**3GPP TSG-RAN WG4 Meeting # 98-bis-e R4-210XXXX**

**Electronic Meeting, 12th – 20th April, 2021**

**Agenda item:** 5.1.3

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

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

5.1.3 RRM perf. requirements (38.133)

5.1.3.1 General

5.1.3.2 Measurement accuracy requirements

5.1.3.3 Test cases

5.1.3.3.1 General

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

5.1.3.3.2 RRC IDLE cell re-selection

5.1.3.3.3 HO (I was thinkdelay and interruptions)

5.1.3.3.4 RRC Re-establishment

5.1.3.3.5 RRC Connection Release with Redirection

5.1.3.3.6 Random access

5.1.3.3.7 Timing (transmit timing and TA)

5.1.3.3.8 BWP switching delay and interruptions

5.1.3.3.9 PSCell addition/release (delay and interruption)

5.1.3.3.10 SCell activation/deactivation (delay and interruption)

5.1.3.3.11 Other interruptions

5.1.3.3.12 RLM

5.1.3.3.13 Beam management (BFD and link recovery)

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

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

5.1.3.3.16 SFTD measurement procedure

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

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

5.1.3.3.19 SFTD measurement accuracy

5.1.3.3.20 Other

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

* Topic #1: Workplan
* Topic #2: NR-U RRM test configuration
* 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 Draft CR is to be endorsed in after the meeting as described in the chairman’s meeting’s arrangements document.

# Topic #1: Workplan

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |  |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |  |
| [**R4-2107362**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107362.zip) | Qualcomm | With the target completion date of June 2021, we propose the following modified work plan:   * RAN4 #97e (Oct-Nov 2020)   + Way forward on general framework and test cases split * RAN4 #98e (Jan-Feb 2021)   + Discussion on CCA models, test configurations and test cases   + CR endorsement and agreement * RAN4 #98-bis-e (April 2021)   + Discussion on CCA models, test configurations and test cases   + CR endorsement and agreement * RAN4 #99e (May 2021)   + Discussion on CCA models, test configurations and test cases   + CR endorsement and agreement   + Performance part completion | Issue 1-1 |

## 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 Workplan

*Sub-topic description:*

*After the extension of the RRM performance part of NR-U in the last plenary, it is necessary to update the work plan accordingly.*

**Issue 1-1: Updated workplan**

* Proposals
* With the target completion date of June 2021, we propose the following modified work plan:
  + RAN4 #97e (Oct-Nov 2020)
    - Way forward on general framework and test cases split
  + RAN4 #98e (Jan-Feb 2021)
    - Discussion on CCA models, test configurations and test cases
    - CR endorsement and agreement
  + RAN4 #98-bis-e (April 2021)
    - Discussion on CCA models, test configurations and test cases
    - CR endorsement and agreement
  + RAN4 #99e (May 2021)
    - Discussion on CCA models, test configurations and test cases
    - CR endorsement and agreement
    - Performance part completion
* Recommended WF
  + Can we agree on the proposed workplan?
  + If not please comment on how this should be updated.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Issue 1-1: Updated workplan** |
|  |  |

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | 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 provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

|  |  |
| --- | --- |
| **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)

# Topic #2: 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** |  |
| [**R4-2107360**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107360.zip) | Qualcomm | Observation 1: MIB is always transmitted with 80 ms periodicity on PDSCH with repetitions scheduled within 80ms according to SSB periodicity. This implies that SMTC periodicity cannot be more than 80ms.  Observation 2: In NR-U, SIB1 is always transmitted with 20 ms periodicity on PDSCH and SIB1 TTI is 160 ms implying that TSI,CCA doesn’t have to be a function of TDBT.  Observation 3: The performance tests related to RRC re-establishment and RRC release with re-direction requirements in NR assume 1280ms for SI reading.  Observation 4: Under no DL CCA failure in NR-U, the network needs 600ms in the worst-case scenario to transmit 6 samples each for MIB and SIB1.  Observation 5: Existing SI decoding time of 1280ms in NR allows the network with 680ms of additional time, which is more than sufficient to compensate for any missed transmission opportunities due to DL CCA failure. |  |
|  |  | Proposal 1: SI decoding time, TSI,CCA, is kept at 1280ms during RRC re-establishment and RRC release with re-direction in NR-U networks. | Issue 2-2-3 |
| [**R4-2107139**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107139.zip) | Ericsson | Proposal 1: Legacy test cases to verify legacy requirements in TS 38.133 that apply to NR-U capable UE are defined for NR-U with NR-U test configuration parameters. | Issue 2-1-3 |
|  |  | Proposal 2: The test cases in proposal 1 are applicable only for the following UE capabilities:   * EN-DC capable UE supporting EN-DC band combinations with only NR-U band(s) (i.e. NR band with shared spectrum access) * SA capable UE supporting ony NR-U band(s) (i.e. NR band with shared spectrum access) | Issue 2-1-3 |
|  |  | Proposal 3: The principles of testing based on proposals 1 and 2 are defined as applicability rule in annex A of TS 38.133. | Issue 2-1-4 |
|  |  | Proposal 4: 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 with only NR band(s) with shared spectrum access is required to be test. * In SA test:   + The UE supporting SA operation with only NR band(s) with shared spectrum access is required to be tested. | Issue 2-1-4 |
| [**R4-2104431**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104431.zip) | ZTE | Observation 1: A UE passing tests for LBE mode does not necessarily pass the tests of FBE mode and vice versa.  Observation 2: Correct UE behavior is critical since it ensures the fair usage of spectral resources, benefiting not only the UE itself, but also other UEs operating under NR-U, and more devices operating under WiFi or other networks. |  |
|  |  | Proposal 1:  A UE that signals both FBE and LBE capability need to tested under both modes.  A UE that signals FBE only capability is subject to tests only with FBE configuration.  A UE that signals LBE only capability is subject to tests only with LBE configuration. | Issue 2-1-1 |
| [**R4-2****106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip) | MediaTek inc. | Proposal 1: if one requirement is not impacted by the LBT behavior, it is not necessary to verify the requirement again if the UE has been tested in the corresponding non-NR-U SA, ENDC tests. | Issue 2-1-5 |
|  |  | Proposal 2: Use the same test case to verify cell reselection for E-UTRAN (FDD,TDD)->NR-U and NR-U -> E-UTRAN (FDD,TDD). | Issue 3-1-4 |
|  |  | Proposal 3: Use the same test case to verify cell reselection for NR(FR1) -> NR-U and NR-U -> NR(FR1). | Issue 3-1-4 |
|  |  | Proposal 4: Not to introduce TC for “NR-U-> NR-U, Inter-frequency, known” in R16. | Issue 3-2-5 |
|  |  | Proposal 5: Use the same test case to verify HO for E-UTRAN (FDD,TDD)->NR-U and NR-U -> E-UTRAN (FDD,TDD). | Issue 3-2-4 |
|  |  | Proposal 6: Use the same test case to verify HO for NR(FR1) -> NR-U and NR-U -> NR(FR1).  Observation 1: Legacy DCI/timer/RRC-based BWP switching tests on NR-U cell can be introduced for the UE support NR-U SA but not NR SA or EN-DC. | Issue 3-2-4 |
|  |  | Proposal 7: For the UE supporting NR SA or EN-DC, the legacy DCI/timer/RRC-based BWP switching tests on NR-U cell can be skipped.  Observation 2: No TCs defined for active TCI in R15 in FR1. | Issue 3-7-5 |
|  |  | Proposal 8: Low priority for defining the TCs for active TCI state switching delay for NR-U. | Issue 3-10-2 |
|  |  | Proposal 9: For the UE supporting NR SA or EN-DC, the following TCs for interruption can be skipped:  Due to NR-U SCell addition/release. (if the TC are defined.)  During measurements on deactivated NR-U SCell. (if the TCs are defined.)  Due to inter-RAT SFTD measurements  Due to NR-U PSCell addition/release | Issue 3-11-1 |
|  |  | Proposal 10: For NR-U intra-frequency measurements accuracy (SS-RSRP, SS-RSRQ, SS-SINR, L1-RSRP, RSSI, CO),  Tests with “NR-U SCC, with NR-U PCC” can be skipped, if the UE has been tested with “NR-U PCC”  Tests with “NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)” can be skipped, if the UE has been tested with “NR-U PSCC, with E-UTRAN PCC (FDD,TDD)” | Issue 3-12-1 |
|  |  | Proposal 11: For the UE supporting NR SA or EN-DC, it can skip the following tests for inter frequency measurement accuracy:  NR (FR1) inter-frequency, with NR-U PCC  NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) | Issue 3-12-2 |
| [**R4-2106574**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106574.zip) | Nokia, Nokia Shanghai Bell | Observation 1: If a UE supporting both dynamic and semi-static channel access (LBE and FBE) would be required to be tested with both CCA variants, this would double the number of test cases for such UE.  Observation 2: It may not be feasible to assume that a UE that can pass all RRM tests with dynamic channel access (LBE) can also pass the same tests with semi-static channel access (FBE).  Observation 3: It is not clear if UEs that only support semi-static channel access (FBE) will be actually available. |  |
|  |  | Proposal 1: For a UE that supports both LBE and FBE, all test cases are run with LBE, and additionally some specific test cases are also run with FBE.  Observation 4: UEs are not allowed to initiate COT when using FBE mode. | Issue 2-1-1 |
|  |  | Proposal 2: Assuming the above Proposal 1 is agreed, include at least the following test cases for FBE mode: “RRC\_Idle, cell-reselection intra-frequency, NR-U (LBE mode) -> NR-U (FBE mode)” and “Random Access to NR-U PCell in FBE mode”. | Issue 2-1-2 |
|  |  | Proposal 3: In the case the PRACH is transmitted within a gNB-initiated COT – which is always the case for FBE mode, a gap greater than 16 µs has to be configured between the DL-UL transmissions. | Issue 3-5-7 |
|  |  | Proposal 4: 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 objection against Option 1 (P1 = 0.75, P2 = 0.5) if this is the preferred option in RAN4. | Issue 2-3-2 |
|  |  | Proposal 5: For CCA success probability for FBE CCA model, agree on Option 2: P(FBE) = 0.9.  Observation 5: The principle of the non-DRX CCA model would not be changed when using the DRX CCA model. | Issue 2-3-3 |
|  |  | Proposal 6: RAN4 should deal first with the non-DRX CCA model and deal with the DRX CCA model afterwards. | Issue 2-3-5 |
|  |  | Proposal 7: For the basic principle of UL CCA model, agree on Option 1:  Option 1 Define baseline UL CCA model as:  i. Use DL FBE model to transmit a OCNG noise pattern with CCA BW in one or more of the scheduled/configured UL resource with probability P.  1. P is FFS  ii. The test equipment keeps a count of the number of UL CCA failures it may cause.  iii. When the OCNG signal is transmitted, the test equipment does not monitor the UL resource in which the OCNG is transmitted.  iv. When the OCNG signal is not transmitted, the test equipment monitors the UL resource for the desired UL signal.  v. Based on whether it receives the signal or not, the test equipment declares the test case pass/fail  vi. Consistent UL CCA failures are modelled by means of a low CCA success probability.  Observation 6: Consistent UL CCA failure depends on an optional UE feature ul-LBT-FailureDetectionRecovery-r16. | Issue 2-4-1 |
|  |  | Proposal 8: RAN4 to define consistent UL CCA failures only as part of the following RRM test cases:  -NR-U – NR-U PCell UL active BWP switch based on persistent UL LBT failure  Observation 7: PRACH transmitted power does not increase after UL LBT failure.  Observation 8: Existing RACH RRM test cases in FR1 specify that the power of the first preamble shall be -30 dBm. | Issue 2-4-3  Issue 3-5-5 |
|  |  | Proposal 9: Specify RACH requirements that reuse NR FR1 configurations and expected PRACH transmitted power. | Issue 3-5-6 |
|  |  | Proposal 10: Specify that the power of the first preamble for NR-U random access test cases to be the same as in NR test cases.  Observation 9: If test runs where Lmax is exceeded are allowed but just not included in the statistics, testing time would be higher and some of the test runs would be useless. | Issue 3-5-6 |
|  |  | Proposal 11: Test environment should not have test runs that are rendered useless due to exceeded LBT failures | Issue 2-3-4 |
|  |  | Proposal 12: Test equipment should make sure that Lmax is not exceeded during a test by monitoring the number of CCA failures and preventing additional CCA failures from happening after Lmax is reached. | Issue 2-3-4 |
| [**R4-2106976**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106976.zip) | Huawei, HiSilicon | Observation 1: DCI-based dynamic UL/DL means tdd-UL-DL-ConfigurationCommon will not be configured and UE determine whether to receive or transmit according to the detection of DCI. |  |
|  |  | Proposal 1: The default UL/DL pattern shall be the same as that in existing configurations, according to which TE shall schedule the UE in each slot. | Issue 2-2-1 |
|  |  | Observation 2: UE may not receive and transmit corresponding signals configured by higher layer by using DCI-based dynamic UL/DL pattern.  Observation 3: Discuss to have RMC burst transmission model for LBE and FBE respectively. |  |
|  |  | Proposal 2: Add a note in each test cases where no particular behaviour to be verified that a test where Lmax is exceeded shall not be considered in the statistics. | Issue 2-3-4 |
|  |  | Proposal 3: The UL CCA failure in PRACH transmission shall only be considered in RA test cases. | Issue 2-4-4 |
| [**R4-2107361**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107361.zip) | Qualcomm Incorporated | Observation 1. For DL LBE CCA model, P1=0.75, P2 = 0.5 would be good choice as it gives a good overall transmission probability, P = P1 + (1-P1)\*P2 = 0.875, without having a significant impact on test time. |  |
|  |  | Proposal 1. Suggest RAN4 to define P1 = 0.75, P2 = 0.5 for DL LBE CCA model | Issue 2-3-2 |
|  |  | Observation 2. FBE is used when the operator can guarantee a controlled environment (no WiFi neighbors), implying that the rate of LBT failure is extremely small in FBE mode. |  |
|  |  | Proposal 2. Suggest that RAN4 defines SSB transmission probability in FBE to be higher than SSB transmission probability in LBE   * P(FBE) > P(LBE) = P1 + (1-P1)\*P2 | Issue 2-3-1 |
|  |  | Proposal 3. Suggest RAN4 to define P(FBE) = 0.95 | Issue 2-3-3 |
|  |  | Proposal 4. Suggest RAN4 to adopt a baseline UL CCA model as below:   * + TCCA ms prior to each UL transmission burst in the test:     - The test equipment (TE) generates a uniform random variable p from the range [0, 1].     - If p<PCCA\_UL, the TE transmits a OCNG noise pattern with a high [TBD] energy within the UE BW scheduled/configured for the UL transmission for at-least TCCA ms.       * TCCA is the channel sensing period depending on LBT category being used by the UE       * PCCA\_UL is the probability of a successful UL CCA         + To be determined along with the test case specification         + To model consistent UL CCA failure, PCCA\_UL takes a low value, e.g. 0%         + To model no UL CCA failure, PCCA\_UL takes a high value, e.g. 100%         + A typical/default value is TBD for PCCA\_UL in other test cases, e.g. 75%   + The TE keeps a count of the number of UL CCA failures it causes.   + The TE monitors the UL resource for the desired UL signal.   + Based on when and/or whether the TE receives the desired UL signal, it deems the test case to pass/fail | Issue 2-4-1  Issue 2-4-2 |
|  |  | Observation 3. During random access, the uncertainty in the UE calculated UL transmission power may cause decoding failure at the test equipment leading to falsely assuming an UL LBT failure and failing the test case. |  |
|  |  | Proposal 5. Test equipment to configure *preambleReceivedTargetPower* for msg1 and *msgA-PreambleReceivedTargetPower* for msgA to the highest value for UL LBT test cases. | Issue 3-5-6 |
|  |  | Observation 4. It is a good idea to choose one typical test tase to test the same requirement, e.g., delay in acquiring PRACH resource across multiple RRM features.  Observation 5. List of features impacted with UL LBT failure   * Handover to target cell using CCA   + Delay in acquiring PRACH resource * RRC re-establishment using CCA   + Delay in acquiring PRACH resource * Random access   + Delay in acquiring PRACH resource * RRC connection release with re-direction   + Delay in acquiring PRACH resource * BWP switch delay on consistent UL LBT recovery   + Additional delay in acquiring PRACH resource as in Handover * SCell activation   + Additional delay in transmission of CSI reporting due to CCA failure * Event triggered measurement reporting delay   + Additional delay due to UL LBT failure not defined   + FFS: Assume it similar to above-mentioned SCell activation case * MAC CE based TCI state switch delay   Delay in sending HARQ feedback transmissions |  |
|  |  | Proposal 6. RAN4 to define one typical test case to test – Additional delay in acquiring PRACH resource due to UL LBT failures for the following requirements:   * Handover to target cell using CCA * RRC re-establishment using CCA * Random access * RRC connection release with re-direction * BWP switch delay on consistent UL LBT recovery | Issue 2-4-4 |
|  |  | Proposal 7a. Suggest RAN4 to test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirement:   * Random access to a target cell using CCA | Issue 2-4-4 |
|  |  | Proposal 7b. (Based on Proposal 7a) Suggest RAN4 to not test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirements:   * Handover to target cell using CCA * RRC re-establishment using CCA * RRC connection release with re-direction * BWP switch delay on consistent UL LBT recovery | Issue 2-4-4 |
|  |  | Proposal 8. RAN4 to discuss whether to include UL LBT failures for the following cases:   * SCell activation   + Additional delay in transmission of CSI reporting due to CCA failure * Event triggered measurement reporting delay   + Additional delay due to UL LBT failure not defined   + FFS: Assume it similar to above-mentioned SCell activation case * MAC CE based TCI state switch delay   + Delay in sending HARQ feedback transmissions | Issue 2-4-5 |
| [**R4-2106849**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106849.zip) | Ericsson | Proposal 1: Two SSBs are modelled in all NR-U test cases, regardless of LBE or FBE, except cell detection where one SSB is stated in the requirements | Issue 2-2-2 |
|  |  | Proposal 2: At least at a low Es/Iot (e.g., Es/Iot<-6 dB), the probability of CCA success is higher for the semi-static channel occupancy compared to that for dynamic channel occupancy:  o PCCA,semi-static,i > PCCA,dynamic,I, when Es/Iot<X,  o PCCA,semi-static,i = PCCA,dynamic,I, when Es/Iot≥X,  where X=TBD (e.g., X=-6 dB). | Issue 2-3-1 |
|  |  | Proposal 3: Prior to each UL transmission burst within a time interval i of the test:  1. Generate a uniform random variable p from the range [0, 1].  2. If p<PCCA\_UL,i, then the energy generated by the test system in the corresponding portion of UL slot is equal to or below the energy detection threshold [TBD]; otherwise the energy generated by the test system in the portion of UL slot is above the energy detection threshold [TBD]. | Issue 2-4-1 |

## Open issues summary

### Sub-topic 2-1 Applicability rules

*Sub-topic description*

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

**Issue 2-1-1: FBE and LBE applicability**

* Proposals:
  + Option 1 (R4-2104431):
    - A UE that signals both FBE and LBE capability need to be tested under both modes.
    - A UE that signals FBE only capability is subject to tests only with FBE configuration.
    - A UE that signals LBE only capability is subject to tests only with LBE configuration.
  + Option 2 (R4-2106574):
    - For a UE that supports both LBE and FBE, all test cases are run with LBE, and additionally some specific test cases are also run with FBE.
* Recommended WF
  + Discuss options 1 and 2.

**Issue 2-1-2: FBE and LBE test cases**

* Assuming Option 2 is agreed on Issue 1.2.1, which test cases should be tested for FBE and LBE:
  + Option 1 (R4-2106574): include at least the following test cases for FBE mode:
    - RRC\_Idle, cell-reselection intra-frequency, NR-U (LBE mode) -> NR-U (FBE mode)
    - Random Access to NR-U PCell in FBE mode
* Recommended WF
  + To be discussed depending upon the decision for issue 2-1-1.

**Issue 2-1-3: How to handle legacy tests for UEs supporting only NR bands with CCA part 1**

* Proposals:
  + Option 1 (R4-2107139):
    - Legacy test cases to verify legacy requirements in TS 38.133 that apply to NR-U capable UE are defined for NR-U with NR-U test configuration parameters
    - The test cases from the bullet above are applicable only for UE with the following capabilities:
      * EN-DC capable UE supporting EN-DC band combinations with only NR-U band(s) (i.e. NR band with shared spectrum access)
      * SA capable UE supporting only NR-U band(s) (i.e. NR band with shared spectrum access)
  + Option 2: Other options?
* Recommended WF
  + Discuss option 1.

**Issue 2-1-4: How to handle legacy tests for UEs supporting only NR bands with CCA part 2**

* Proposals
  + Option 1 (R4-2107139): If we agree on Option 1 of the previous issue, consider the following proposals:
    - The principles of testing based on proposals 1 and 2 are defined as applicability rule in annex A of TS 38.133.
    - 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.
* Recommended WF
  + Postpone discussion or 2nd round if Option 1 is agreed in Issue 2-1-3.

**Issue 2-1-5: Applicability of NR-U test cases if the requirement is not impacted by CCA**

Please consider the following proposal on requirements not impacted by CCA:

* Proposal 1 **(**[R4-2106357](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** If one requirement is not impacted by the LBT behavior, it is not necessary to verify the requirement again if the UE has been tested in the corresponding non-NR-U SA, ENDC tests.

Recommended WF

* Discuss Proposal 1, please include examples of test cases for which Proposal 1 would apply.

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

**Issue 2-2-1: UL/DL pattern configuration**

Consider the following proposal

* Proposal 1 (R4-2106976): The default UL/DL pattern shall be the same as that in existing configurations, according to which TE shall schedule the UE in each slot.

Recommended WF

* It is proposed to agree on Proposal 1.

**Issue 2-2-2: SSB configuration for NR-U test cases**

Consider the following proposal

* Option 1 (R4-2106849): Two SSBs are modelled in all NR-U test cases, regardless of LBE or FBE, except cell detection where one SSB is stated in the requirements.
* Option 2: The number of SSB indexes to be used in each test case is configured to be the same as in the existing NR test case.

Recommended WF

* Discuss options 1 and 2.

**Issue 2-2-3: SI decoding time**

Please consider the following proposal:

* Proposal 1 (R4-2107360): SI decoding time, TSI,CCA, is kept at 1280ms during RRC re-establishment and RRC release with re-direction in NR-U networks.

Recommended WF

* Please discuss this issue considering Issue 2-1-1 from [201] NR-U RRM part 1.

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

**Issue 2-3-1: FBE vs. LBE transmission probability**

How should the LBE model probabilities differ among LBE and FBE configurations?

* Option 1 (R4-2107361): define SSB transmission probability in FBE to be higher than SSB transmission probability in LBE P(FBE) > P(LBE) = P1 + (1-P1)\*P2
* Option 2 (R4-2106849): At least at a low Es/Iot (e.g., Es/Iot<-6 dB), the probability of CCA success is higher for the semi-static channel occupancy compared to that for dynamic channel occupancy:
  + PCCA,semi-static,i > PCCA,dynamic,I, when Es/Iot<X,
  + PCCA,semi-static,i = PCCA,dynamic,I, when Es/Iot≥X,
  + where X=TBD (e.g., X=-6 dB).
* Option 3: The LBT model probabilities should not be defined comparing the probabilities from FBE and LBE as a working assumption.

Recommended WF

* Indicate your preferred option.

**Issue 2-3-2: CCA DL success probability for dynamic channel access configurations**

Which value should be used as a baseline for the CCA success probability for dynamic channel access (LBE) configurations?

* Candidate options:
  + Option 1 (R4-2106574): P1=P2= 0.75
  + Option 2 (R4-2107361): P1 = 0.75, P2 = 0.5
* Recommended WF:
  + Please indicate your preferred option.

**Issue 2-3-3: CCA DL success probability for semi-static channel access configurations**

Which value should be used as a baseline for the CCA success probability for semi-static channel access (FBE) configurations?

* Candidate options:
  + Option 1 (R4-2106574): P(FBE)= 0.9
  + Option 2 (R4-2107361): P(FBE) = 0.95
* Recommended WF:
  + Please indicate your preference

**Issue 2-3-4: How to avoid exceeding Lmax in RRM tests**

On the last meeting it was agreed that in test cases where no particular behaviour is verified, exceeding Lmax shall be avoided. Regarding how this should be avoided, consider the following options:

* Candidate options:
  + Option 1 (R4-2106574):
    - Proposal 1a: Test environment should not have test runs that are rendered useless due to exceeded LBT failures
    - Proposal 1b: Test equipment should make sure that Lmax is not exceeded during a test by monitoring the number of CCA failures and preventing additional CCA failures from happening after Lmax is reached.
  + Option 2 (R4-2106976): Add a note in each test cases where no particular behaviour to be verified that a test where Lmax is exceeded shall not be considered in the statistics.
* Recommended WF
  + Indicate your preferred option.

**Issue 2-3-5 DRX CCA model**

Consider the following proposal:

* Proposal 1(R4-2106574): RAN4 should deal first with the non-DRX CCA model and deal with the DRX CCA model afterwards

Recommended WF:

* It is proposed to agree on proposal 1.

### Sub-topic 2-4 CCA models in UL

**Issue 2-4-1: UL CCA model**

Consider the following proposals for the UL CCA model:

* Proposal 1 (R4-2106574) Define baseline UL CCA model as:
  + Use DL FBE model to transmit a OCNG noise pattern with CCA BW in one or more of the scheduled/configured UL resource with probability P.
    - P is FFS
  + The test equipment keeps a count of the number of UL CCA failures it may cause.
  + When the OCNG signal is transmitted, the test equipment does not monitor the UL resource in which the OCNG is transmitted.
  + When the OCNG signal is not transmitted, the test equipment monitors the UL resource for the desired UL signal.
  + Based on whether it receives the signal or not, the test equipment declares the test case pass/fail
  + Consistent UL CCA failures are modelled by means of a low CCA success probability.
* Proposal 2 (R4-2107361): to adopt a baseline UL CCA model as below:
* TCCA ms prior to each UL transmission burst in the test:
  + The test equipment (TE) generates a uniform random variable p from the range [0, 1].
  + If p<PCCA\_UL, the TE transmits a OCNG noise pattern with a high [TBD] energy within the UE BW scheduled/configured for the UL transmission for at-least TCCA ms.
    - TCCA is the channel sensing period depending on LBT category being used by the UE
    - PCCA\_UL is the probability of a successful UL CCA
* The TE keeps a count of the number of UL CCA failures it causes.
* The TE monitors the UL resource for the desired UL signal.
* Based on when and/or whether the TE receives the desired UL signal, it deems the test case to pass/fail
* Proposal 3 (R4-2106849): Prior to each UL transmission burst within a time interval i of the test:
  + Generate a uniform random variable p from the range [0, 1].
  + If p<PCCA\_UL,i, then the energy generated by the test system in the corresponding portion of UL slot is equal to or below the energy detection threshold [TBD]; otherwise the energy generated by the test system in the portion of UL slot is above the energy detection threshold [TBD].

Recommended WF:

* Please comment on which of the proposals can be agreed.

**Issue 2-4-2: UL CCA success probability**

* Proposal 1 (R4-2107361): PCCA\_UL is the probability of a successful UL CCA
  + To be determined along with the test case specification
  + To model consistent UL CCA failure, PCCA\_UL takes a low value, e.g. 0%
  + To model no UL CCA failure, PCCA\_UL takes a high value, e.g. 100%
  + A typical/default value is TBD for PCCA\_UL in other test cases, e.g. 75%

Recommended WF:

* Can we agree on Proposal 1?

**Issue 2-4-3: Configuration of UL CCA Failure Detection Recovery**

Consider the following option:

* Proposal 1 (R4-2106574) Configure UL CCA failure recovery only as part of the following RRM test case:
  + NR-U – NR-U PCell UL active BWP switch based on persistent UL LBT failure

Recommended WF:

* It is proposed to agree on Proposal 1

**Issue 2-4-4: Additional delay in acquiring PRACH resource due to UL LBT failures**

Considering the additional delay in acquiring PRACH resource due to UL LBT failures, please evaluate the following proposals:

* Proposal 1 (R4-2107361): RAN4 to define one typical test case to test – Additional delay in acquiring PRACH resource due to UL LBT failures for the following requirements:
  + Handover to target cell using CCA
  + RRC re-establishment using CCA
  + Random access
  + RRC connection release with re-direction
  + BWP switch delay on consistent UL LBT recovery
* Proposal 2 (R4-2107361): RAN4 to test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirement:
  + Random access to a target cell using CCA
* Proposal 3 (R4-2107361): RAN4 to not test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirements:
  + Handover to target cell using CCA
  + RRC re-establishment using CCA
  + RRC connection release with re-direction
  + BWP switch delay on consistent UL LBT recovery
* Proposal 4 (R4-2106976): The UL CCA failure in PRACH transmission shall only be considered in RA test cases.

Recommended WF

* Please indicate which proposals can be agreed.

**Issue 2-4-5 Test case list to include UL CCA failures**

Discuss whether to include UL LBT failures for the following cases (R4-2107361):

* Proposal 1: SCell activation
  + Additional delay in transmission of CSI reporting due to CCA failure
* Proposal 2: 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 3: MAC CE based TCI state switch delay
  + Delay in sending HARQ feedback transmissions

Recommended WF:

* Discuss which of the above test cases should include UL CCA failures.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub-topic 2-1 Applicability rules  Issue 2-1-1: FBE and LBE applicability  Issue 2-1-2: FBE and LBE test cases  Issue 2-1-3: How to handle legacy tests for UEs supporting only NR bands with CCA part 1  Issue 2-1-4: How to handle legacy tests for UEs supporting only NR bands with CCA part 2  Issue 2-1-5: Applicability of NR-U test cases if the requirement is not impacted by CCA  Sub-topic 2-2 General configuration of the RRM tests  Issue 2-2-1: UL/DL pattern configuration  Issue 2-2-2: SSB configuration for NR-U test cases  Issue 2-2-3: SI decoding time  Sub-topic 2-3 CCA models in DL  Issue 2-3-1: FBE vrs LBE transmission probability  Issue 2-3-2: CCA DL success probability for dynamic channel access configurations  Issue 2-3-3: CCA DL success probability for semi-static channel access configurations  Issue 2-3-4: How to avoid exceeding Lmax in RRM tests  Issue 2-3-5 DRX CCA model  Sub-topic 2-4 CCA models in UL  Issue 2-4-1: UL CCA model  Issue 2-4-2: UL CCA success probability  Issue 2-4-3: Configuration of UL CCA Failure Detection Recovery  Issue 2-4-4: Additional delay in acquiring PRACH resource due to UL LBT failures  Issue 2-4-5: Test case list to include UL CCA failures |
|  |  |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| **AI 5.1.3.1 General** | |
| R4-2106846  Ericsson | Draft Big CR: Introduction of Rel-16 NR-U RRM performance requirements |
| Company A… |
| Company B… |
| **5.1.3.2 Measurement accuracy requirements** | |
| [R4-2106847](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106847.zip)  Ericsson | NR-U accuracy requirements |
| Company A… |
| Company B… |
| [R4-2106879](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106879.zip)  Ericsson | DraftCR 36.133 Correction of accuracy requirements for NR-U bands |
| Company A… |
| Company B… |
| [R4-2106975](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106975.zip)  Huawei | Draft CR on inter-RAT NR measurement accuracy requirements |
| Company A… |
| Company B… |
| **5.1.3.3.1 General** | |
| R4-2106580  Nokia | Draft CR on DL CCA model for NR-U |
| Company A… |
| Company B… |
| R4-2106850  Ericsson | CCA model in NR-U test cases |
| Company A… |
| Company B… |
| R4-2106873  Ericsson | Draft CR: Update of RMC for NR-U test cases |
| Company A… |
| Company B… |
| R4-2106977  Huawei | Draft CR of test case configurations for NR-U |
| Company A… |
| Company B… |
| **AI 5.1.3.3.20 other** | |
| R4-2107140  Ericsson | Applicability rules for legacy NR tests for NR-U 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** |
| [**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip) | MediaTek Inc. | **Proposal 1:** if one requirement is not impacted by the LBT behavior, it is not necessary to verify the requirement again if the UE has been tested in the corresponding non-NR-U SA, ENDC tests.  **Proposal 2:** Use the same test case to verify cell reselection for E-UTRAN (FDD,TDD)->NR-U and NR-U -> E-UTRAN (FDD,TDD).  **Proposal 3:** Use the same test case to verify cell reselection for NR(FR1) -> NR-U and NR-U -> NR(FR1).  **Proposal 4:** Not to introduce TC for “NR-U-> NR-U, Inter-frequency, known” in R16.  **Proposal 5:** Use the same test case to verify HO for E-UTRAN (FDD,TDD)->NR-U and NR-U -> E-UTRAN (FDD,TDD).  **Proposal 6:** Use the same test case to verify HO for NR(FR1) -> NR-U and NR-U -> NR(FR1).  Observation 1: Legacy DCI/timer/RRC-based BWP switching tests on NR-U cell can be introduced for the UE support NR-U SA but not NR SA or EN-DC.  **Proposal 7:** For the UE supporting NR SA or EN-DC, the legacy DCI/timer/RRC-based BWP switching tests on NR-U cell can be skipped.  Observation 2: No TCs defined for active TCI in R15 in FR1.  **Proposal 8:** Low priority for defining the TCs for active TCI state switching delay for NR-U.  **Proposal 9:** For the UE supporting NR SA or EN-DC, the following TCs for interruption can be skipped:   * Due to NR-U SCell addition/release. (if the TC are defined.) * During measurements on deactivated NR-U SCell. (if the TCs are defined.) * Due to inter-RAT SFTD measurements * Due to NR-U PSCell addition/release   **Proposal 10:** For NR-U intra-frequency measurements accuracy (SS-RSRP, SS-RSRQ, SS-SINR, L1-RSRP, RSSI, CO),   * Tests with “NR-U SCC, with NR-U PCC” can be skipped, if the UE has been tested with “NR-U PCC” * Tests with “NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)” can be skipped, if the UE has been tested with “NR-U PSCC, with E-UTRAN PCC (FDD,TDD)”   **Proposal 11:** For the UE supporting NR SA or EN-DC, it can skip the following tests for inter frequency measurement accuracy:   * NR (FR1) inter-frequency, with NR-U PCC * NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |
| **AI 5.1.3.3.2 RRC IDLE cell re-selection** | | |
| [R4-2106853](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106853.zip) | Ericsson | Discussions on cell reselection test cases for NR-U   * Observation #1: Not possible to verify the requirement that UE shall trigger cell detection on all configured carriers after two unsuccessful measurement attempts. * Observation #2: Not possible to verify the requirement on minimum spacing between two measurements used in the filtering. * **Proposal #1:** Test configurations in Table 3 and Table 4 are proposed for cell reselections between NR-U and NR, and between NR-U and E-UTRAN.   Table 3 Test configurations for cell reselections between NR-U and NR   |  |  |  | | --- | --- | --- | | Configuration | Description of a cell with CCA | Description of a cell without CCA | | 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | | 2 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode | | 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |   Table 4 Test configurations for cell reselections between NR-U to E-UTRAN   |  |  |  | | --- | --- | --- | | Configuration | Description of a cell with CCA | Description of a cell without CCA | | 1 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, TDD duplex mode | | 2 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, FDD duplex mode | | Note: The UE is only required to be tested in one of the supported test configurations. | | |  * **Proposal #2:** 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   + New RMCs * **Proposal #3:** Reselection test shall verify that maximum allowed CCA failures for Md, Mm and Me. |
| **AI 5.1.3.3.3 HO (delay and interruptions)** | | |
| [R4-2106575](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106575.zip) | Nokia, Nokia Shanghai Bell | Discussion about HO test cases with shared core requirements  Observation 1: NR(FR1) -> NR-U handover: The core requirements are the same as for NR-U->NR-U handover. Only the cell configuration for Cell 1 (NR FR1 source cell) needs to be updated.  Observation 2: NR-U -> NR(FR1) handover: The core requirements are the same as for NR(FR1)->NR(FR1) handover in section 6.1.1.2. The existing NR test cases are in A.6.3.1.1 (Intra-frequency handover from FR1 to FR1; known target cell), A.6.3.1.2 (Intra-frequency handover from FR1 to FR1; unknown target cell) and A.6.3.1.3 (Inter-frequency handover from FR1 to FR1; unknown target cell). The only difference to the existing NR test cases would be the cell configuration for Cell 1 (NR-U source cell).  Observation 3: NR-U - > E-UTRAN (FDD,TDD) handover: The existing NR test cases are in A.6.3.1.4 (SA NR - E-UTRAN handover) and A.6.3.1.5 (SA NR - E-UTRAN handover with unknown target cell), and the only difference to NR-U -> NR(FR1) handover test case would be the cell configuration for Cell 1 (NR-U source cell).  Observation 4: Some of the cell specific parameters for at least handover test cases depend on the time period in the test and making such parameters general may be difficult.   1. Introduce NR-U test cases that share core requirements with already existing NR or NR-U test cases as new test cases in their own sections with the required changes in the cell configuration. |
| [R4-2106855](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106855.zip) | Ericsson | Discussions on handover test cases for NR-U  **Proposal #1:** Following test configurations are proposed for handovers between NR-U and NR, and between NR-U and E-UTRAN:  Table 3 Test configurations for cell reselections between NR-U and NR   |  |  |  | | --- | --- | --- | | Configuration | Description of a cell with CCA | Description of a cell without CCA | | 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | | 2 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode | | 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |   Table 4 Test configurations for cell reselections between NR-U to E-UTRAN   |  |  |  | | --- | --- | --- | | Configuration | Description of a cell with CCA | Description of a cell without CCA | | 1 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, TDD duplex mode | | 2 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, FDD duplex mode | | Note: The UE is only required to be tested in one of the supported test configurations. | | |  * **Proposal #2:** 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   + New RMCs * **Proposal #3:** Handover delay verified in test requirements is expressed using a formula containing L1, L1’, L2 and L3 depending on the type of test case, and the total delay is limited by T304 timer. |
| **AI 5.1.3.3.4 RRC Re-establishment** | | |
| [R4-2104432](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104432.zip) | ZTE Corporation | Test cases for RRC re-establishment in NR-U  Proposal 1: The value of PCCA\_DL can be independent from the channel access mode (FBE / LBE)  Proposal 2: Serving cell: PCCA\_UL=1 and PCCA\_DL=1 in all test times. Target cell: PCCA\_UL=1 and PCCA\_DL = 0.75 in all test times. |
| [R4-2107141](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107141.zip) | Ericsson | RRC re-establishment tests for NR-U   * **Proposal 1:** At least the following NR-U 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 is subject to CCA and known target cell subject to CCA 2. TC2: Inter-frequency RRC Re-establishment in FR1 with serving cell is subject to CCA and with unknown target cell subject to CCA 3. TC3: Intra-frequency RRC Re-establishment in FR1 with serving cell is subject to CCA, with unknown target cell subject to CCA and without serving cell timing.  * **Proposal 2:** NR-U 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 | Description | | 1 | With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |  * **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-U to NR-U RRC re-establishment tests can be defined for the following LBT configuration/setting subject to agreements on the LBT. The initial draft contains these values are TBD due to lack of agreement on LBT model.   + **Serving cell:** PCCA\_UL=1 and PCCA\_DL=1 in all test times   + **Target cell:** PCCA\_UL=1 and PCCA\_DL< 1 (e.g. 0.5) in all test times |
| **AI 5.1.3.3.5 RRC Connection Release with Redirection** | | |
| [R4-2104433](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104433.zip) | ZTE Corporation | Test cases for RRC release with re-direction in NR-U   1. Serving cell: PCCA\_UL=1 and PCCA\_DL=1 in all test times. Target cell: PCCA\_UL=1 and PCCA\_DL = 0.75 in all test times. |
| [R4-2107143](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107143.zip) | Ericsson | RRC connetion release with re-direction from NR to NR-U test   * **Proposal 1:** The following NR to NR-U RRC connection release with redirection test to verify core requirements in clause 6.2.3.2.3, TS 38.133, is defined:  1. TC2: Redirection from NR FR1 carrier without CCA to NR FR1 carrier with CCA  * **Proposal 2:** NR to NR-U RRC connection release with redirection 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 |  * **Proposal 3:** NR to NR-U RRC connection release with redirection test is defined for the following LBT configuration/setting. The initial draft contains these values are TBD due to lack of agreement on LBT model.   + **Target cell:** PCCA\_UL=1 and PCCA\_DL< 1 (e.g. 0.75) in all test times * **Proposal 4:** In NR to NR-U RRC connection release with redirection test ensure that number of DL LBT failures (L1) in target cell does not exceed L1,max ; L1,max is defined in Table 6.2.3.2.3-1, TS 38.133. |
| **AI 5.1.3.3.6 Random access** | | |
| [R4-2106876](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106876.zip) | Ericsson | Test cases on random access for NR-U  **Proposal 1:** Define the random access procedure test cases for NR-U as follows.   |  | | --- | | A.10 EN-DC Tests with NR PSCell under CCA and Other NR Cells in FR1  […]  A.10.1.1.1 Random Access  A.10.1.1.1.1 Contention-based random access for NR PSCell  A.10.1.1.1.1.1 4-step RA type contention-based random access test  A.10.1.1.1.1.2 2-step RA type contention-based random access test  A.10.1.1.1.2 Non-contention based random access for NR PSCell  A.10.1.1.1.2.1 4-step RA type non-contention based random access test  A.10.1.1.1.2.2 2-step RA type non-contention based random access test  A.11 NR Standalone Tests with NR PCell under CCA and Other NR Cells in FR1  […]  A.11.2.2.2 Random Access  A.11.2.2.2.1 Contention-based random access for NR PCell  A.11.2.2.2.1.1 4-step RA type contention-based random access test  A.11.2.2.2.1.2 2-step RA type contention-based random access test  A.11.2.2.2.2 Non-contention based random access for NR PCell  A.11.2.2.2.2.1 4-step RA type contention-based random access test  A.11.2.2.2.2.2 2-step RA type contention-based random access test |   **Proposal 2:** For the non-contention random access procedure in NR-U, define only the SSB-based random access procedure test cases.  **Proposal 3:** NR-U random access procedure tests do not need to configure DL LBT failure, i.e., set PCCA\_DL=1.0.  **Proposal 4:** NR-U random access procedure tests should configure UL LBT failure, i.e., set PCCA\_UL < 1.0.  **Proposal 5:** Configure lbt-FailureRecoveryConfig for the random access procedure test cases for NR-U. Set *FailureInstanceMaxCount* to 4 and *lbt-FailureDetectionTimer* to 320ms. |
| **5.1.3.3.7 Timing (transmit timing and TA)** | | |
| [R4-2104434](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104434.zip) | ZTE Corporation | 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. |
| [R4-2106980](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106980.zip) | Huawei, HiSilicon | Discussion on test cases for timing requirements for NR-U  Observation 1: The reference cell shall be considered as available only if all SSB are available during the last 160 ms.  Observation 2: Handling the DL CCA failure in transmit timing requirements:   * Option 1: PCCA\_DL <1, and add a note that the UL transmission is not taken in to statistics if there is at least on SSB not available during the last 160 ms * Option 2: PCCA\_DL = 1.   **Proposal 1:** Configure PCCA\_UL=1 and PCCA\_DL=1 for transmit timing test cases. |
| **AI 5.1.3.3.8 BWP switching delay and interruptions** | | |
| [R4-2104435](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104435.zip) | ZTE Corporation | Test cases for BWP switching in NR-U  Proposal 1: Periodic SRS shall be configured in the SpCell to enable the UE to detect consistent UL LBT failure in the SpCell.  Proposal 2: 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 | |
| [R4-2107145](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107145.zip) | Ericsson | Test cases on BWP switching for NR-U SA   * **Proposal 1:** The following BWP switching tests to verify core requirements in clauses 8.6.2 and 8.6.3, TS 38.133, are defined:  1. TC1: A.10.3.5.2.1 E-UTRAN – NR PSCell FR1 DL active BWP switch in non-DRX in synchronous EN-DC 2. TC2: A.10.3.5.2.2 E-UTRAN – NR PSCell FR1 DL active BWP switch with FR1 SCell in non-DRX in synchronous EN-DC 3. TC3: A.10.3.5.3.1 E-UTRAN – NR PSCell FR1 DL active BWP switch in non-DRX in synchronous EN-DC 4. TC4: A.11.4.5.2.1 NR FR1- NR FR1 DL active BWP switch of PCell with non-DRX in SA 5. TC5: A.11.4.5.2.2 NR FR1 DL active BWP switch with non-DRX in SA 6. TC6: A.11.4.5.3.1 NR FR1 DL active BWP switch of Cell with non-DRX in SA  * **Proposal 2:** BWP switching tests are defined for the following configurations related to SSB SCS and BW for both serving and target cells:   + The EN-DC tests shall be done for the following two set of test configuration:  |  |  | | --- | --- | | Config | Description | | 1 | LTE FDD,  With CCA: NR TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz | | 2 | LTE TDD,  With CCA: NR TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |  * + The SA tests shall be done for the following test configuration:  |  |  | | --- | --- | | Config | Description | | 1 | With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |  * **Proposal 3:** No LBT failure is modelled in any of above the test cases i.e.   + **In all NR-U cells:** PCCA\_UL= PCCA\_DL =1 * **Proposal 4:** The above test cases are applicable as follows:   + EN-DC tests TC1-TC3 for UE capable of EN-DC with only NR-U bands   + SA tests TC4-TC6 for UE capable of SA with only NR-U bands |
| **AI 5.1.3.3.13 Beam management (BFD and link recovery)** | | |
| [R4-2106874](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106874.zip) | Ericsson | Test cases on link recovery and L1-RSRP reporting for NR-U  **Proposal 1:** Set the time durations and timer values of link recovery tests for NR-U as follows:   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | SSB-based LR with non-DRX  (both EN-DC and SA) | | SSB-based LR with DRX  (both EN-DC and SA) | | | BFD-RS SSB Es/Iot | Es/Iot ≥ -7 dB | Es/Iot < -7 dB | Es/Iot ≥ -7 dB | Es/Iot < -7 dB | | T310 | 1000ms | 1000ms | 1000ms | 1000ms | | N310 | 2 | 2 | 2 | 2 | | T1 | 0.2s | 0.2s | 1s | 1s | | T2 | 0.85s | 0.93s | 8.37s | 9.01s | | T3 | 0.44s | 0.52s | 4.52s | 5.16s | | T4 | 0s | 0s | 0s | 0s | | T5 | 0.45s | 0.45s | 3.89s | 3.89s | | D1 | 0.41s | 0.41s | 3.85s | 3.85s |   **Proposal 2:** 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.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  |  | 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 |   **Proposal 3:** Set PCCA\_DL=100% and PCCA\_UL=100% during T1 for L1-RSRP measurement reporting tests.  **Proposal 4:** Set PCCA\_DL=75% and PCCA\_UL=75% during T2 for L1-RSRP measurement reporting tests. |
| **AI 5.1.3.3.18 RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT)** | | |
| [R4-2104829](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104829.zip) | Apple | On RSSI and CO testing in NR-U  **Proposal 1:** RAN4 set the RMTC parameters for NR-U RSSI/CO measurement TCs as below, including intra-frequency/inter-frequency and inter-RAT.   |  |  | | --- | --- | | measDurationSymbols-r16 | sym14or12 | | rmtc-Periodicity-r16 | ms40 | | rmtc-SubframeOffset-r16 | 20 | | ref-SCS-CP-r16 | kHz30 | | ReportInterval | ms120 |   **Proposal 2:** in the NR-U RSSI/CO measurement TCs the parameter configuration shall guarantee the Io difference between inside RMTC and outside RMTC within a range of [14dB, 15dB]. |
| **AI 5.1.3.3.20 Other** | | |
| [R4-2106984](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106984.zip) | Huawei, HiSilicon | Discussion on test cases for TCI switching for NR-U  Observation 1: Introduce the timing different between the RS in the two TCI states.  **Proposal 1:** Introduce the timing different between the RS in the two TCI states in the TCI state switching test cases, where the exact value needs further discussion. |

## Open issues summary

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

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

**Issue 3-1-1: Test configurations for RRC IDLE cell re-selection test cases**

* **Proposal 1 (**[**R4-2106853**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106853.zip)**):** Test configurations in Table 3-1-1.1 and Table 3-1-1.2 are proposed for cell reselections between NR-U and NR, and between NR-U and E-UTRAN.

**Table 3-1-1.1: Test configurations for cell re-selections between NR-U and NR**

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

**Table 3-1-1.2: Test configurations for cell re-selections between NR-U and E-UTRAN**

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, TDD duplex mode |
| 2 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | | |

* Recommended WF
  + Can Proposal 1 be agreed?

**Issue 3-1-2: Cell specific test parameters for RRC IDLE cell re-selection test cases**

* **Proposal 1 (**[**R4-2106853**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106853.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
  + New RMCs
* Recommended WF
  + Can Proposal 1 be agreed?

**Issue 3-1-3: Verifying maximum allowed CCA failures for Md Mm and Me in RRC IDLE cell re-selection test cases**

* **Proposal 1 (**[**R4-2106853**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106853.zip)**):** Reselection test shall verify that maximum allowed CCA failures for Md, Mm and Me.
* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-1-4: The way to introduce RRC IDLE cell re-selection test cases**

Background:

The following test cases have been agreed for NR-U RRC IDLE cell re-selection:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Group of requirements** | **Test cases** |  | **Requirements section** | **Agreed** |
| RRC\_IDLE, cell re-selection | NR-U -> NR-U | intra-frequency | 4.2A | Yes |
| inter-frequency | Yes |
| NR(FR1) -> NR-U |  | Yes |
| NR-U -> NR(FR1) |  | Yes |
| NR-U - > E-UTRAN (FDD,TDD) |  | Yes |
| E-UTRAN (FDD,TDD) -> NR-U |  | TS 36.133 | Yes |

* **Proposal 1 (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** Use the same test case to verify cell reselection for E-UTRAN (FDD,TDD)->NR-U and NR-U -> E-UTRAN (FDD,TDD).
* **Proposal 2 (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** Use the same test case to verify cell reselection for NR(FR1) -> NR-U and NR-U -> NR(FR1).
* Recommended WF
  + Discuss Proposals 1 and 2.

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

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

**Issue 3-2-1: Test configurations for handover test cases**

* **Proposal 1 (**[**R4-2106855**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106855.zip)**):** Following test configurations are proposed for handovers between NR-U and NR, and between NR-U and E-UTRAN:

**Table 3-2-1.1 Test configurations for handover between NR-U and NR**

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, TDD duplex mode |
| 2 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | | |

**Table 3-2-1.2 Test configurations for handover between NR-U and E-UTRAN**

* Recommended WF
  + Can Proposal 1 be agreed?

**Issue 3-2-2: Cell specific test parameters for handover test cases**

* **Proposal 1 (**[**R4-2106855**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106855.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
  + New RMCs
* Recommended WF
  + Can Proposal 1 be agreed?

**Issue 3-2-3: Handover delay in test requirements**

* **Proposal 1 (**[**R4-2106855**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106855.zip)**):** Handover delay verified in test requirements is expressed using a formula containing L1, L1’, L2 and L3 depending on the type of test case, and the total delay is limited by T304 timer.
* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-2-4: The way to introduce handover test cases**

Background:

The following test cases have been agreed for handover:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Group of requirements | Test cases |  | Requirements section | Agreed |
| HO (delay and interruptions) | NR-U-> NR-U | intra-frequency, known | 6.1B | Yes |
| intra-frequency, unknown | Yes |
| inter-frequency, unkown | Yes |
| Inter-frequency, known | FFS |
| NR(FR1) -> NR-U | known | 6.1B | Yes |
| unkown | Yes |
| NR-U -> NR(FR1) | known |  | Yes |
| unknown | 6.1.1.2 | Yes |
| NR-U - > E-UTRAN (FDD,TDD) |  | 6.1.2.1 | Yes |
| E-UTRAN (FDD,TDD) -> NR-U |  | TS 36.133 | Yes |

* **Option 1 (**[**R4-2106575**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106575.zip)**):** Introduce NR-U test cases that share core requirements with already existing NR or NR-U test cases as new test cases in their own sections with the required changes in the cell configuration.
* **Option 2a (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** Use the same test case to verify HO for E-UTRAN (FDD,TDD)->NR-U and NR-U -> E-UTRAN (FDD,TDD).
* **Option 2b (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** Use the same test case to verify HO for NR(FR1) -> NR-U and NR-U -> NR(FR1).
* Recommended WF
  + Discuss Options 1, 2a and 2b.

**Issue 3-2-5: Test case for NR-U to NR-U inter-frequency handover to known cell**

* **Proposal 1 (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** Not to introduce TC for “NR-U-> NR-U, Inter-frequency, known” in R16.
* Recommended WF
  + Discuss Proposal 1. Please indicate your company view also under Topic 4.

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

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

**Issue 3-3-1: PCCA\_DL and PCCA\_DL in RRC re-establishment test cases**

* Proposal 1 ([R4-2104432](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104432.zip)): The value of PCCA\_DL can be independent from the channel access mode (FBE / LBE)
* Proposal 2 ([R4-2104432](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104432.zip), [R4-2107141](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107141.zip)):
  + In all test times:
    - **Serving cell:** PCCA\_UL=1 and PCCA\_DL=1
    - **Target cell:** 
      * PCCA\_UL=1
      * PCCA\_DL
        + **Option 1 (**[**R4-2107141**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107141.zip)**):** < 1 (e.g. 0.5)
        + **Option 2 (**[**R4-2104432**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104432.zip)**):** 0.75
* Recommended WF
  + Can Proposals 1 and 2 be agreed? Please indicate your company preference for PCCA\_DL, is 0.75 acceptable?

**Issue 3-3-2: Tests for RRC re-establishment**

* **Proposal 1 (**[**R4-2107141**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107141.zip)**):** At least the following NR-U 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 is subject to CCA and known target cell subject to CCA
2. TC2: Inter-frequency RRC Re-establishment in FR1 with serving cell is subject to CCA and with unknown target cell subject to CCA
3. TC3: Intra-frequency RRC Re-establishment in FR1 with serving cell is subject to CCA, with unknown target cell subject to CCA and without serving cell timing.

* Recommended WF
  + Can Proposal 1 be agreed?

**Issue 3-3-3: Test configuration for RRC re-establishment test cases**

* **Proposal 1 (**[**R4-2107141**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107141.zip)**):** NR-U 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:

**Table 3-3-3.1: Test configuration for RRC re-establishment tests**

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

* Recommended WF
  + It is proposed to agree on Proposal 1

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

* **Proposal 1 (**[**R4-2107141**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107141.zip)**):** 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
  + It is proposed to agree on Proposal 1

### Sub-topic 3-4: RRC Connection Release with Redirection

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

**Issue 3-4-1: CCA probabilities in RRC connection release with redirection test cases**

* **Proposal 1:**
  + **Serving cell (**[**R4-2104433**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104433.zip)**):** PCCA\_UL=1 and PCCA\_DL=1 in all test times.
  + **Target cell (**[**R4-2104433**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104433.zip)**,** [**R4-2107143**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107143.zip)**):** PCCA\_UL=1 and PCCA\_DL = 0.75 in all test times.
* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-4-2: Test for RRC connection release with redirection test cases**

* **Proposal 1 (**[**R4-2107143**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107143.zip)**):** The following NR to NR-U RRC connection release with redirection test to verify core requirements in clause 6.2.3.2.3, TS 38.133, is defined:
  + TC2: Redirection from NR FR1 carrier without CCA to NR FR1 carrier with CCA
* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-4-3: Test configurations for RRC connection release with redirection test cases**

* **Proposal 1 (**[**R4-2107143**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107143.zip)**):** NR to NR-U RRC connection release with redirection 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 |

* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-4-4: Lmax in RRC connection release with redirection test cases**

* **Proposal 1 (**[**R4-2107143**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107143.zip)**):** In NR to NR-U RRC connection release with redirection test ensure that number of DL LBT failures (L1) in target cell does not exceed L1,max ; L1,max is defined in Table 6.2.3.2.3-1, TS 38.133.
* Recommended WF
  + It is proposed to agree on Proposal 1

### Sub-topic 3-5: Random access

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

**Issue 3-5-1: Tests for random access**

* **Proposal 1 (**[**R4-2106876**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106876.zip)**):** Define the random access procedure test cases for NR-U as follows.

A.10 EN-DC Tests with NR PSCell under CCA and Other NR Cells in FR1

[…]

A.10.1.1.1 Random Access

A.10.1.1.1.1 Contention-based random access for NR PSCell

A.10.1.1.1.1.1 4-step RA type contention-based random access test

A.10.1.1.1.1.2 2-step RA type contention-based random access test

A.10.1.1.1.2 Non-contention based random access for NR PSCell

A.10.1.1.1.2.1 4-step RA type non-contention based random access test

A.10.1.1.1.2.2 2-step RA type non-contention based random access test

A.11 NR Standalone Tests with NR PCell under CCA and Other NR Cells in FR1

[…]

A.11.2.2.2 Random Access

A.11.2.2.2.1 Contention-based random access for NR PCell

A.11.2.2.2.1.1 4-step RA type contention-based random access test

A.11.2.2.2.1.2 2-step RA type contention-based random access test

A.11.2.2.2.2 Non-contention based random access for NR PCell

A.11.2.2.2.2.1 4-step RA type contention-based random access test

A.11.2.2.2.2.2 2-step RA type contention-based random access test

* Recommended WF

It is proposed to agree on Proposal 1.

**Issue 3-5-2: SSB and CSI-RS based random access in test cases**

* **Proposal 1 (**[**R4-2106876**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106876.zip)**):** For the non-contention random access procedure in NR-U, define only the SSB-based random access procedure test cases.
* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-5-3: DL CCA failure probability in random access test cases**

* **Proposal 1 (**[**R4-2106876**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106876.zip)**):** NR-U random access procedure tests do not need to configure DL LBT failure, i.e., set PCCA\_DL=1.0.
* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-5-4: UL CCA failure probability in random access test cases**

* **Proposal 1 (**[**R4-2106876**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106876.zip)**):** NR-U random access procedure tests should configure UL LBT failure, i.e., set PCCA\_UL < 1.0.
* Recommended WF
  + It is proposed to agree on Proposal 1. Please consider that PCCA\_UL is also discussed on Issue 2-4-2.

**Issue 3-5-5: lbt-FailureRecoveryConfig in random access test cases**

* **Option 1 (**[**R4-2106876**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106876.zip)**):** Configure lbt-FailureRecoveryConfig for the random access procedure test cases for NR-U. Set *FailureInstanceMaxCount* to 4 and *lbt-FailureDetectionTimer* to 320ms.
* **Option 2 (**[**R4-2106579**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106579.zip)**):** Not to configure lbt-FailureRecoveryConfig for the random access procedure test cases.
* Recommended WF
  + Discuss options considering also the Issue 2-4-3.

**Issue 3-5-6: preambleReceivedTargetPower in random access test cases**

* Option 1 ([**R4-2107361**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107361.zip)): Test equipment to configure *preambleReceivedTargetPower* for msg1 and *msgA-PreambleReceivedTargetPower* for msgA to the highest value for UL LBT test cases.
* Option 2 ([**R4-2106574**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106574.zip)):
  + Specify RACH requirements that reuse NR FR1 configurations and expected PRACH transmitted power.
  + Specify that the power of the first preamble for NR-U random access test cases to be the same as in NR test cases.
* Recommended WF
  + Discuss your preferred options, 1 or 2

**Issue 3-5-7: PRACH configuration for UL CCA testing**

Considering UL CCA failure testing, consider the following proposal related to PRACH configuration:

* Proposal 1 ([**R4-2106574**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106574.zip)): In the case the PRACH is transmitted within a gNB-initiated COT – which is always the case for FBE mode, a gap greater than 16 µs has to be configured between the DL-UL transmissions.

Recommended WF:

* It is proposed to agree on Proposal 1

### Sub-topic 3-6: Timing (transmit timing and TA)

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

**Issue 3-6-1: CCA probabilities in timing test cases**

* **Proposal 1 (**[**R4-2104434**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104434.zip)**,** [**R4-2106980**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106980.zip)**):** UE timing tests are defined for the following CCA probabilities: PCCA\_UL=1 and PCCA\_DL =1 in all test times.
* Recommended WF
  + It is proposed to agree on Proposal 1

### Sub-topic 3-7: BWP switching delay and interruptions

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

**Issue 3-7-1: Periodic SRS in UL BWP switching test cases**

* **Proposal 1 (**[**R4-2104435**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104435.zip)**):** Periodic SRS shall be configured in the SpCell to enable the UE to detect consistent UL LBT failure in the SpCell.
* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-7-2: CCA probabilities in UL BWP switching test cases**

* Proposal 1 ([R4-2104435](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104435.zip)): Endorse the configurations in the WF [1]:

**Table 3-7-2.1: BWP switching test configurations for EN-DC**

|  |  |  |
| --- | --- | --- |
| 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
  + It is proposed to agree on Proposal 1

**Issue 3-7-3: New Tests for DL BWP switching**

* **Proposal 1 (**[**R4-2107145**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107145.zip)**):** The following BWP switching tests to verify core requirements in clauses 8.6.2 and 8.6.3, TS 38.133, are defined:
  1. TC1: A.10.3.5.2.1 E-UTRAN – NR PSCell FR1 DL active BWP switch in non-DRX in synchronous EN-DC
  2. TC2: A.10.3.5.2.2 E-UTRAN – NR PSCell FR1 DL active BWP switch with FR1 SCell in non-DRX in synchronous EN-DC
  3. TC3: A.10.3.5.3.1 E-UTRAN – NR PSCell FR1 DL active BWP switch in non-DRX in synchronous EN-DC
  4. TC4: A.11.4.5.2.1 NR FR1- NR FR1 DL active BWP switch of PCell with non-DRX in SA
  5. TC5: A.11.4.5.2.2 NR FR1 DL active BWP switch with non-DRX in SA
  6. TC6: A.11.4.5.3.1 NR FR1 DL active BWP switch of Cell with non-DRX in SA
* **Proposal 2 (**[**R4-2107145**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107145.zip)**):** The above test cases are applicable as follows:
  + EN-DC tests TC1-TC3 for UE capable of EN-DC with only NR-U bands
  + SA tests TC4-TC6 for UE capable of SA with only NR-U bands
* **Proposal 3 (**[**R4-2107145**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107145.zip)**):** No LBT failure is modelled in any of above the test cases i.e.
  + In all NR-U cells:PCCA\_UL= PCCA\_DL =1

Recommended WF

* + Can Proposals 1, 2 and 3 be agreed?

**Issue** **3-7-4: Test configurations for DL BWP switching test cases**

* **Proposal 1 (**[**R4-2107145**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107145.zip)**):** BWP switching tests are defined for the following configurations related to SSB SCS and BW for both serving and target cells:
  + The EN-DC tests shall be done for the following two set of test configuration:

**Table 3-7-4.1: BWP switching test configurations for EN-DC**

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD,  With CCA: NR TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| 2 | LTE TDD,  With CCA: NR TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |

* + The SA tests shall be done for the following test configuration:

**Table 3-7-4.2: BWP switching test configurations for SA**

|  |  |
| --- | --- |
| Config | Description |
| 1 | With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-7-5: Applicability of BWP switching test cases**

Background:

The following test cases have been agreed for BWP switching:

|  |  |  |  |
| --- | --- | --- | --- |
| Group of requirements | Test cases | Requirements section | Agreed |
| BWP switching delay and interruptions | ·       E-UTRAN – NR-U PSCell UL active BWP switch based on persistent UL LBT failure | 8.6 | Yes |
| ·       NR-U – NR-U PCell UL active BWP switch based on persistent UL LBT failure | Yes |
| Legacy DCI/timer/RRC-based BWP switching on NR-U SCell, with: |  |
| ·        NR PCC (PCC) | FFS |
| ·        NR-U PCC | FFS |
| ·        NR-U PSCC and E-UTRAN PCC (FDD, TDD) | FFS |

* **Proposal 1 (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** For the UE supporting NR SA or EN-DC, the legacy DCI/timer/RRC-based BWP switching tests on NR-U cell can be skipped.
* Recommended WF
  + Discuss Proposal 1.

### Sub-topic 3-8: Beam management (BFD and link recovery)

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

**Issue 3-8-1: Time durations and timer values for link recovery test cases**

* **Proposal 1 (**[**R4-2106874**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106874.zip)**):** Set the time durations and timer values of link recovery tests for NR-U as follows:

**Table 3-8-1.1: Time durations and timer values for link recovery tests for NR-U**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | SSB-based LR with non-DRX  (both EN-DC and SA) | | SSB-based LR with DRX  (both EN-DC and SA) | |
| BFD-RS SSB Es/Iot | Es/Iot ≥ -7 dB | Es/Iot < -7 dB | Es/Iot ≥ -7 dB | Es/Iot < -7 dB |
| T310 | 1000ms | 1000ms | 1000ms | 1000ms |
| N310 | 2 | 2 | 2 | 2 |
| T1 | 0.2s | 0.2s | 1s | 1s |
| T2 | 0.85s | 0.93s | 8.37s | 9.01s |
| T3 | 0.44s | 0.52s | 4.52s | 5.16s |
| T4 | 0s | 0s | 0s | 0s |
| T5 | 0.45s | 0.45s | 3.89s | 3.89s |
| D1 | 0.41s | 0.41s | 3.85s | 3.85s |

* Recommended WF
  + Can Proposal 1 be agreed?

**Issue 3-8-2: CCA probabilities for link recovery test cases**

* **Proposal 1 (**[**R4-2106874**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106874.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.

**Table 3-8-2.1: 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 |

* **Proposal 2 (**[**R4-2106874**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106874.zip)**):** Set PCCA\_DL=100% and PCCA\_UL=100% during T1 for L1-RSRP measurement reporting tests.
* **Proposal 3 (**[**R4-2106874**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106874.zip)**):** Set PCCA\_DL=75% and PCCA\_UL=75% during T2 for L1-RSRP measurement reporting tests.
* Recommended WF
  + Can Proposals 1-3 be agreed?

### Sub-topic 3-9: RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT)

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

**Issue 3-9-1: RMTC parameters for RSSI/CO measurement test cases**

* **Proposal 1 (**[**R4-2104829**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104829.zip)**):** RAN4 set the RMTC parameters for NR-U RSSI/CO measurement TCs as below, including intra-frequency/inter-frequency and inter-RAT.

**Table 3-9-1.1: RMTC parameters for NR-U RSSI/CO measurement test cases**

|  |  |
| --- | --- |
| measDurationSymbols-r16 | sym14or12 |
| rmtc-Periodicity-r16 | ms40 |
| rmtc-SubframeOffset-r16 | 20 |
| ref-SCS-CP-r16 | kHz30 |
| ReportInterval | ms120 |

* Recommended WF
  + It is proposed to agree on Proposal 1

**Issue 3-9-2: Io difference between inside and outside RMTC in RSSI/CO measurement test cases**

* **Proposal 1 (**[**R4-2104829**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104829.zip)**):** In the NR-U RSSI/CO measurement TCs the parameter configuration shall guarantee the Io difference between inside RMTC and outside RMTC within a range of [14dB, 15dB].
* Recommended WF
  + Can Proposal 1 be agreed?

### Sub-topic 3-10: TCI state switching

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

**Issue 3-10-1: Timing difference between RSs in two TCI states**

* **Proposal 1 (**[**R4-2106984**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106984.zip)**):** Introduce the timing different between the RS in the two TCI states in the TCI state switching test cases, where the exact value needs further discussion.
* Recommended WF
  + Can Proposal 1 be agreed?

**Issue 3-10-2: Introducing TCI state switching test cases**

Background:

The status of the TCI state switching test cases is the following:

|  |  |  |  |
| --- | --- | --- | --- |
| **Group of requirements** | **Test cases** | **Requirements section** | **Agreed** |
| 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 |

* **Proposal 1 (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** Low priority for defining the TCs for active TCI state switching delay for NR-U.
* Recommended WF
  + Discuss Proposal 1.

### Sub-topic 3-11: Interruptions

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

**Issue 3-11-1: Introducing interruption test cases**

Background:

The status of interruption test cases after RAN4#98-e meeting is the following:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Interruptions | Due to NR-U SCell addition/release, with: |  | 8.2.1, 8.2.2 |  | Ericsson |
| ·        NR PCC (FR1) |  | FFS |
| ·        NR-U PCC |  | FFS |
| ·        NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS |
| Due to NR-U SCell activation/deactivation, with: |  | 8.2.1, 8.2.2 |  |  |
| ·        NR PCC (FR1) |  | Yes |
| ·        NR-U PCC |  | Yes |
| ·        NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |
| During measurements no deactivated NR-U SCell, with: |  | 8.2.1, 8.2.2 |  |  |
| ·        NR PCC (FR1) |  | FFS |
| ·        NR-U PCC |  | FFS |
| ·        NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS |
| 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 |

* **Proposal 1 (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** For the UE supporting NR SA or EN-DC, the following TCs for interruption can be skipped:
  + Due to NR-U SCell addition/release. (if the TC are defined.)
  + During measurements on deactivated NR-U SCell. (if the TCs are defined.)
  + Due to inter-RAT SFTD measurements
  + Due to NR-U PSCell addition/release
* Recommended WF
  + Discuss Proposal 1.

### Sub-topic 3-12: Measurement accuracy test cases

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

**Issue 3-12-1: Applicability of intra-frequency measurement accuracy test cases**

Background:

The following configurations for intra-frequency measurement accuracy test cases have been agreed after RAN4#98-e:

|  |
| --- |
| ·        NR-U SCC, with NR PCC (FR1) |
| ·        NR-U PCC |
| ·        NR-U SCC, with NR-U PCC |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |

* **Proposal 1 (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** For NR-U intra-frequency measurements accuracy (SS-RSRP, SS-RSRQ, SS-SINR, L1-RSRP, RSSI, CO),
  + Tests with “NR-U SCC, with NR-U PCC” can be skipped, if the UE has been tested with “NR-U PCC”
  + Tests with “NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)” can be skipped, if the UE has been tested with “NR-U PSCC, with E-UTRAN PCC (FDD,TDD)”
* Recommended WF
  + Discuss Proposal 1.

**Issue 3-12-2: Applicability of inter-frequency measurement accuracy test cases**

Background:

The following inter-frequency measurement accuracy test cases are marked FFS after RAN4#98-e meeting:

|  |
| --- |
| ·        NR (FR1) inter-frequency, with NR-U PCC |
| ·        NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |

* **Proposal 1 (**[**R4-2106357**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106357.zip)**):** For the UE supporting NR SA or EN-DC, it can skip the following tests for inter frequency measurement accuracy:
  + NR (FR1) inter-frequency, with NR-U PCC
  + NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)
* Recommended WF
  + Discuss Proposal 1.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub-topic 3-1: RRC IDLE cell re-selectionSub topic 1-2:  Issue 3-1-1: Test configurations for RRC IDLE cell re-selection test cases  ….  Issue 3-1-2: Cell specific test parameters for RRC IDLE cell re-selection test cases  …  Issue 3-1-3: Verifying maximum allowed CCA failures for Md Mm and Me in RRC IDLE cell re-selection test cases  …  Issue 3-1-4: The way to introduce RRC IDLE cell re-selection test cases  …  Sub-topic 3-2: HO (delay and interruptions)  Issue 3-2-1: Test configurations for handover test cases  …  Issue 3-2-2: Cell specific test parameters for handover test cases  …  Issue 3-2-3: Handover delay in test requirements  …  Issue 3-2-4: The way to introduce handover test cases  …  Issue 3-2-5: Test case for NR-U to NR-U inter-frequency handover to known cell  …  Sub-topic 3-3: RRC Re-establishment  Issue 3-3-1: PCCA\_DL and PCCA\_DL in RRC re-establishment test cases  …  Issue 3-3-2: Tests for RRC re-establishment  …  Issue 3-3-3: Test configuration for RRC re-establishment test cases  …  Issue 3-3-4: CCA probabilities in RRC re-establishment test cases  …  Sub-topic 3-4: RRC Connection Release with Redirection  Issue 3-4-1: CCA probabilities in RRC connection release with redirection test cases  …  Issue 3-4-2: Test for RRC connection release with redirection test cases  …  Issue 3-4-3: Test configurations for RRC connection release with redirection test cases  …  Issue 3-4-4: Lmax in RRC connection release with redirection test cases  …  Sub-topic 3-5: Random access  Issue 3-5-1: Tests for random access  …  Issue 3-5-2: SSB and CSI-RS based random access in test cases  …  Issue 3-5-3: DL CCA failure probability in random access test cases  …  Issue 3-5-4: UL CCA failure probability in random access test cases  …  Issue 3-5-5: lbt-FailureRecoveryConfig in random access test cases  …  Issue 3-5-6: preambleReceivedTargetPower in random access test cases  …  Issue 3-5-7: PRACH configuration for UL CCA testing  …  Sub-topic 3-6: Timing (transmit timing and TA)  Issue 3-6-1: CCA probabilities in timing test cases  …  Sub-topic 3-7: BWP switching delay and interruptions  Issue 3-7-1: Periodic SRS in BWP switching test cases  …  Issue 3-7-2: CCA probabilities in BWP switching test cases  …  Issue 3-7-3: Tests for BWP switching  …  Issue 3-7-4: Test configurations for BWP switching test cases  …  Issue 3-7-5: Applicability of BWP switching test cases  …  Sub-topic 3-8: Beam management (BFD and link recovery)  Issue 3-8-1: Time durations and timer values for link recovery test cases  …  Issue 3-8-2: CCA probabilities for link recovery test cases  …  Sub-topic 3-9: RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT)  Issue 3-9-1: RMTC parameters for RSSI/CO measurement test cases  …  Issue 3-9-2: Io difference between inside and outside RMTC in RSSI/CO measurement test cases  …  Sub-topic 3-10: TCI state switching  Issue 3-10-1: Timing difference between RSs in two TCI states  …  Issue 3-10-2: Introducing TCI state switching test cases  …  Sub-topic 3-11: Interruptions  Issue 3-11-1: Introducing interruption test cases  …  Sub-topic 3-12: Measurement accuracy test cases  Issue 3-12-1: Applicability of intra-frequency measurement accuracy test cases  …  Issue 3-12-2: Applicability of inter-frequency measurement accuracy test cases  … |
|  |  |

### 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** |
| **AI 5.1.3.3.2 RRC IDLE cell re-selection** | |
| [R4-2106854](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106854.zip)  Ericsson | Introduction of NR-U cell reselection tests |
| Company A… |
| Company B… |
| **AI 5.1.3.3.3 HO (delay and interruptions)** | |
| [R4-2106576](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106576.zip)  Nokia, Nokia Shanghai Bell | Draft TC NR-U handover test cases |
|  |
|  |
| [**R4-2106856**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106856.zip)  Ericsson | Introduction of NR-U handover tests |
|  |
|  |
| [R4-2106978](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106978.zip)  Huawei, HiSilicon | Draft CR of test cases for HO delay and interruption for NR-U |
|  |
|  |
| **AI 5.1.3.3.4 RRC Re-establishment** | |
| [R4-2106577](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106577.zip)  Nokia, Nokia Shanghai Bell | Draft TC RRC re-establishment with CCA |
|  |
|  |
| [R4-2107142](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107142.zip)  Ericsson | RRC re-establishment tests for NR-U in 38.133 |
|  |
|  |
| **AI 5.1.3.3.5 RRC Connection Release with Redirection** | |
| [R4-2106979](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106979.zip)  Huawei, HiSilicon | Draft CR on test cases for RRC release with redirection for NR-U |
|  |
|  |
| [R4-2107144](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107144.zip)  Ericsson | RRC connetion release with re-direction from NR to NR-U test in 38.133 |
|  |
|  |
| **AI 5.1.3.3.6 Random access** | |
| [R4-2106579](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106579.zip)  Nokia, Nokia Shanghai Bell | Draft CR NR-U RRM random access performance requirements |
|  |
|  |
| [R4-2106877](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106877.zip)  Ericsson | Draft CR: Random access procedure test cases for NR-U |
|  |
|  |
| **AI 5.1.3.3.8 BWP switching delay and interruptions** | |
| [R4-2107146](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2107146.zip)  Ericsson | Test cases on BWP switching for NR-U SA in TS 38.133 |
|  |
|  |
| **AI 5.1.3.3.9 PSCell addition/release (delay and interruption)** | |
| [R4-2106981](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106981.zip)  Huawei, HiSilicon | Draft CR of test cases for PSCell addition and release for NR-U |
|  |
|  |
| **AI 5.1.3.3.13 Beam management (BFD and link recovery)** | |
| [R4-2106875](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106875.zip)  Ericsson | Draft CR: Update of beam management test cases for NR-U |
|  |
|  |
| **AI 5.1.3.3.14 SS-RSRP/SS-RSRQ/SS-SINR/L1-RSRP measurement procedure (intra-frequency, inter-frequency, inter-RAT)** | |
| [R4-2106578](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106578.zip)  Nokia, Nokia Shanghai Bell | Draft TC NR-U inter-frequency measurements |
|  |
|  |
| [R4-2106982](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106982.zip)  Huawei, HiSilicon | Draft CR on test cases for inter-RAT measurement for NR-U |
|  |
|  |
| **AI 5.1.3.3.17 SS-RSRP/SS-RSRQ/SS-SINR/L1-RSRP measurement accuracy (intra-frequency, inter-frequency, inter-RAT)** | |
| [R4-2106359](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106359.zip)  MediaTek inc. | Introduction of test cases for L1-RSRP measurement accuracy with CCA serving cell |
|  |
|  |
| [R4-2106983](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106983.zip)  Huawei, HiSilicon | Draft CR on test cases for intra-frequency measurement accuracy for NR-U |
|  |
|  |
| **AI 5.1.3.3.18 RSSI/CO measurement accuracy (intra-frequency, inter-frequency, inter-RAT)** | |
| [R4-2104830](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104830.zip)  Apple | Test cases for RSSI and CO measurement accuracy in NR-U R16 |
|  |
|  |

## 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 4-4-4.1 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** | **RAN4#98-bis-e Draft CR** | **Test case should be included** | **Test case should NOT be included** |
| RRC\_IDLE, cell re-selection | NR-U -> NR-U | intra-frequency | 4.2A | Yes | Ericsson | A.11.1.1.1.1 | No updates |  |  |
| inter-frequency | Yes | A.11.1.1.1.2 | R4-2106854 |  |  |
| NR(FR1) -> NR-U |  | Yes |  | R4-2106854 |  |  |
| NR-U -> NR(FR1) |  | Yes |  | R4-2106854 |  |  |
| NR-U - > E-UTRAN (FDD,TDD) |  | Yes |  | R4-2106854 |  |  |
| E-UTRAN (FDD,TDD) -> NR-U |  | TS 36.133 | Yes | Ericsson | A.12.1.1.1 | No updates |  |  |
| HO (delay and interruptions) | NR-U-> NR-U | intra-frequency, known | 6.1B | Yes | Huawei | A.11.2.1.1 | R4-2106978 |  |  |
| intra-frequency, unknown | Yes | A.11.2.1.2 | R4-2106978 |  |  |
| inter-frequency, unkown | Yes | A.11.2.1.3 | R4-2106978 |  |  |
| Inter-frequency, known | FFS |  |  |  |  |  |
| NR(FR1) -> NR-U | known | 6.1B | Yes | [Nokia/Ericsson] |  | R4-2106576, R4-2106856 |  |  |
| unkown | Yes |  | R4-2106576, R4-2106856 |  |  |
| NR-U -> NR(FR1) | known |  | Yes | [Nokia] |  | R4-2106576 |  |  |
| unknown | 6.1.1.2 | Yes |  | R4-2106576 |  |  |
| NR-U - > E-UTRAN (FDD,TDD) |  | 6.1.2.1 | Yes | [Ericsson?] |  | R4-2106856 (known + unknown) |  |  |
| E-UTRAN (FDD,TDD) -> NR-U |  | TS 36.133 | Yes | Nokia |  | R4-2106576 |  |  |
| RRC Re-establishment | NR-U-> NR-U |  | 6.2.1A | Yes | Nokia |  | R4-2106577, R4-2107142 |  |  |
| NR(FR1) -> NR-U |  | FFS |  |  |  |  |  |
| 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/Nokia] |  | R4-2106579, R4-2106877 |  |  |
| ·        to NR-U PSCell |  | Yes | [Ericsson/Nokia] |  | R4-2106579, R4-2106877 |  |  |
| RRC Connection Release with Redirection | ·        NR-U-> NR-U |  | 6.2.3.2.3 | Yes | Huawei | A.11.2.2.3.1 | R4-2106979 |  |  |
| ·        NR(FR1) -> NR-U |  | FFS | [Ericsson] |  | R4-2107144 |  |  |
| Timing (transmit timing) | ·        NR-U PCell |  | 7.1, 7.3 | Yes | MTK/ | A.11.3.1.1 | No updates |  |  |
| ·        NR-U PSCell |  | Yes | [Ericsson] | A.10.2.1.1 | No updates |  |  |
| Timing (timing advance) | ·        NR-U PCell |  | Yes | Ericsson | A.11.3.2.1 | No updates |  |  |
| ·        NR-U PSCell |  | Yes | A.10.2.2.1 | No updates |  |  |
| 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 | No updates |  |  |
| ·       NR-U – NR-U PCell UL active BWP switch based on persistent UL LBT failure |  | Yes | A.11.4.5.1 | No updates |  |  |
| Legacy DCI/timer/RRC-based BWP switching on NR-U SCell, with: |  |  |  |  |  |  |  |
| ·        NR PCC (PCC) |  | FFS |  |  | R4-2107146 |  |  |
| ·        NR-U PCC |  | FFS | Ericsson |  | R4-2107146 |  |  |
| ·        NR-U PSCC and E-UTRAN PCC (FDD, TDD) |  | FFS |  |  | R4-2107146 |  |  |
| 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 | No updates |  |  |
| IS, non-DRX | Yes | A.10.3.1.3 | No updates |  |  |
| OOS, DRX | Yes | A.10.3.1.4 | No updates |  |  |
| IS, DRX | Yes | A.10.3.1.5 | No updates |  |  |
| ·        On NR-U PCC | OOS, non-DRX | Yes | A.11.4.1.2 | No updates |  |  |
| IS, non-DRX | Yes | A.11.4.1.3 | No updates |  |  |
| OOS, DRX | Yes | A.11.4.1.4 | No updates |  |  |
| IS, DRX | Yes | A.11.4.1.5 | No updates |  |  |
| BM (beam failure detection and link recovery) | ·        On NR-U PCC | nonDRX | 8.5A | Yes | Ericsson | A.11.4.4.1 | R4-2106875 |  |  |
| DRX | A.11.4.4.2 | R4-2106875 |  |  |
| ·        On NR-U PSCC, with E-UTRAN PCC (FDD,TDD) | nonDRX | Yes | A.10.3.4.1 | R4-2106875 |  |  |
| DRX | A.10.3.4.2 | R4-2106875 |  |  |
| SCell activation/deactivation delay | ·        NR PCC (FR1) | known | 8.3A | Yes | [Ericsson] | A.9.2.2.1/2 | No updates |  |  |
| unknown | Yes | A.9.2.2.3 | No updates |  |  |
| ·        NR-U PCC | known | Yes | A.11.4.3.1/2 | No updates |  |  |
| unknown | Yes | A.11.4.3.3 | No updates |  |  |
| ·        NR-U PSCC and E-UTRAN PCC (FDD, TDD) | known | Yes | A.10.3.3.1/2 | No updates |  |  |
| unknown | Yes | A.10.3.3.3 | No updates |  |  |
| PSCell addition/release delay | NR-U PSCell with E-UTRA PCC | konwn | TS 36.133 | Yes | Huawei |  | R4-2106981 |  |  |
| 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 addition/release, with: |  | 8.2.1, 8.2.2 |  |  |  |  |  |  |
| ·        NR PCC (FR1) |  | FFS | Ericsson |  |  |  | Ericsson |
| ·        NR-U PCC |  | FFS |  |  |  | Ericsson |
| ·        NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS |  |  |  | Ericsson |
| 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 | No updates |  |  |
| ·        NR-U PCC |  | Yes | A.11.4.2.1 | No updates |  |  |
| ·        NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.3.2.1 | No updates |  |  |
| During measurements no deactivated NR-U SCell, with: |  | 8.2.1, 8.2.2 |  |  |  |  |  |  |
| ·        NR PCC (FR1) |  | FFS |  |  |  |  |  |
| ·        NR-U PCC |  | FFS |  |  |  |  |  |
| ·        NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS |  |  |  |  |  |
| Due to inter-RAT SFTD measurements between: |  | TS 36.133 |  |  |  |  |  |  |
| ·        NR-U PCell and E-UTRAN PCell (FDD,TDD) |  | Yes |  |  | No CR |  |  |
| Due to NR-U PSCell addition/release, with: |  | TS 36.133 | Yes |  |  |  |  |  |
| ·        E-UTRA PCell |  | Yes |  |  | No CR |  |  |
| 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 | No updates |  |  |
| ·        NR-U PCC |  | Yes | A.11.5.1.1/2/3/4 | No updates |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes | A.11.5.1.5/6/7/8 | No updates |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.1.1/2/3/4 | No updates |  |  |
| ·        NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | A.10.4.1.5/6/7/8 | No updates |  |  |
| L1-RSRP measurements on: |  | 9.5.4A |  |  |  |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) | Non-DXR | Yes | Ericsson | A.9.3.3.1 | R4-2106875 |  |  |
| DRX | A.9.3.3.2 | R4-2106875 |  |  |
| ·        NR-U PCC | Non-DXR | Yes | A.11.5.4.1 | R4-2106875 |  |  |
| DRX | A.11.5.4.2 | R4-2106875 |  |  |
| ·        NR-U SCC, with NR-U PCC | Non-DXR | Yes | A.11.5.4.3 | R4-2106875 |  |  |
| DRX | A.11.5.4.4 | R4-2106875 |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) | Non-DXR | Yes | A.10.4.3.1 | R4-2106875 |  |  |
| DRX | A.10.4.3.2 | R4-2106875 |  |  |
| ·        NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC | Non-DXR | Yes | A.10.4.3.3 | R4-2106875 |  |  |
| DRX | A.10.4.3.4 | R4-2106875 |  |  |
| Intra-frequency RSSI measurements on: |  | 9.2A.7.1 |  |  |  |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.1.5 | No updates |  |  |
| ·        NR-U PCC |  | Yes | A.11.5.1.9 | No updates |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes | A.11.5.1.11 | No updates |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.1.9 | No updates |  |  |
| ·        NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | A.10.4.1.11 | No updates |  |  |
| Intra-frequency CO measurements on: |  | 9.2A.7.2 |  |  |  |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.1.6 | No updates |  |  |
| ·        NR-U PCC |  | Yes | A.11.5.1.10 | No updates |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes | A.11.5.1.12 | No updates |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.1.10 | No updates |  |  |
| ·        NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | A.10.4.1.12 | No updates |  |  |
| 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 |  | R4-2106578 |  |  |
| ·        NR-U inter-frequency, with NR-U PCC |  | Yes |  | R4-2106578 |  |  |
| ·        NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2106578 |  |  |
| ·        NR (FR1) inter-frequency, with NR-U PCC |  | Requirements missing ~~FFS~~ | FFS |  |  |  |  |  |
| ·        NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Requirements missing ~~FFS~~ | FFS |  |  |  |  |  |
| Inter-frequency RSSI measurements on: |  | 9.3A.8 |  |  |  |  |  |  |
| ·        NR-U inter-frequency, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.2.1 | No updates |  |  |
| ·        NR-U inter-frequency, with NR-U PCC |  | Yes | A.11.5.2.1 | No updates |  |  |
|  |  |
| ·        NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.2.1 | No updates |  |  |
| Inter-frequency CO measurements on: |  | 9.3A.9 |  |  |  |  |  |  |
| ·        NR-U inter-frequency, with NR PCC (FR1) |  | Yes | Ericsson | A.9.3.2.2 | No updates |  |  |
| ·        NR-U inter-frequency, with NR-U PCC |  | Yes | A.11.5.2.2 | No updates |  |  |
| ·        NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes | A.10.4.2.2 | No updates |  |  |
|  | Inter-RAT SFTD between: |  | TS 36.133 |  |  |  |  |  |  |
|  |  |  |  |
|  | ·        E-UTRAN PCell (FDD,TDD) and NR-U neighbor |  | Yes | Ericsson | A.12.4.1.1 | No updates |  |  |
|  | 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 |  |  | No CR |  |  |
|  | ·        On E-UTRA (FDD,TDD), with NR-U PSCC |  | Yes |  |  | No CR |  |  |
|  | 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 | R4-2106982 |  |  |
|  | ·        On NR-U non-serving neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes |  | No CR |  |  |
|  | 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~~neighbor~~, with E-UTRA (FDD,TDD) PCC |  | Yes | Ericsson | A.12.4.2.5/6 | No updates |  |  |
|  | ·        On NR-U non-serving frequency~~neighbor~~, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes |  | No CR |  |  |
| 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 | R4-2106983 |  |  |
| ·        NR-U PCC |  | Yes | A.11.6.1.1 | R4-2106983 |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes | A.11.6.1.2 | R4-2106983 |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  | No CR |  |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  | No CR |  |  |
| Intra-frequency absolute accuracies for SS-RSRQ on: |  | [10.1.29] |  |  |  |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes |  |  | No CR |  |  |
| ·        NR-U PCC |  | Yes |  |  | No CR |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  |  | No CR |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |  | No CR |  |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |  | No CR |  |  |
| Intra-frequency absolute accuracies for SS-SINR on: |  | [10.1.31] |  |  |  |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes |  |  | No CR |  |  |
| ·        NR-U PCC |  | Yes |  |  | No CR |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  |  | No CR |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |  | No CR |  |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |  | No CR |  |  |
| Absolute and relative accuracies for L1-RSRP on: |  | [10.1.33] |  |  |  |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | MTK |  | R4-2106359 |  |  |
| ·        NR-U PCC |  | Yes |  | R4-2106359 |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  | No CR |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2106359 |  |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  | No CR |  |  |
| Intra-frequency RSSI on: |  | [10.1.34.1] |  |  |  |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Apple |  | R4-2104830 |  |  |
| ·        NR-U PCC |  | Yes |  | R4-2104830 |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  | R4-2104830 |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2104830 |  |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2104830 |  |  |
| Intra-frequency CO on: |  | [10.1.35.1] |  |  |  |  |  |  |
| ·        NR-U SCC, with NR PCC (FR1) |  | Yes | Apple |  | R4-2104830 |  |  |
| ·        NR-U PCC |  | Yes |  | R4-2104830 |  |  |
| ·        NR-U SCC, with NR-U PCC |  | Yes |  | R4-2104830 |  |  |
| ·        NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2104830 |  |  |
| ·        NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2104830 |  |  |
| 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 |  | R4-2106358 |  |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  | R4-2106358 |  |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2106358 |  |  |
| ·        NR (FR1) inter-frequency, with NR-U PCC |  | Requirements missing ~~FFS~~ | FFS |  |  |  |  |  |
| ·        NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Requirements missing ~~FFS~~ | FFS |  |  |  |  |  |
| Inter-frequency absolute and relative accuracies for SS-RSRQ on: |  | [10.1.30] |  |  |  |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes |  |  | No CR |  |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  |  | No CR |  |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |  | No CR |  |  |
| ·        NR (FR1) inter-frequency, with NR-U PCC |  | Requirements missing ~~FFS~~ | FFS |  |  |  |  |  |
| ·        NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Requirements missing ~~FFS~~ | FFS |  |  |  |  |  |
| Inter-frequency absolute and relative accuracies for SS-SINR on: |  | [10.1.32] |  |  |  |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes |  |  | No CR |  |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  |  | No CR |  |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |  | No CR |  |  |
| ·        NR (FR1) inter-frequency, with NR-U PCC |  | Requirements missing ~~FFS~~ | FFS |  |  |  |  |  |
| ·        NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Requirements missing ~~FFS~~ | FFS |  |  |  |  |  |
| Inter-frequency RSSI on: |  | [10.1.34.2] |  |  |  |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes | Apple |  | R4-2104830 |  |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  | R4-2104830 |  |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2104830 |  |  |
| Inter-frequency CO on: |  | [10.1.35.2] |  |  |  |  |  |  |
| ·        NR-U neighbor, with NR PCC (FR1) |  | Yes | Apple |  | R4-2104830 |  |  |
| ·        NR-U neighbor, with NR-U PCC |  | Yes |  | R4-2104830 |  |  |
| ·        NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  | R4-2104830 |  |  |
| 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 | No updates |  |  |
| NOTE: under the condition of stationary paths |  |  |
| NR-U-E-UTRA RSRP with: |  | 10.2.2002 |  |  |  |  |  |  |
| ·        NR-U PCC |  | Yes |  |  | No CR |  |  |
| ·        NR-U PSCC |  | Yes |  |  | No CR |  |  |
| NR-U-E-UTRA RSRQ with: |  | 10.2.2003 |  |  |  |  |  |  |
| ·        NR-U PCC |  |  | FFS |  |  | No CR | Ericsson |  |
| ·        NR-U PSCC |  |  | FFS |  |  | No CR | Ericsson |  |
| E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR: |  | TS 36.133 |  |  |  |  |  |  |
| ·        On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | Yes |  |  | No CR |  |  |
| ·        On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes |  |  | No CR |  |  |
| E-UTRA-NR-U RSSI/CO: |  | TS 36.133 |  |  |  |  |  |  |
| ·        On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | Yes | Ericsson |  | No CR |  |  |
| ·        On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes | Ericsson |  | No CR |  |  |

* Recommended WF:
  + Update the test case list provided in [R4-2106848](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106848.zip) 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 10. |

### 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** |
| **AI 5.1.3.1 General** | |
| [**R4-2106848**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106848.zip)  Ericsson | Updated test case list for NR-U |
| Company A… |
| Company B… |

# 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