1.2  A.11.2.2.1.3 |
| NR(FR1) -> NR-U |  | Yes | [Huawei/ Ericsson] | A.11.2.2.1.4   A.11.2.2.1.5   A.11.2.2.1.6 |
| Random access | Contention-based and non-contention based RA for both 2-step and 4-step RA types: |  | 6.2.2A [1] |  |  |  |
| ·        to NR-U PCell |  | Yes | Ericsson | A.10.1.1.1 |
| ·        to NR-U PSCell |  | Yes | Ericsson | A.11.2.2.2 |
| RRC Connection Release with Redirection | ·        NR-U-> NR-U |  | 6.2.3.2.3 | Yes | Huawei | A.11.2.2.3.1 |
| ·        NR(FR1) -> NR-U |  | Yes | Ericsson |  |
| Timing (transmit timing) | ·        NR-U PCell |  | 7.1, 7.3 | Yes | MTK | A.11.3.1.1 |
| ·        NR-U PSCell |  | Yes | Ericsson | A.10.2.1.1 |
| Timing (timing advance) | ·        NR-U PCell |  | Yes | Ericsson | A.11.3.2.1 |
| ·        NR-U PSCell |  | Yes | A.10.2.2.1 |
| BWP switching delay and interruptions | ·       E-UTRAN – NR-U PSCell UL active BWP switch based on persistent UL LBT failure |  | 8.6 | Yes | Ericsson | A.10.3.5.1 |
| ·       NR-U – NR-U PCell UL active BWP switch based on persistent UL LBT failure |  | Yes | A.11.4.5.1 |
| Legacy DCI/timer/RRC-based BWP switching on NR-U SCell, with: |  |  |  |  |
| ·        NR PCC (PCC) |  | Yes | Ericsson |  |
| ·        NR-U PCC |  | Yes | Ericsson |  |
| ·        NR-U PSCC and E-UTRAN PCC (FDD, TDD) |  | Yes | Ericsson |  |
| RLM (in-syn and out-of-sync) | ·        On NR-U PSCC, with E-UTRAN PCC (FDD,TDD) | OOS, non-DRX | 8.1A | Yes | Ericsson | A.10.3.1.2 |
| IS, non-DRX | Yes | A.10.3.1.3 |
| OOS, DRX | Yes | A.10.3.1.4 |
| IS, DRX | Yes | A.10.3.1.5 |
| ·        On NR-U PCC | OOS, non-DRX | Yes | A.11.4.1.2 |
| IS, non-DRX | Yes | A.11.4.1.3 |
| OOS, DRX | Yes | A.11.4.1.4 |
| IS, DRX | Yes | A.11.4.1.5 |
| BM (beam failure detection and link recovery) | ·        On NR-U PCC | nonDRX | 8.5A | Yes | Ericsson | A.11.4.4.1 |
| DRX | A.11.4.4.2 |
| ·        On NR-U PSCC, with E-UTRAN PCC (FDD,TDD) | nonDRX | Yes | A.10.3.4.1 |
| DRX | A.10.3.4.2 |
| SCell activation/deactivation delay | ·        NR PCC (FR1) | known | 8.3A | Yes | Ericsson | A.9.2.2.1/2 |
| unknown | Yes | A.9.2.2.3 |
| ·        NR-U PCC | known | Yes | A.11.4.3.1/2 |
| unknown | Yes | A.11.4.3.3 |
| ·        NR-U PSCC and E-UTRAN PCC (FDD, TDD) | known | Yes | A.10.3.3.1/2 |
| unknown | Yes | A.10.3.3.3 |
| PSCell addition/release delay | NR-U PSCell with E-UTRA PCC | konwn | TS 36.133 | Yes | Huawei |  |
| Active TCI state switching delay | For known and unknown target TCI state in NR-U, on: |  | 8.10A |  |  |  |
| ·        NR-U PCC |  | FFS |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | FFS |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD, TDD) |  | FFS |  |  |
| Interruptions | Due to NR-U SCell activation/deactivation/addition/release, with: |  | 8.2.1, 8.2.2 |  | | |
| ·        NR PCC (FR1) |  | Yes | Ericsson | A.9.2.1.1 |
| ·        NR-U PCC |  | Yes | A.11.4.2.1 |
| ·        NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.3.2.1 |
| Due to inter-RAT SFTD measurements between: |  | TS 36.133 |  |  |  |
| ·        NR-U PCell and E-UTRAN PCell (FDD,TDD) |  | Yes |  |  |
| Due to NR-U PSCell addition/release, with: |  | TS 36.133 | Yes |  |  |
| ·        E-UTRA PCell |  | Yes |  |  |
| Intra-frequency measurement procedure (SS-RSRP, SS-RSRQ, SS-SINR, L1-RSRP, RSSI, CO) | Intra-frequency SS-RSRP/SS-RSRQ/SS-SINR, measurements on: |  | 9.2A.5, 9.2A.6 |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.1.1/2/3/4 |
| ·        NR-U PCC |  | Yes | A.11.5.1.1/2/3/4 |
| ·        NR-U SCC, with NR-U PCC |  | Yes | A.11.5.1.5/6/7/8 |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.1.1/2/3/4 |
| ·        NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | A.10.4.1.5/6/7/8 |
| L1-RSRP measurements on: |  | 9.5.4A |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) | Non-DXR | Yes | Ericsson | A.9.3.3.1 |
| DRX | A.9.3.3.2 |
| ·        NR-U PCC | Non-DXR | Yes | A.11.5.4.1 |
| DRX | A.11.5.4.2 |
| ·        NR-U SCC, with NR-U PCC | Non-DXR | Yes | A.11.5.4.3 |
| DRX | A.11.5.4.4 |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) | Non-DXR | Yes | A.10.4.3.1 |
| DRX | A.10.4.3.2 |
| ·        NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC | Non-DXR | Yes | A.10.4.3.3 |
| DRX | A.10.4.3.4 |
| Intra-frequency RSSI measurements on: |  | 9.2A.7.1 |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.1.5 |
| ·        NR-U PCC |  | Yes | A.11.5.1.9 |
| ·        NR-U SCC, with NR-U PCC |  | Yes | A.11.5.1.11 |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.1.9 |
| ·        NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | A.10.4.1.11 |
| Intra-frequency CO measurements on: |  | 9.2A.7.2 |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.1.6 |
| ·        NR-U PCC |  | Yes | A.11.5.1.10 |
| ·        NR-U SCC, with NR-U PCC |  | Yes | A.11.5.1.12 |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.1.10 |
| ·        NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | A.10.4.1.12 |
| Inter-frequency measurement procedure (SS-RSRP, SS-RSRQ, SS-SINR, SFTD, RSSI, CO) | Inter-frequency SS-RSRP/SS-RSRQ/SS-SINR measurements on: |  | 9.3A.4, 9.3A.5 |  |  |  |
| ·        NR-U inter-frequency, with NR PCC (FR1) |  | Yes | Nokia |  |
| ·        NR-U inter-frequency, with NR-U PCC |  | Yes |  |
| ·        NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Inter-frequency RSSI measurements on: |  | 9.3A.8 |  |  |  |
| ·        NR-U inter-frequency, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.2.1 |
| ·        NR-U inter-frequency, with NR-U PCC |  | Yes | A.11.5.2.1 |
|
| ·        NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.2.1 |
| Inter-frequency CO measurements on: |  | 9.3A.9 |  |  |  |
| ·        NR-U inter-frequency, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.2.2 |
| ·        NR-U inter-frequency, with NR-U PCC |  | Yes | A.11.5.2.2 |
| ·        NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.2.2 |
|  | Inter-RAT SFTD between: |  | TS 36.133 |  |  |  |
|  |  |
|  | ·        E-UTRAN PCell (FDD,TDD) and NR-U neighbor |  | Yes | Ericsson | A.12.4.1.1 |
|  | NOTE: under the condition of stationary paths |
|  | NR-U-E-UTRA RSRP/RSRQ (needed for HO): |  | 9.4.2, 9.4.3 |  |  |  |
|  | ·        On E-UTRA (FDD,TDD), with NR-U PCC |  | Yes |  |  |
|  | ·        On E-UTRA (FDD,TDD), with NR-U PSCC |  | Yes |  |  |
|  | E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR: |  | TS 36.133 |  |  |  |
|  | ·        On NR-U non-serving neighbor, with E-UTRA (FDD,TDD) PCC | With/without index detection with/without DRX | Yes | Huawei | A.12.4.2.1/2/3/4 |
|  | ·        On NR-U non-serving neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes |  |
|  | E-UTRA-NR-U RSSI/CO: |  | TS 36.133 |  |  |  |
| Inter-RAT measurement procedure (SFTD, E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR and RSSI/CO, NR-U-E-UTRA RSRP/RSRQ) | ·        On NR-U non-serving, with E-UTRA (FDD,TDD) PCC |  | Yes | Ericsson | A.12.4.2.5/6 |
|  | ·        On NR-U non-serving frequency, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes |  |
| Accuracy for NR-U intra-frequency measurements (SS-RSRP, SS-RSRQ, SS-SINR, L1-RSRP, RSSI, CO) | Intra-frequency absolute and relative accuracies for SS-RSRP on: |  | [10.1.27] |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Huawei | A.9.4.1.1 |
| ·        NR-U PCC |  | Yes | A.11.6.1.1 |
| ·        NR-U SCC, with NR-U PCC |  | Yes | A.11.6.1.2 |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Intra-frequency absolute accuracies for SS-RSRQ on: |  | [10.1.29] |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes |  |  |
| ·        NR-U PCC |  | Yes |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |  |
| Intra-frequency absolute accuracies for SS-SINR on: |  | [10.1.31] |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes |  |  |
| ·        NR-U PCC |  | Yes |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |  |
| Absolute and relative accuracies for L1-RSRP on: |  | [10.1.33] |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | MTK |  |
| ·        NR-U PCC |  | Yes |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Intra-frequency RSSI on: |  | [10.1.34.1] |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Apple |  |
| ·        NR-U PCC |  | Yes |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Intra-frequency CO on: |  | [10.1.35.1] |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Apple |  |
| ·        NR-U PCC |  | Yes |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Accuracy for NR-U inter-frequency measurements (SS-RSRP, SS-RSRQ, SS-SINR, SFTD, RSSI, CO) | Inter-frequency absolute and relative accuracies for SS-RSRP on: |  | [10.1.28] |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes | MTK |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Inter-frequency absolute and relative accuracies for SS-RSRQ on: |  | [10.1.30] |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes |  |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |  |
| Inter-frequency absolute and relative accuracies for SS-SINR on: |  | [10.1.32] |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes |  |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |  |
| Inter-frequency RSSI on: |  | [10.1.34.2] |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes | Apple |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Inter-frequency CO on: |  | [10.1.35.2] |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes | Apple |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Accuracy for inter-RAT measurements (SFTD, E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR and RSSI/CO, NR-U-E-UTRA RSRP/RSRQ) | Inter-RAT SFTD between: |  | TS 36.133 |  |  |  |
| ·        E-UTRAN PCell (FDD,TDD) and NR-U neighbor |  | Yes | Ericsson | A.12.5.1.1 |
| NOTE: under the condition of stationary paths |
| NR-U-E-UTRA RSRP with: |  | 10.2.2002 |  |  |  |
| ·        NR-U PCC |  | Yes |  |  |
| ·        NR-U PSCC |  | Yes |  |  |
| NR-U-E-UTRA RSRQ with: |  | 10.2.2003 |  |  |  |
| ·        NR-U PCC |  |  | Yes |  |  |
| ·        NR-U PSCC |  |  | Yes |  |  |
| E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR: |  | TS 36.133 |  |  |  |
| ·        On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | Yes |  |  |
| ·        On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes |  |  |
| E-UTRA-NR-U RSSI/CO: |  | TS 36.133 |  |  |  |
| ·        On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | Yes | Ericsson |  |
| ·        On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes | Ericsson |  |

* Recommended WF:
  + Update the test case list provided based on the input in Table 4-1-1.2.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub-topic 4-2: Test case list:  Please fill your input directly to Table 4-1-1.2. |

### 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** |
|  | |
|  |  |
|  |
|  |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents