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

**Electronic Meeting, 25th Jan – 5th Feb 2021**

**Agenda item:** 7.1.6

**Source:** Nokia, Nokia Shanghai Bell

**Title:** Email discussion summary for [98e][206] 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 agenda (email discussion with the flag [98e][206] NR\_unlic\_RRM\_2):

7.1.6 RRM perf. requirements (38.133)

7.1.6.1 General

7.1.6.2 Common RRM test configuration

7.1.6.3 Test cases

7.1.6.3.1 General

7.1.6.3.2 RRC IDLE, cell re-selection

7.1.6.3.3 HO delay and interruptions

7.1.6.3.4 RRC Re-establishment

7.1.6.3.5 RRC Connection Release with Redirection

7.1.6.3.6 Timing (transmit timing and TA)

7.1.6.3.7 BWP switching delay and interruptions

7.1.6.3.8 PSCell addition/release (delay and interruption)

7.1.6.3.9 Interruptions

7.1.6.3.10 RLM

7.1.6.3.11 Beam management

7.1.6.3.12 Intra-frequency, inter-frequency and inter-RAT measurement requirements

7.1.6.3.13 Accuracy requirements for NR-U intra-frequency, inter-frequency and inter-RAT measurements

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

* Topic #1: NR-U RRM test configurations
  + Sub-topic 1-1: General configuration of the RRM tests
  + Sub-topic 1-2: General issues on LBT models
  + Sub-topic 1-3: DL LBT model during RRM tests
  + Sub-topic 1-4: UL LBT model during RRM tests
* Topic #2: NR-U RRM test cases
  + Sub-topic 2-1: Test case list
  + Sub-topic 2-2: Test case details for cell re-selection
  + Sub-topic 2-3: Test case details for handover
  + Sub-topic 2-4: Test case details for RRC re-establishment
  + Sub-topic 2-5: Test case details for RRC connection release with re-direction
  + Sub-topic 2-6: Test case details for timing
  + Sub-topic 2-7: Test case details for BWP switching
  + Sub-topic 2-8: Test case details for TCI state switching delay
  + Sub-topic 2-9: Test case details for Interruptions
  + Sub-topic 2-10: Test case details for SCell activation/deactivation
  + Sub-topic 2-11: Test case details for RLM
  + Sub-topic 2-12: Test case details for link recovery
  + Sub-topic 2-13: Test case details for RRM measurements: Intra-frequency, inter-frequency and inter-RAT
  + Sub-topic 2-14: Test case details for RSSI and CO measurements
  + Sub-topic 2-15: Test case details for SFTD measurements
  + Sub-topic 2-16: Test case details for SFTD measurement accuracy
* Topic #3: Spec structure and applicability rules
  + Sub-topic 3-1: Differentiation between UEs supporting LBE, FBE or both
  + Sub-topic 3-2: Specification structure for test cases

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 test case configurations on general level, specification structure and test case list i.e. the following topics:

* Topic #1 NR-U RRM test configurations
  + All subtopics with highest priority on
    - Issue 1-1-4: Cell configuration SCS and channel bandwidth
* Topic #2 NR-U RRM test cases:
  + Sub-topic 2-1
* Topic #3 Spec structure and applicability rules
* Comments to CRs and Draft CRs may be done, but they will only be agreed/endorsed in the second round.

**Second round:** Continue on the topics listed for the first round, and if time allows, expand the discussion to cover also test case details i.e.:

* Topic #2: Sub-topics 2-2 – 2-16
* CRs and 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.

*Moderator’s Note: Companies are welcomed to comment any of the sub-topics and issues in this document already on the first round, but the focus of the discussion (also in GTW) should be on the topics listed for the first round above.*

# Topic #1: NR-U RRM test configurations

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2101647**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101647.zip)  Huawei, HiSilicon | Proposal 1: Consider to have particular test cases to verify the correct UE behavior for the following cases:   * Initiating the measurements on neighbour upon exceeding Mp and Mq in Cell reselection * Initiate cell selection procedures for the selected PLMN upon L1 exceeding L1,max in RRC release with redirection * Report RSRP\_0 upon L1 exceeding L1,max for L1-RSRP measurement | Issue 1-3-11 |
| Proposal 2: For the test cases no particular behavior to be verified, exceeding Lmax shall be avoided in each test cases. | Issue 1-3-10 Option 2 |
| Observation 1: It is hard to guarantee that there will be certain number of consecutive unavailable SSBs with the probability model to verify the particular UE behavior. | - |
| Observation 2: It is hard to avoid exceeding the Lmax, which will lead to an invalid test as UE may abandon or terminate the procedure using the probability model. | - |
| Proposal 3: Consider the LBT model as a repetitive pattern of n available SSBs for every m SSB occasions. | Issue 1-2-2 Option 2 |
| [**R4-2101648**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101648.zip)  Huawei, HiSilicon | Observation 1: For NR-U, the symbols containing SSBs depends on the LBT model, FBE/LBE and ssb-PositionQCL configurations. | - |
| Proposal 1: New RMSI COREST reference channel configurations shall be added for NR-U | Issue 1-1-10 Proposal 1 |
| Proposal 2: Define test cases for 15 KHz SCS with channel bandwidth of 20 MHz. | Issue 1-1-4 Option 1 |
| Proposal 3: Add the corresponding configurations for 15 KHz SCS with 20MHz CBW. | Implicit in the Issue 1-1-4 |
| [**R4-2102921**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102921.zip)  Qualcomm Inc. | Proposal 1. Support Option 1 as the baseline DL LBT model for LBE test cases:   * RAN4 to adopt the following DL LBT model:   + Define a probability equal to P1 for the transmission of the DRS in the first candidate position.   + In case of LBT failure for transmission in the first candidate position, define a probability equal to P2 for the transmission in the second candidate position for a given SSB index. | Issue 1-3-1, option 1 |
| Observation 1. It would be nice to reflect the superior performance of NR-U as compared to LTE-LAA in handling the LBT failures | - |
| Proposal 2. RAN4 to define P1 and P2 such that the overall LBT failure rate is reflected to be lower than LTE-LAA | Issue 1-3-2 Option 1 |
| Observation 2. It would be safe to assume that the LBT failure rate for first candidate is same as that for LTE-LAA. | - |
| Proposal 3. RAN4 to define P1 = 0.75 (same as that defined for LTE-LAA) | Issue 1-3-3 Option 1a |
| Observation 3. If DL LBT is unsuccessful for the first candidate position, the channel can be assumed to be busy for the second candidate position with a significantly high probability. | - |
| Proposal 4. Suggest RAN4 to define P2 < P1. | Issue 1-3-3 Option 1 |
| Observation 4: With P1 defined as 0.75, P2 = 0.5 and P2 =0.25 appears to be two good candidates satisfying all the identified criteria:   * Reflects the superior performance of NR-U as compared to LTE-LAA * Does not increase the test time by a significant amount * More realistic model with P2<P1 (P2=0.25 may be a little pessimistic) | - |
| Proposal 5. Suggest RAN4 to define P2 = 0.5 | Issue 1-3-3 Option 1a |
| Proposal 6. Support Option 1 as the baseline DL LBT model for FBE non-DRX test cases:   * RAN4 to define a DL LBT model that considers a probability of P for the transmission of each DRS. Only the first SSB candidate position for a given SSB index shall be considered in these tests. | Issue 1-3-5 Option 1 |
| Observation 5. Similar to LBE case, it would be nice to reflect the superior performance of NR-U as compared to LTE-LAA in handling the LBT failures. | - |
| Observation 6. 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 7. 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 1-3-6 Option 1 |
| Observation 7. Although the above proposal indicates a higher test time for FBE based test cases, it would be nice to reflect the benefits and use cases of FBE based channel access for IIot use-cases. | - |
| Proposal 8. Suggest RAN4 to define P(FBE) = 0.95 | Issue 1-3-7 Option 1 |
| Observation 8. For RRM purposes, the UL transmission occasions are always scheduled/configured for a UE and hence can be blocked by the test equipment, for test purposes, by transmitting a OCNG noise signal in the UL resource. | - |
| Observation 9. Since the test equipment may not transmit and monitor the UL resource at the same time, it can monitor the next UL resource where it doesn’t transmit the OCNG signal. | - |
| Proposal 9. Suggest RAN4 to adopt a baseline UL LBT model as:   * Use DL FBE model to transmit a full band/LBT BW OCNG noise pattern 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 LBT 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 | Issue 1-4-3 Option 1 |
| Observation 10. 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 10. Test equipment to configure preambleReceivedTargetPower for msg1 and msgA-PreambleReceivedTargetPower for msgA to the highest value for UL LBT test cases. | Issue 1-4-4 Option 1 |
| Observation 11. 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 12. 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 11. 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 * FFS: Random access * RRC connection release with re-direction * BWP switch delay on consistent UL LBT recovery | Issue 1-4-5 |
| Proposal 12a. (With no particular reason but as a matter of choice) Suggest RAN4 to test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirement:   * Handover to target cell using CCA | Issue 1-4-5 |
| Proposal 12b. (Based on Proposal 12a) Suggest RAN4 to not test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirements:   * RRC re-establishment using CCA * FFS: Random access * RRC connection release with re-direction * BWP switch delay on consistent UL LBT recovery | Issue 1-4-5 |
| Proposal 13. 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 1-4-6 |
| Observation 13. LBT failures are based on one of the probabilistic models | - |
| Observation 14. Most of the Lmax values are defined for consecutive LBT failures | - |
| Observation 15. There is significant impact on the test-time if Lmax values are to be considered in the test cases. | - |
| Observation 16. Most of the requirements fall into one of the following category w.r.t LBT failures and have little to no value in getting tested:   * + Restart the procedure, e.g. measurements   + Abandon the procedure, e.g. SCell activation   + Controlled by timer, e.g. Handover | - |
| Observation 17. NR-U has a long list of test cases to be covered, unnecessary test cases or test cases with little value should be avoided. | - |
| Proposal 14: RAN4 to avoid designing test cases with exceeding max allowed LBT failures for NR-U. | Issue 1-3-10 Option 1 |
| Observation 18. FBE and LBE mode of operations are both optional UE capabilities and UE can signal capability to support either FBE or LBE or both LBE and FBE. | - |
| Observation 19: Separate models are defined for FBE and LBE channel access in NR-U | - |
| Proposal 15: RAN4 to define separate test cases for LBE and FBE whenever an LBT failure dependent requirement is tested. | Issue 1-2-1 Option 2 |
| Proposal 16a: Only FBE based test cases apply to a UE that signals FBE only capability. | Issue 3-1-3 Option 1 |
| Proposal 16b: Only LBE based test cases apply to a UE that signals LBE only capability. | Issue 3-1-2 Option 1 |
| Proposal 16c: A UE that signals both FBE and LBE capability need to test only LBE test cases | Issue 3-1-1 Option 2 |
| [**R4-2100772**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100772.zip)  MediaTek inc. | Proposal 1: For SCell activation in NR-U, exceeding Lmax should be avoided. | Issue 1-3-11 |
| Proposal 2: For SFTD measurement NR-U, exceeding Lmax should be avoided. | Issue 1-3-11 |
| Proposal 3: For intra-frequency and inter- frequency measurement for NR-U, exceeding LPSS/SSS,gaps,max should be avoided. | Issue 1-3-11 |
| Proposal 4: For test cases with DRX in use, the LBT can be modelled as either all SMTCs are with available SSBs or all SMTCs are with no SSBs available during one DRX cycle. | Issue 1-3-9 Option 1 |
| Proposal 5: Test configurations of NR FDD is not applicable to NR-U test cases. | Issue 1-1-2 Option 1 |
| Observation 1: Only 30 kHz SSB SCS has been applied for initial access. For NR-U SA UEs and NR-U PCell, NR-U PSCell, 15 kHz SSB SCS are not applicable. | - |
| Proposal 6: Test configurations for NR-U test cases are based on 30kHz SSB SCS. | Issue 1-1-4 Option 3 |
| [**R4-2100834**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100834.zip)  ZTE Corporation | Proposal 1: LBT failures exceeding Lmax shall be tested when there is new UE behavior defined for such scenarios. | Issue 1-3-10 Option 2 |
| Proposal 2: For the cell-reselection test cases, Mp consecutive DRX cycles with LBT failures of the serving cell should be also tested. | Issue 1-3-11 Proposal 5 |
| Proposal 3: If a UE claims to support both modes then the UE shall pass tests for both modes. De-prioritize the discussion if needed since this shall be seen as a corner case. | Issue 3-1-1 Option 1 |
| [**R4-2101133**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101133.zip)  Nokia | Proposal 1: For LBE test cases in non DRX: RAN4 to adopt the following DL LBT model: 1) Define a probability equal to P1 for the transmission of each SSB index in the first candidate position. 2) In case of LBT failure for transmission of a given SSB index in the first candidate position, define a probability equal to P2 for the transmission of a given SSB index in the second candidate position.. | Issue 1-3-1 Option 1 |
| Proposal 2: Define P1 = P2 = 0.75 for LBE. | Issue 1-3-3 Option 2 |
| Proposal 3: For FBE test cases in non-DRX: RAN4 to define a DL LBT model that considers a probability of P for the transmission of each frame. Only the first SSB candidate position for a given SSB index shall be considered in these tests. | Issue 1-3-5 Option 1 |
| Proposal 4: Define P = 0.9 for FBE. | Issue 1-3-7 Option 2 |
| Observation 1: A number of NR-U requirements consider the delay caused by UL LBT failures, as follows:  Table 1 – Requirements in 38.133 which are impacted by UL LBT failure   |  |  | | --- | --- | | Clause with UL LBT failure impact | Comments | | 6.1B NR Handover | UL LBT failure is considered in the time uncertainty for acquiring the first available PRACH occasion | | 6.2.1A RRC re-establishment with CCA delay requirement | The number of consecutive SSB to PRACH occasions not available due to UL LBT failure is considered in the delay uncertainty | | 6.2.3.2.3 RRC connection release with redirection to NR carrier subject to CCA | The number of consecutive SSB to PRACH occasions not available due to UL LBT failure is considered in the delay uncertainty | | 8.3A.2 SCell Activation and Deactivation in carriers with CCA | UL LBT failures are considered in THARQ. | | 8.6.4 BWP switch delay on consistent UL LBT recovery | The consistent UL LBT detection / recovery mechanism will trigger the active BWP switch. | | 8.10A Active TCI state switching delay with CCA | UL LBT failures are considered in THARQ. | | 9.2A NR Intra-frequency measurements with CCA | UL LBT failures are considered in the reporting delay | | 9.3A NR Inter-frequency measurements with CCA | UL LBT failures are considered in the reporting delay | | - |
| Observation 2: One way to test UL LBT failure at the UE is by the test equipment injecting a sufficiently high interference precisely at the time the UE should transmit. | - |
| Proposal 5: UL LBT failure to be tested in a typical test case for each scenario (A, B or C) | Issue 1-4-1 Option 1 |
| Proposal 6: If RAN4 agrees to test UL LBT in the RRM tests, an UL LBT type configuration needs to be defined. | Issue 1-4-2 Option 1 |
| Proposal 7: The test cases shall assume only TDD operation in unlicensed bands. | Issue 1-1-2 Option 1 |
| Proposal 8: RAN4 to define RRM test cases with 20 MHz and 40 MHz carriers subject to CCA. | Issue 1-1-4 Option 2 |
| Proposal 9: RAN4 to define RRM test cases with 15 kHz and 30 kHz NR-U cells. | Issue 1-1-4 Option 2 |
| Proposal 10: Combining proposals 7, 8 and 9, we propose to define following two test configurations for NR-U cells:  1. NR with CCA 15 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode  2. NR with CCA 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | Issue 1-1-4 Option 2 |
| Proposal 10: RAN4 to discuss which combinations of E-UTRA, NR and NR-U configurations are to be included in the test cases. | Issue 1-1-5 Proposal 1 |
| Observation 3: The NR-U WID introduced two new, longer PRACH sequences (LRA = 1151 with ΔfRA = 15 kHz and LRA = 571 with ΔfRA = 30 kHz). | - |
| Proposal 11: For handover and RRC re-establishment cases, RAN4 to assume PRACH configuration 1 and 2 as baseline for NR-U tests, as specified in Annex A.3.8.2 in TS 38.133. | Issue 1-1-6 |
| Proposal 12: For the random access test case: RAN4 to discuss the PRACH configuration after the core requirements are defined | Issue 1-1-6 |
| Proposal 13: RAN4 to discuss defining a new test configuration with the new PRACH sequences introduced in NR Rel-16. | Issue 1-1-6 |
| Proposal 14: RAN4 to discuss the DRS transmission window duration to be used in the SSB configuration. | Issue 1-1-7 Proposal 1 |
| Proposal 15: RAN4 to define the following SSB configuration to be used in the 15 kHz NR-U test cases:   |  |  | | --- | --- | | SSB Parameters | Values | | Channel bandwidth | 20 MHz | | SSB SCS | 15 kHz | | SSB periodicity (TSSB) | 20 ms | | Number of SSB indexes per SS-burst | 1 | | DRS transmission window duration | [1] ms | | Highest SS/PBCH block index | 0 | | Symbol numbers containing SSB Note 2 | 2-5 and 4-7 | | Slot numbers containing SSB Note 2 | 0 | | SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | | RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | | Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | | | Issue 1-1-8 Proposal 2 |
| Proposal 16: RAN4 to define the following SSB configuration to be used in the 30 kHz NR-U test cases:     |  |  | | --- | --- | | SSB Parameters | Values | | Channel bandwidth | 40 MHz | | SSB SCS | 30 kHz | | SSB periodicity (TSSB) | 20 ms | | Number of SSB indexes per SS-burst | 1 | | DRS transmission window duration | [1] ms | | Highest SS/PBCH block index | 0 | | Symbol numbers containing SSB Note 2 | 2-5 Note 2 | | Slot numbers containing SSB Note 3 | 0 and 1 | | SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | | RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | | Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: Symbol 2-5 is chosen (1 SSB/slot).  Note 3: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves | | | Issue 1-1-8 Proposal 3 |
| Proposal 17: For NR-U test case configuration with 20 MHz BW and 15 kHz SCS (Proposal 10), define new configurations for PDSCH reference measurement channel, CORESET reference channel and Dedicated CORESET RMC configuration with 20 MHz BW and 15 kHz subcarrier spacing. | Issue 1-1-9 Proposal 1  Issue 1-1-10 Proposal 1 |
| [**R4-2101430**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101430.zip)  Ericsson | Proposal 1: RAN4 define NR-U RRM test cases with SCS=30kHz for both SSB and data transmission. | Issue 1-1-4 Option 3 |
| Proposal 2: For NR-U RRM tests, define the following discovery burst transmission (DBT) window configurations under CCA:   * DBT Window duration: 5ms * DBT Periodicity: 20ms | Issue 1-1-7 Proposal 2 |
| Proposal 3: For NR-U RRM tests, define new SSB configurations corresponding to the introduced DBT window configurations.   * SCS=30kHz with SS Block pattern case C. | Issue 1-1-8 Proposal 1 |
| Proposal 4: Configure PBCH DMRS sequence index with =1. | 3c. Test configurations – other |
| Proposal 5: Define new RMC for CORESET for RMSI scheduling under CCA to transmit Type0-PDCCH in the discovery burst.   * SCS=30kHz * Refers to TS38.213 Table 13-4A Index 4 (i.e., 2 OFDM symbols, RB offset = 0). * Refers to TS38.213 Table 13-11 Index 0 (i.e., O=0, M=1) | Issue 1-1-10 Proposal 3 |
| Proposal 6: Define new RMC for PDSCH for slots with RMSI under CCA   * SCS=30kHz * Reuse the same configuration as RMC for PDSCH for slots with RMSI (i.e., Type A, 24PRB, MCS4, dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 1, etc.) | Issue 1-1-9 Proposal 2 |
| Proposal 7: Define new RMC for PDSCH for slots without RMSI under CCA   * SCS=30kHz * Reusing SR.2.1 TDD (i.e., Type A, 24PRB, MCS4, dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 2, etc.) | Issue 1-1-9 Proposal 3 |
| Proposal 8: For NR-U RRM tests, RMC is transmitted during the RMC transmission burst:   * The length of the RMC transmission burst in slots is defined as N. The RMC burst transmission format is determined according to the steps below:   1. Select N randomly from a given set of the number of slots S1 = {[1,3,5,8]} with equal probability as the total length of RMC burst transmission format.   2. A uniform random variable from 0 to 1 is generated. If the random variable is less than PCCA\_DL, a burst of N fully occupied slots is transmitted. Otherwise, the RMC transmission burst is muted and the muting duration is the same as the number N of slots for determined burst format. * RMC transmission burst is scheduled outside DBT window. * RAN4 discuss further the number of slots in S1. | Issue 1-1-11 |
| Proposal 9: NR-U RRM tests does not configure tdd-UL-DL-ConfigurationCommon using RRC configuration. DL scheduling is configured by DCI 1\_1 slot by slot. | Issue 1-1-12 |
| Proposal 10: Reuse the existing OCNG patterns in A.3.2.1 for NR-U RRM tests. | Issue 1-1-13 |
| Proposal 11: Reuse the existing TCI state configuration in A.3.16.2 for NR-U RRM tests. | Issue 1-1-13 |
| Proposal 12: Reuse the existing CSI-RS configurations in A.3.13.2 and A.3.17.1.2 for NR-U RRM tests. If necessary RAN4 define new CSI-RS configuration e.g. transmitted inside DBT window. | Issue 1-1-13 |
| Proposal 13: Define new subclause for antenna configurations with unlicensed bands. For 4Rx UE, apply the same applicability rule as Rel-15 RRM test. | Issue 1-1-14 |
| [**R4-2102527**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102527.zip)  Ericsson | Observation 1: NR-U and LAA/eLAA have many similarities, but there are also some differences, including the terminology. | - |
| Observation 2: For NR-U, a more flexible configuration is desired, to accommodate the demand for testing in various environments, to model LBE-like and FBE-like networks, DL CCA and UL CCA, to model consistent UL CCA failures, etc. | - |
| Proposal 1: For NR-U, define a parameter for CCA success probability, PCCA, to model the probability of successful attempt for acquiring the channel and transmitting the necessary signals. | Issue 1-3-1 Option 2  Issue 1-3-5 Option 2 |
| Proposal 2: CCA success probability PCCA is defined among cell-specific test parameters in each test cases (the access probability can be different at different BS locations). | Issue 1-2-3 Option 1  Issue 1-3-1 Option 3  Issue 1-3-7 Option 3 |
| Proposal 3: The SSB shifting can be modelled by randomly selecting a candidate SSB location from the set of allowed candidate SSB locations. No need to model SSB shifting for non-congested channels. | Issue 1-3-1 Option 3 |
| Proposal 4: The probability parameter PCCA is not a single fixed value in the specification; the value(s) are configured to a relevant setting in each test. | Issue 1-2-3 Option 1  Issue 1-3-4 Option 1  Issue 1-3-8 Option 1 |
| Proposal 5: The CCA model specifies possible values for PCCA. RAN4 to further discuss:   * Option 1: The CCA model specifies a continuous range of possible values (one or more specific values from the range are configured in each test), e.g., PCCA[0%, 100%] * Option 2: The CCA model specifies a discrete set of possible values (one or more specific values from the set are chosen in each test). | Issue 1-2-3 Option 1a and 1b |
| Proposal 6: One probability value (per transmitter) applies at any time point during a test; one or more probability values can be configured in the entire test, one value PCCA,i per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA=1.0 in T1 and PCCA=0.75 in T2). | Issue 1-2-5 Option 1 |
| Proposal 7: In each test case, the following parameters shall be present in the tables:   * network indication of the channel occupancy in SIB1, * UE capability for the channel access mode indicative of that the UE supports the network-indicated channel occupancy. | Issue 1-1-1 Option 1 |
| Proposal 8: The configuration of the CCA model (e.g., parameter PCCA,i) in the test shall match the network-indicated channel occupancy in time interval Ti. during which the requirement is tested. | Issue 1-1-1 Proposal 2 |
| Proposal 9: For the semi-static channel access, there is no need to configure SSB shift within the discovery burst transmission window. | Issue 1-3-5 Option 3 |
| Proposal 10: 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). | Issue 1-2-4 Option 1 |
| Proposal 11: Test parameter values for FBE and LBE (e.g., signaling-related) are specified in the same test case (a note to clarify their applicability can be added, if needed). | Issue 1-2-1 Option 1 |
| Proposal 12: For PCCA, it is the actual value that matters, there is no need to call it “FBE” or “LBE”; if needed, multiple PCCA values can be specified in the same test. | Issue 1-2-1 Option 1 |
| Proposal 13: For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i. | Issue 1-2-6 Option 1 |
| Proposal 14: In the same time interval i, PCCA\_UL,I and PCCA\_DL,i can have different values. | Issue 1-2-7 Option 1 |
| Proposal 15: Consistent UL CCA failures are modelled by means of a low PCCA\_UL,i (e.g., 0%) during the relevant time interval Ti within the test. | Issue 1-4-7 Option 1 |

## Open issues summary and view’s collection for the 1st round

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

**Issue 1-1-1: Channel occupancy parameters**

The following proposals were made concerning channel occupancy parameters:

* Proposal 1 (Ericsson): In each test case, the following parameters shall be present in the tables:
  + network indication of the channel occupancy in SIB1,
  + UE capability for the channel access mode indicative of that the UE supports the network-indicated channel occupancy.
* Proposal 2 (Ericsson): The configuration of the CCA model (e.g., parameter PCCA,i) in the test shall match the network-indicated channel occupancy in time interval Ti. during which the requirement is tested.

Recommended way forward for the first round:

* Can we agree with proposals 1 and 2?

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Cannot agree to Proposal 1: Does channel occupancy here refers to LBE or FBE mode of operation? If yes, it depends on how the test cases/test configurations are defined for LBE and FBE channel access modes. If defined separately for LBE and FBE, such indication is implicit in the test case/configuration and is not required.  Cannot agree to Proposal 2: As mentioned above, the CCA model and corresponding SSB transmission probability will be chosen based on the channel access the UE supports. A default value may be used for most of the test cases |
| MediaTek | Not clear about the network indication of the channel occupancy in SIB1, is that *channelAccessMode* in *ServingCellConfigCommonSIB ?* |
| Ericsson | Support Proposal1 and Proposal 2.  To Qualcomm:  Given the GTW agreement below, at least Proposal 1 should be agreeable.  Agreement: If needed, test parameter values for FBE and LBE (e.g., signaling-related) are specified in the same test case (a note to clarify their applicability can be added, if needed). |
|  |  |

**Issue 1-1-2: Applicability of NR FDD test configurations**

Consider the following proposal concerning the applicability of NR FDD test configurations:

* Option 1 (Nokia, Mediatek?): NR FDD test configurations do not apply to the configuration of NR-U cells, but may apply to the configuration of NR cells in NR-U test cases.
* Option 2: NR FDD test configurations do not apply to the configuration of NR-U and NR cells in NR-U test cases.

Recommended way forward for the first round:

* Can we agree on Option 1?

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We are fine with Option 1 |
| Huawei | We are fine with option 1 |
| MediaTek | Option 1 |
| Ericsson | To avoid confusion, isn’t better to just directly agree on the list applicable configurations for cells with CCA, NR cells without CCA, and LTE cells?  For example, why to not agree for cells with CCA:   * 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode   And for cells without CCA:   * 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode * 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode * 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode   LTE cells:   * Rel-15 LTE FDD * Rel-15 LTE TDD |
| Nokia | Support Option 1. Detailed configurations to be agreed under issue 1-1-5. |

**Issue 1-1-3: SCS for data and SSB**

Considering that proposals on SCS are not clear differentiating SSB and data, discuss on the following options:

* Option 1: Configure the same SCS for data and SSB.
* Option 2: Allow configuration of different SCS for SSB and data.

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* Agreement: Configure the same SCS for data and SSB.

Recommended way forward for the first round:

* No need for further discussion

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 1-1-4: Cell configuration SCS and channel bandwidth on carrier frequency with CCA**

RAN4 to consider the following options of SCS and channel bandwidths for the cell configurations of NR-U RRM test cases:

* Option 1 (Huawei?):
  + 15 kHz SSB SCS with 20 MHz bandwidth
* Option 2 (Nokia):
  + NR with CCA 15 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode
  + NR with CCA 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
* Option 3 (Ericsson, Mediatek?)
  + RAN4 define NR-U RRM test cases with SCS=30kHz for both SSB and data transmission.
    - FFS bandwidths

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Agreement

* + RAN4 define NR-U RRM test cases with SCS=30kHz for both SSB and data transmission and 40 MHz bandwidth.

Recommended way forward for the first round:

* No need for further discussion

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 1-1-5: E-UTRA, NR and NR-U configurations**

* Proposal 1 (Nokia): RAN4 to discuss which combinations of E-UTRA, NR and NR-U configurations are to be included in the test cases, i.e. agree which of the Rel-15 NR and LTE configurations are to be tested with the NR-U configurations discussed under Issue 1-1-4.
  + NR configurations in Rel-15 test cases:
    - NR1: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
    - NR2: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
    - NR3: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
  + LTE configurations in Rel-15 test cases
    - LTE FDD
    - LTE TDD

Recommended way forward for the first round:

* On the first round, companies are invited to indicate in the comment section, which of the configurations for NR and LTE need to be included in NR-U test cases that have NR and/or E-UTRA cells. Further discussion about combinations of NR-U/NR/LTE cells depends on agreements in Issue 1-1-4.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We can agree to keep the same configurations for NR and LTE cells as in Rel-15 test cases. |
| MediaTek | OK for Proposal 1.  If one UE has passed the legacy NR requirements, then the tests are not necessary if the requirements are just the same as the legacy NR requirements, even with different cell configurations. |
| Ericsson | Agreeable test configurations:  For cells with CCA:   * 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode   And for cells without CCA:   * 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode * 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode * 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode   LTE cells:   * Rel-15 LTE FDD * Rel-15 LTE TDD |
| Nokia | Unless a good reason for leaving some configuration out is shown, we think all listed configurations for NR and LTE should be included. |

**Issue 1-1-6: PRACH test configuration**

RAN4 to consider the following proposals on PRACH configuration:

* Proposal 1 (Nokia): For handover and RRC re-establishment cases, RAN4 to assume PRACH configuration 1 and 2 as baseline for NR-U tests, as specified in Annex A.3.8.2 in TS 38.133.
* Proposal 2 (Nokia): For the random access test case: RAN4 to discuss the PRACH configuration after the core requirements are defined.
* Proposal 3 (Nokia): RAN4 to discuss defining a new test configuration with the new PRACH sequences introduced in NR Rel-16.

Recommended way forward for the first round:

* Can we agree on Proposals 1-3?

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | OK for Proposal 1, 2, 3. |
| Ericsson | We support proposals 1, 2, and 3. |
| Nokia | Support proposals 1,2 and 3. |

**Issue 1-1-7: DRS/DBT transmission window duration**

RAN4 to consider the proposals below:

* Proposal 1 (Nokia): RAN4 to discuss the DRS transmission window duration to be used in the SSB configuration.
  + Consider DRS transmission window duration of 1ms and SSB periodicity of 20 ms.
* Proposal 2 (Ericsson): For NR-U RRM tests, define the following discovery burst transmission (DBT) window configurations under CCA:
  + DBT Window duration: 5ms
  + DBT Periodicity: 20ms

Recommended way forward for the first round:

* Can we agree on Proposals 1 and 2?

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | This can be agreed based on number SSB indices configured per SSB burst. Since RAN4 agreed to monitoring only first two candidate SSB positions in test cases, if a single SSB index is configured in the SSB test configuration (Issue 1-1-8), we are okay with Proposal 1. |
| MediaTek | Prefer to Proposal 1. The duration of 1ms has been used in LAA tests. |
| Ericsson | Prefer Proposal 2. Our idea is to transmit several SSBs in one Discovery Burst Transmission Window. For at most 2 SSBs transmitted in the discovery burst, we are fine to specify the DBT pattern as follows:   * Discovery burst transmission window periodicity: 20ms * Discovery burst transmission window duration: 1ms * Discovery burst transmission window offset: 0ms (if necessary) |
| Nokia | If transmission and monitoring is only within the first two SSB candidate positions, then Proposal 1 is sufficient. |

**Issue 1-1-8: SSB test configuration**

RAN4 to consider the following proposals on SSB configuration:

* Proposal 1 (Ericsson): For NR-U RRM tests, define new SSB configurations corresponding to the introduced DBT window configurations.
  + SCS=30kHz with SS Block pattern case C.
* Proposal 2 (Nokia): RAN4 to define the following SSB configuration to be used in the 15 kHz NR-U test cases:

|  |  |
| --- | --- |
| SSB Parameters | Values |
| Channel bandwidth | 20 MHz |
| SSB SCS | 15 kHz |
| SSB periodicity (TSSB) | 20 ms |
| Number of SSB indexes per SS-burst | 1 |
| DRS transmission window duration | [1] ms |
| Highest SS/PBCH block index | 0 |
| Symbol numbers containing SSB Note 2 | 2-5 and 4-7 |
| Slot numbers containing SSB Note 2 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 |
| RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 |
| Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | |

* Proposal 3 (Nokia): RAN4 to define the following SSB configuration to be used in the 30 kHz NR-U test cases:

|  |  |
| --- | --- |
| SSB Parameters | Values |
| Channel bandwidth | 40 MHz |
| SSB SCS | 30 kHz |
| SSB periodicity (TSSB) | 20 ms |
| Number of SSB indexes per SS-burst | 1 |
| DRS transmission window duration | [1] ms |
| Highest SS/PBCH block index | 0 |
| Symbol numbers containing SSB Note 2 | 2-5 Note 2 |
| Slot numbers containing SSB Note 3 | 0 and 1 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 |
| RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 |
| Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: Symbol 2-5 is chosen (1 SSB/slot).  Note 3: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | |

Recommended way forward for the first round:

* Can we agree on Proposals 1 to 3?

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We can agree to Proposal 3. |
| Huawei | We are fine to introduce new SSB configurations but we have concerns on the symbols containing SSB in option 2 and 3. The actual symbol containing SSB may depend on the Q value and the LBT results in each test. For option 3, it means there is only one SSB position. |
| MediaTek | Fine with Proposal 3. |
| Ericsson | Proposal 2 is irrelevant.  We have similar proposal as Proposal 3 in our draft CR R4-2101431, which is based on Proposal 1. We propose also add Q in the configuration as follows (two successive candidate SSB positions)   |  |  |  | | --- | --- | --- | | **SSB Parameters** | **Values** | | | Channel bandwidth | 40 MHz | | | SSB SCS | 30 kHz | | | SSB periodicity (TSSB) | 20 ms | | | Number of SSBs per SS-burst | 2 | | | SS/PBCH block index | 0 | 0 | | Symbol numbers containing SSB Note 2 | 2-5 | 2-5 | | Slot numbers containing SSB Note 2 | 0 | 1 | | SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | | | RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | | | ssb-PositionQCL () | 2 | | | Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | | |   Moreover we think RAN4 need SSB configuration with one candidate SSB position for cell detection:   |  |  | | --- | --- | | **SSB Parameters** | **Values** | | Channel bandwidth | 40 MHz | | SSB SCS | 30 kHz | | SSB periodicity (TSSB) | 20 ms | | Number of SSBs per SS-burst | 1 | | SS/PBCH block index | 0 | | Symbol numbers containing SSB Note 2 | 2-5 | | Slot numbers containing SSB Note 2 | 0 | | SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | | RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | | ssb-PositionQCL () | 1 | | Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves | | |
| Nokia | After agreeing that only test configuration with 30 kHz SCS and 40 MHz BW is included (Issue 1-1-4), Proposal 2 is not needed. Proposal 3 or the proposal Ericsson mentions in their comment can be used as the baseline for discussion. |

**Issue 1-1-9: RMCs for PDSCH**

Considering the RMCs for PDSCH, consider the following proposals:

* Proposal 1 (Nokia): For NR-U test case configuration with 20 MHz BW and 15 kHz SCS, define new configurations for PDSCH reference measurement channel.
* Proposal 2 (Ericsson): Define new RMC for PDSCH for slots with RMSI under CCA
  + SCS=30kHz
  + Reuse the same configuration as RMC for PDSCH for slots with RMSI (i.e., Type A, 24PRB, MCS4, dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 1, etc.)
* Proposal 3 (Ericsson): Define new RMC for PDSCH for slots without RMSI under CCA
  + SCS=30kHz
  + Reusing SR.2.1 TDD (i.e., Type A, 24PRB, MCS4, dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 2, etc.)

Recommended way forward for the first round:

* Can we agree on Proposals 1 to 3?

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | No need to define RMC for 15Khz based on the agreements in the GTW session. |
| MediaTek | Proposal 1 is obsolete since we agreed NR-U RRM test cases with SCS=30kHz. |
| Ericsson | Support Proposal 2 and Proposal 3. |
| Nokia | After agreeing that only test configuration with 30 kHz SCS and 40 MHz BW is included (Issue 1-1-4), Proposal 1 is not needed. We would like to take more time to check the details of Proposal 3. |

**Issue 1-1-10: CORESET**

Considering the RMCs that are not for PDSCH, consider the following proposals:

* Proposal 1 (Huawei): New RMSI COREST reference channel configurations shall be added for NR-U.
* Proposal 2 (Nokia): For NR-U test case configuration with 20 MHz BW and 15 kHz SCS, define new configurations for CORESET reference channel and Dedicated CORESET RMC configuration with 20 MHz BW and 15 kHz subcarrier spacing.
* Proposal 3 (Ericsson): Define new RMC for CORESET for RMSI scheduling under CCA to transmit Type0-PDCCH in the discovery burst.
  + SCS=30kHz
  + Refers to TS38.213 Table 13-4A Index 4 (i.e., 2 OFDM symbols, RB offset = 0).
  + Refers to TS38.213 Table 13-11 Index 0 (i.e., O=0, M=1)

Proposed way forward for the first round:

* To be discussed based on the outcome of Issue 1-1-4.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | No need to define RMC for 15Khz based on the agreements in the GTW session. |
| MediaTek | Proposal 2 is obsolete since we agreed NR-U RRM test cases with SCS=30kHz.  Agree Proposal 1. |
| Ericsson | Support Proposal 3. |
| Nokia | After agreeing that only test configuration with 30 kHz SCS and 40 MHz BW is included (Issue 1-1-4), Proposal 2 is not needed. CORESET configuration for the agreed test configuration is needed. |

**Issue 1-1-11: RMC transmission burst**

Considering the length of transmission bursts for NR-U tests, consider the following proposal:

* Proposal 1 (Ericsson): For NR-U RRM tests, RMC is transmitted during the RMC transmission burst:
  + The length of the RMC transmission burst in slots is defined as N. The RMC burst transmission format is determined according to the steps below:
    1. Select N randomly from a given set of the number of slots S1 = {[1,3,5,8]} with equal probability as the total length of RMC burst transmission format.
    2. A uniform random variable from 0 to 1 is generated. If the random variable is less than PCCA\_DL, a burst of N fully occupied slots is transmitted. Otherwise, the RMC transmission burst is muted and the muting duration is the same as the number N of slots for determined burst format.
  + RMC transmission burst is scheduled outside DBT window.
  + RAN4 discuss further the number of slots in S1.

Recommended way forward for the first round:

* Please discuss further the proposal above stating if it can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Fine with Proposal 1 as the starting point. |
| Ericsson | Support Proposal 1. |

**Issue 1-1-12: TDD UL/DL configuration**

Considering the TDD UL/DL configuration, consider the following proposal:

* Proposal 1 (Ericsson): NR-U RRM tests does not configure tdd-UL-DL-ConfigurationCommon using RRC configuration. DL scheduling is configured by DCI 1\_1 slot by slot.

Recommended way forward for the first round:

* Please discuss further the proposal above stating if it can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Support Proposal 1. |

**Issue 1-1-13: Existing configuration to be reused**

Considering the existing configuration from NR tests that might be reused, consider the following proposals:

* Proposal 1 (Ericsson): Reuse the existing OCNG patterns in A.3.2.1 for NR-U RRM tests..
* Proposal 2 (Ericsson): Reuse the existing TCI state configuration in A.3.16.2 for NR-U RRM tests.
* Proposal 3 (Ericsson): Reuse the existing CSI-RS configurations in A.3.13.2 and A.3.17.1.2 for NR-U RRM tests. If necessary RAN4 define new CSI-RS configuration e.g. transmitted inside DBT window.

Recommended way forward for the first round:

* Discuss on the proposals above indicating which ones can be agreed considering that the proposals are not mutually exclusive.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Fine with Proposal 1 and 2 as the baseline.  On Proposal 3, it needs to discussion how to handle CSI-RS during tests, because UE is not required to determine whether the CSI-RS is available or not. |
| Ericsson | Support Proposals 1, 2, 3. |
| Nokia | Our initial view is that Proposals 1-3 are ok, but we would still like to double-check this before making an agreement. |

**Issue 1-1-14: Antenna configurations**

Considering the existing configuration from NR tests that might be reused, consider the following proposals:

* Proposal 1 (Ericsson): Define new subclause for antenna configurations with unlicensed bands. For 4Rx UE, apply the same applicability rule as Rel-15 RRM test.

Recommended way forward for the first round:

* Please discuss further the proposal above stating if it can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Fine with Proposal 1. |
| Ericsson | Support Proposal 1 |

**Issue 1-1-15: PBCH DMRS**

Considering the configuration of PBCH, consider the following proposal:

* Proposal 1 (Ericsson): Configure PBCH DMRS sequence index with =1.

Recommended way forward for the first round:

* Please discuss further the proposal above stating if it can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | For test cases with two SSB within one the burst, Q should be as least 2. |
| Ericsson | Agree to add the setup with Q=2. See 1-1-8 also. |

### Sub-topic 1-2: General issues on LBT models

**Issue 1-2-1: Differentiation between FBE and LBE**

Proposals

* Option 1 (Ericsson): If needed, test parameter values for FBE and LBE (e.g., signaling-related) are specified in the same test case (a note to clarify their applicability can be added, if needed).
  + For PCCA, it is the actual value that matters, there is no need to call it “FBE” or “LBE”; if needed, multiple PCCA values can be specified in the same test.
* Option 2 (Qualcomm): Define separate test cases for LBE and FBE whenever an LBT failure dependent requirement is tested.

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Agreement: If needed, test parameter values for FBE and LBE (e.g., signaling-related) are specified in the same test case (a note to clarify their applicability can be added, if needed).

Recommended way forward for the first round:

* No need for further discussion

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 1-2-2: General approach for DL LBT/CCA models**

How should the DL LBT models be defined?

* Option 1: Describe LBT models as a random process defined
* Option 2 (Huawei): Consider the LBT model as a repetitive pattern of n available SSBs for every m SSB occasions.
* Option 3 (Ericsson): For NR-U, define a parameter for CCA success probability, PCCA, to model the probability of successful attempt for acquiring the channel and transmitting the necessary signals.

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Agreement:

DL LBT modelling procedures

Option 1: Probabilistic model. Define a parameter for CCA success probability, PCCA, to model the probability of successful attempt for acquiring the channel and transmitting the necessary signals.

Option 2: Deterministic LBT pattern with a repetitive pattern of n available SSBs for every m SSB occasions

Option 1 approach is used as a baseline approach. Option 2 can be used for selected test cases to guarantee proper UE behavior.

Recommended way forward for the first round:

* No need for further discussion

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 1-2-3: General approach for defining parameters of LBT models**

How should the parameters of DL LBT models be defined?

* Option 1 (Ericsson): The probability parameter PCCA is not a single fixed value in the model but a variable; the value(s) are configured to a relevant setting in each test. The specific PCCA values should be defined among cell-specific test parameters in each test case (the access probability can be different at different BS locations). The CCA model only specifies possible values for PCCA. The possible values for PCCA may be defined as
  + 1): The CCA model specifies a continuous range of possible values (one or more specific values from the range are configured in each test), e.g., PCCA[0%, 100%], or
  + 2): The CCA model specifies a discrete set of possible values (one or more specific values from the set are chosen in each test).
* Option 2: Common parameters should be defined for all test cases.

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Agreement: Probabilistic DL LBT model

* The probability parameter PCCA is not a single fixed value in the model but a variable; the value(s) are configured to a relevant setting in each test.
* The specific PCCA values should be defined among cell-specific test parameters in each test case.
* The CCA model specifies a discrete set of possible values
  + One or more specific values from the set are chosen in each test
  + One value can be chosen as a default one and will apply to most of test cases
* The set of values
  + Option 1: {0%, 25%, 50%, 75%, 100%}
  + Other options are not precluded

Recommended way forward for the first round:

* No need for further discussion

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 1-2-4: General approach for defining parameters of LBT models**

How should the parameters of DL LBT models be defined?

* Proposal 1 (Ericsson): 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)..

Recommended way forward for the first round:

* Discuss on the proposal above indicating if it can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 1-2-5: DL LBT models parameter variation**

Should the parameters of DL LBT models be allowed to vary during a test?

* Option 1 (Ericsson): One probability value (per transmitter) applies at any time point during a test; one or more probability values can be configured in the entire test, one value PCCA,i per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA=1.0 in T1 and PCCA=0.75 in T2).
* Option 2: DL LBT model parameters are kept constant during a test.

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We don’t see any value in varying the probability of DL LBT success during a test. Prefer option 2. |
| Huawei | Could proponent companies explain why to have different LBT models for different time interval in one test. In legacy test cases, we only have different SINR/RSRP conditions for different time intervals. |
| MediaTek | Prefer to Option 2 for simplicity. Option 1 may apply to some selected tests if the necessity is identified. |
| Ericsson | Prefer to define the CCA model (which is generic) based on Option 1, though in test cases where this is not necessary the same probability can be configured in the parameters for the entire TC. |
| Nokia | The benefit of Option 1 is a bit unclear. For now we prefer Option 2, but if clear benefit of Option 1 can be shown for some test case, we are open to consider it for such selected test case(s). |

**Issue 1-2-6: UL LBT models parameter variation**

Should the parameters of UL LBT models be allowed to vary during a test?

* Option 1 (Ericsson): For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i.
* Option 2: UL LBT model should be kept constant during a test.

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We don’t see any value in varying the probability of UL LBT success during a test. Prefer option 2. |
| MediaTek | Prefer to Option 2 for simplicity. Option 1 may apply to some selected tests if the necessity is identified. |
| Ericsson | First, we should agree on that we need the UL LBT model. Second, that it is based on the probability. And then, we think that the CCA model (which is generic) should allow for different settings within the test period if necessary, while the same probability can be configured where this is not necessary. In few test cases UL LBT is needed e.g. RA with UL CCA. |
| Nokia | Same as for DL in issue 1-2-5, could the benefit of Option 1 be clarified? |

**Issue 1-2-7: LBT failure probability differences between UL and DL**

Should the probability of LBT failure for UL and DL be allowed to differ for a test or time instant within a test?

* Option 1 (Ericsson): Yes
* Option 2: No

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | While the probability of LBT failure may be chosen to be different for UL and DL, they should be kept constant during the test. |
| Huawei | Could proponent companies explain why to have different LBT models for different time interval in one test. In legacy test cases, we only have different SINR/RSRP conditions for different time intervals. |
| MediaTek | Prefer to Option 2. The UL and DL are on the same band, so the the probability of LBT failure would be similar. |
| Ericsson | Support option 1.  At least, the model should define separate variables PCCA\_DL and PCCA\_UL, but this does not prevent the same values in some test cases if needed. In other cases, the same values for UL and DL may be not suitable e.g. where we want to model consistent UL LBT failures, etc. |
| Nokia | Could it be clarified in which type of test case Option 1 would be beneficial? |

### Sub-topic 1-3: DL LBT model during RRM tests

**Issue 1-3-1a: DL LBT model for LBE operation**

* Option 1 (Qualcomm, Nokia): DL-LBE-Model 1:
  + For LBE test cases in non DRX: RAN4 to adopt the following DL LBT model: 1) Define a probability equal to P1 for the transmission of the DRS in the first candidate position. 2) In case of LBT failure for transmission in the first candidate position, define a probability equal to P2 for the transmission in the second candidate position for a given SSB index.
* Option 2 (Ericsson): DL-LBE-Model 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:
    - 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).

GTW session (26th Jan 2021)

Agreement:

DL LBT model for LBE and FBE operation:

1) Define a probability equal to P1 for the transmission of the DRS in the first candidate position.

2) In case of LBT failure for transmission in the first candidate position, define a probability equal to P2 for the transmission in the second candidate position for a given SSB index.

Different probabilities can be used for LBE and FBE operation

Note: in case significant issues with this model are identified then the model with independent probabilities for LBT failure can be considered

Recommended way forward for the first round:

* No need for further discussion

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 1-3-1b: How to model different SSB candidate positions on DL-LBE-Model 2**

When considering the DL-LBE-Model 2, consider the following proposal on how to model the different SSB candidate positions:

* Proposal 1: The SSB shifting can be modelled by randomly selecting a candidate SSB location from the set of allowed candidate SSB locations. No need to model SSB shifting for non-congested channels.

Recommended way forward for the first round:

* This proposal relates to the second part of the model DL-LBE-Model 2 and it doesn’t relate to the model in Proposal 1 in issue 1-2-1a. Please comment on whether that proposal can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | support Proposal 1. |
| Nokia | Is this issue still relevant after the agreement for issue 1-3-1a? |

**Issue 1-3-2: DL-LBE-Model 1 general idea for the definition of P1 and P2**

Should RAN4 define P1 and P2 such that the overall LBT failure rate is reflected to be lower than LTE-LAA

* Option 1 (Qualcomm): Yes
* Option 2: No

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | As a proponent company, we support option 1. It will be nice to indicate the superior performance of NR-U as compared to LTE-LAA |
| Ericsson | Do not agree. Has nothing related to LTE-LAA. NR is completely different deployment, and thus should be discussed separately. |
| Nokia | Since we are discussing test cases, we do not see the need for focusing on this issue. We do not think that this kind of high level agreement is needed. Instead we can discuss the probabilities related to the test model directly. |

**Issue 1-3-3: DL-LBE-Model 1 parameters**

If Option 1 in Issue 1-3-1 is agreed, which parameters should be considered:

* Option 1 (Qualcomm): P1=0.75, P2<P1
  + Option 1a (Qualcomm): P1=0.75, P2=0.5
* Option 2 (Nokia): P1 = P2 = 0.75

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | As a proponent company, we support the proposal 1. As analyzed in our paper (R4-2102921), P1=0.75, P2=0.5 appears to be a better model as compared to P1 = P2 = 0.75.  As a clarification, we are proposing these values to be used as default for most of the test cases.  Other probabilities, e.g. P1=P2=0 (to model consistent DL LBT failures), etc may be used to test some specific test cases. |
| Huawei | If the P is some value between 0 and 1. Can companies explain how to void consecutive unavailable samples if it is intended to be avoided in the test case. |
| MediaTek | Prefer to Option 2. Not sure it is realistic to assume P is time-varying within DRS window (i.e. suddenly changes in few ms).  To handle the “consecutive unavailable”, I guess one way is terminated the test once the condition is met. |
| Ericsson | Needs further discussion. No need to decide in this meeting. |
| Nokia | For default case, for simplicity, Option 2 should be sufficient, but maybe for certain scenarios Option 1 might have benefits as well. |

**~~Issue 1-3-4: Should the common CCA model define a single probability value or a variable (set to actual values in test cases)? DL-LBE-Model 2 parameters~~**

* ~~Option 1 (Ericsson): The probability parameter P~~~~CCA~~ ~~is not a single fixed value in the specification; the value(s) are configured to a relevant setting in each test.~~
* ~~Option 2: Fixed P~~~~CCA~~~~.~~
  + ~~Moderator’s note: in case of choosing Option 2, please discuss which value should be used for P~~~~CCA~~~~.~~

~~Recommended way forward for the first round:~~

* ~~Discuss on the options above indicating which one can be agreed.~~

Moderator’s note: Issue 1-3-4 is already covered in Issue 1-2-3.

**Issue 1-3-5: DL LBT model for FBE operation**

* Option 1a (Qualcomm): DL-FBE Model 1:
  + DL LBT model, in FBE non-DRX test cases: RAN4 to define a DL LBT model that considers a probability of P for the transmission of each **DRS**. Only the first SSB candidate position for a given SSB index shall be considered in these tests.
* Option 1b ( Nokia): DL-FBE Model 1:
  + DL LBT model, in FBE non-DRX test cases: RAN4 to define a DL LBT model that considers a probability of P for the transmission of each **frame**. Only the first SSB candidate position for a given SSB index shall be considered in these tests.
* Option 2 (Ericsson): DL-FBE Model 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:
    - 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).
  + For the semi-static channel access, there is no need to configure SSB shift within the discovery burst transmission window.

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We believe Option 1a and 1b share the same intent, but since we are talking about the DRS transmissions in RRM tests, **DRS** is the correct term to use instead of **Frame**. Support option (1a) as the proponent company. |
| Huawei | Similar comments as Issue 1-3-3. If the possibility of transmission of SSB for each occasion is independent, how to make sure the target requirements could be evaluated without abandoning. We are not sure whether TE could do the traceback work to see whether the test is a valid one. |
| MediaTek | Fine with Option 1a. |
| Ericsson | The model is generic, not specific to FBE or LBE. We already have agreement in GTW. |
| Nokia | Options 1a and 1b are ok, but refer to the agreement made during the GTW. |

**Issue 1-3-6: DL-FBE-Model 1 general idea for the definition of the SSB transmission probability**

If Option 1 in Issue 1-3-5 is agreed, should RAN4 define a SSB transmission probability in FBE to be higher than SSB transmission probability in LBE: P(FBE) > P(LBE) = P1 + (1-P1)\*P2?

* Option 1 (Qualcomm): yes
* Option 2: No

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | As a proponent company, we support option 1. Since FBE is used when the operator can guarantee a controlled environment (no WiFi neighbors), the rate of LBT failure is extremely small in FBE mode. |
| Ericsson | Do not agree.  Our proposal is:   * + 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). |

**Issue 1-3-7: DL-FBE-Model 1 SSB transmission probability**

If Option 1 in Issue 1-3-5 is agreed, which parameters should be considered:

* Option 1 (Qualcomm): Define P(FBE) = 0.95
* Option 2 (Nokia): P(FBE) = 0.9
* Option 3 (Ericsson): Defined among cell-specific test parameters in each test cases (the access probability can be different at different BS locations).

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Support option 1 as the proponent company.  As a clarification, we are proposing these values to be used as default for most of the test cases.  Other probabilities, e.g. P(FBE)=0 (to model consistent DL LBT failures, although not a typical scenario), P(FBE) = 1, etc may be used to test some specific test cases |
| Ericsson | GTW agreement:   * The specific PCCA values should be defined among cell-specific test parameters in each test case. |
| Nokia | As the default value, we support Option 2 since despite the assumed good LBT conditions where FBE can be used, it needs to be made sure that the UE can pass the test cases correctly in case LBT failures happen. Probability 0.95 allows very little chance for LBT failure, so we would like to have the probability of success a bit lower, thus proposing 0.9. |

**~~Issue 1-3-8: DL-FBE-Model 2 parameters~~**

* ~~Option 1 (Ericsson): The probability parameter P~~~~CCA~~ ~~is not a single fixed value in the specification; the value(s) are configured to a relevant setting in each test.~~
* ~~Option 2: Fixed P~~~~CCA~~~~.~~
  + ~~Moderator Note: in case of choosing Option 2, please discuss which value should be used.~~

~~Recommended way forward for the first round:~~

* ~~Discuss on the options above indicating which one can be agreed.~~

Moderator’s note: Issue 1-3-8 is already covered in Issue 1-2-3.

**Issue 1-3-9: DL LBT model when DRX is in use**

Considering the following options for DL LBT model when DRX is in use:

* Option 1 (MediaTek): For test cases with DRX in use, the LBT can be modelled as either all SMTCs are with available SSBs or all SMTCs are with no SSBs available during one DRX cycle.
* Other options?

Recommended way forward for the first round:

* Discuss on the option above indicating if it can be agreed or if another option should be considered.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | We are fine with option 1. |
| MediaTek | Support Option 1 for simplicity. |
| Ericsson | In this meeting, let’s focus on the requirements with DRX. And come back to this issue in the next meeting. |

**Issue 1-3-10: General approach in exceeding Lmax values during RRM tests**

Considering the approach when exceeding Lmax during the RRM tests, please consider the following options:

* Option 1 (Qualcomm): Avoid designing test cases with exceeding max allowed LBT failures for NR-U.
* Option 2 (Huawei, ZTE): For the test cases where no particular behaviour to be verified, exceeding Lmax shall be avoided.

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Both the options share the same intent, we can agree to option 2 since a few requirements, e.g. cell re-selection needs to be tested with exceeding Mp, Mq values. |
| ZTE | We support Option 2, which is to only avoid exceeding Lmax when no clear UE behavior is defined (then there’s nothing really to be tested anyways). But if there are UE behaviors defined when Lmax is exceeded, of course those UE behaviors shall be tested. |
| Huawei | We support option 2. But the issue on how to trigger/not trigger the case when exceeding Lmax shall be discussed. |
| MediaTek | Fine with Option 1 and Option 2. |
| Ericsson | Option 2 is fine. Cannot agree with Option 1.  How to make sure that the Lmax is not exceeded? Is the below agreeable (can be added as a clarification to option 2):   * Add a note in the TC description (e.g., under tested requirement part, together with the sentence on 90%) that a test realization where Lmax is exceeded shall not be considered in the statistics. |

**Issue 1-3-11: List of test cases in which exceeding Lmax values may be considered**

As a part of the discussion, please fill-in the table indicating which of the following test cases should or should not exceed Lmax

* Proposal 1 (Huawei): Consider having particular test cases to verify the correct UE behaviour for the following cases:
  + Initiating the measurements on neighbour upon exceeding Mp and Mq in Cell reselection
  + Initiate cell selection procedures for the selected PLMN upon L1 exceeding L1,max in RRC release with redirection
  + Report RSRP\_0 upon L1 exceeding L1,max for L1-RSRP measurement
* Proposal 2 (MediaTek): For SCell activation in NR-U, exceeding Lmax should be avoided.
* Proposal 3 (MediaTek): For SFTD measurement NR-U, exceeding Lmax should be avoided.
* Proposal 4 (MediaTek): For intra-frequency and inter- frequency measurement for NR-U, exceeding LPSS/SSS,gaps,max should be avoided.
* Proposal 5 (ZTE): For the cell-reselection test cases, Mp consecutive DRX cycles with LBT failures of the serving cell should be also tested.

Recommended way forward for the first round:

* Discuss on the proposals above indicating which ones can be agreed considering that the proposals are not mutually exclusive.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We can agree to Proposal 1-4, Proposal 5 is already included in Proposal 1. |
| ZTE | Support Proposal 1 and 5. (proposal 1 includes proposal 5) |
| Huawei | No strong views. |
| MediaTek | Support Proposal 1,2,3,4. |
| Ericsson | Proposals 1-5 are Ok. |

### Sub-topic 1-4: UL LBT model during RRM tests

**Issue 1-4-1: Need for an UL LBT model**

Should RAN4 choose one typical test case to check this functionality?

* Option 1 (Nokia): Yes, RAN4 can choose one typical test case to check this functionality.
* Option 2: No, the UL LBT functionality should be tested in all requirements that depend on UL LBT failures.

Recommended way forward for the first round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We agree with the general idea of choosing one typical test to check a particular requirement,e.g. Delay in acquiring PRACH resource. But we don’t agree with choosing one test to check all the requirements. |
| Ericsson | Agree on:   * UL CCA model is needed for NR * UL CCA model is not necessary in every cases, but where the requirement depends on UL CCA failures (the list of such test cases is FFS). |
| Nokia | Option 1. One typical test case for each Scenario A-C could be enough, but if the group sees a need to test UL LBT in more test cases, this can be discussed case by case. |

**Issue 1-4-2: UL LBT model configuration**

About the LBT model configuration, please consider the following option:

* Option 1 (Nokia): If RAN4 agrees to test UL LBT in the RRM tests, an UL LBT type configuration needs to be defined.
* Option 2 (Ericsson): basic principles:
  + For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i.
  + 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].
  + Consistent UL CCA failures are modelled by means of a low PCCA\_UL,i (e.g., 0%) during the relevant time interval Ti within the test.
  + In the same time interval i, PCCA\_UL,I and PCCA\_DL,i can have different values.

Recommended way forward for the first round:

* Discuss on the option above indicating if it can be agreed.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Support option 1 that UL LBT model needs to be defined. The options are discussed in Issue 1-4-3 below. |
| MediaTek | Fine with Option 1 to define the model. |
| Ericsson | Support option 2. |
| Nokia | Option 1: would be good to clarify which LBT configuration is used. Discussion about Option 2 is more related to the next issue in our view. |

**Issue 1-4-3: UL LBT model**

The following model is proposed as an option for the UL LBT model:

* Option 1 (Qualcomm): baseline UL LBT model as:
  + Use DL FBE model to transmit a full band/LBT BW OCNG noise pattern 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 LBT 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
* Option 2 (Ericsson): basic principles:
  + For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i.
  + 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].
  + Consistent UL CCA failures are modelled by means of a low PCCA\_UL,i (e.g., 0%) during the relevant time interval Ti within the test.
  + In the same time interval i, PCCA\_UL,I and PCCA\_DL,i can have different values.
* Other options

Recommended way forward for the first round:

* Discuss on the option above indicating if it can be agreed or if another option should be considered.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | As a proponent company support Option 1 which, in principle, is similar to Option 2. We agree with Ericsson’s proposal that P can be set to 0 to model consistent LBT failures. There is no need to model DL and UL LBT failures at the same time. The LBT success probability should be kept constant during the test. |
| Ericsson | Support Option 2. In fact, option 2 does not contradict Option 1. Option 1 is more detailed though, so we propose to start with Option 2 (basic principles). |
| Nokia | We think RAN4 should aim at defining a similar principle of modelling UL LBT failures as was agreed for DL LBT failures (taking of course into account the difference in the way test equipment generates the LBT failures). With the following clarification we think Option 1 would be a good baseline for discussion: the test equipment is only required to send noise bursts in the time periods when the UE is expected to be performing LBT (with the agreed probability). |

**Issue 1-4-4: PRACH configuration in test-cases subject to UL LBT**

The following option is proposed for the PRACH configuration when using an UL LBT mode:

* Option 1 (Qualcomm): Test equipment to configure preambleReceivedTargetPower for msg1 and msgA-PreambleReceivedTargetPower for msgA to the highest value for UL LBT test cases.
* Other options

Recommended way forward for the first round:

* Discuss on the option above indicating if it can be agreed or if another option should be considered.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Support option 1 as the proponent company.  During Random access, if the UE wrongly calculates the UL transmission power for Msg1/Msg A and the decoding fails at the test equipment, then there is no way for the TE to tell whether there was an UL LBT failure or transmit power issue. This proposal addresses this ambiguity at the TE. |
| Ericsson | Come back to this issue in the next meeting. |
| Nokia | Could it be clarified why the UE would incorrectly calculate the power for PRACH? |

**Issue 1-4-5: Which test cases should include additional delay in acquiring PRACH resource due to UL LBT failures**

As a part of the discussion, please comment on which of the following proposals related to that topic can be agreed:

* Proposal 1 (Qualcomm): RAN4 to define one typical test case to test – Additional delay in acquiring PRACH resource due to UL LBT failures for the following requirements:
  + Handover to target cell using CCA
  + RRC re-establishment using CCA
  + FFS: Random access
  + RRC connection release with re-direction
  + BWP switch delay on consistent UL LBT recovery
* Proposal 2 (Qualcomm): Suggest RAN4 to test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirement:
  + Handover to target cell using CCA
* Proposal 3 (Qualcomm): (Based on proposal 2) Suggest RAN4 to not test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirements:
  + RRC re-establishment using CCA
  + FFS: Random access
  + RRC connection release with re-direction
  + BWP switch delay on consistent UL LBT recovery

Recommended way forward for the first round:

* Discuss if the proposals above can be agreed, and what should be added/removed from the test case list.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Support proposals 1-3 as the proponent company |
| Ericsson | Needs more discussion. In this meeting, we can try to agree on a list of the requirements which depend on UL CCA failures. Then we can decide in the next meeting further details. |

**Issue 1-4-6: Which test cases should include UL LBT failures**

As a part of the discussion, please comment on the following proposal related to test cases to include UL LBT failures:

* Proposal 1 (Qualcomm): 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
* Proposal 2 (Nokia):

|  |  |
| --- | --- |
| Clause with UL LBT failure impact | Comments |
| 6.1B NR Handover | UL LBT failure is considered in the time uncertainty for acquiring the first available PRACH occasion |
| 6.2.1A RRC re-establishment with CCA delay requirement | The number of consecutive SSB to PRACH occasions not available due to UL LBT failure is considered in the delay uncertainty |
| 6.2.3.2.3 RRC connection release with redirection to NR carrier subject to CCA | The number of consecutive SSB to PRACH occasions not available due to UL LBT failure is considered in the delay uncertainty |
| 8.3A.2 SCell Activation and Deactivation in carriers with CCA | UL LBT failures are considered in THARQ. |
| 8.6.4 BWP switch delay on consistent UL LBT recovery | The consistent UL LBT detection / recovery mechanism will trigger the active BWP switch. |
| 8.10A Active TCI state switching delay with CCA | UL LBT failures are considered in THARQ. |
| 9.2A NR Intra-frequency measurements with CCA | UL LBT failures are considered in the reporting delay |
| 9.3A NR Inter-frequency measurements with CCA | UL LBT failures are considered in the reporting delay |

Recommended way forward for the first round:

* Discuss if the proposal can be agreed, and what should be added/removed from the test case list.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Same comment as in 1-4-5 |
| Nokia | It should be made sure that UL LBT is tested at least in one test case for each NR-U scenario (A, B and C). A test case that is common for all can be chosen, or the test case for different scenarios can be different if a benefit is seen for this option. No strong preference which test case(s) this should be. |

**Issue 1-4-7: Consistent UL CCA failures**

Should consistent UL CCA failures be modelled and how?

* Option 1 (Ericsson): Consistent UL CCA failures are modelled by means of a low PCCA\_UL,i (e.g., 0%) during the relevant time interval Ti within the test.

Recommended way forward for the first round:

* Discuss on the option above indicating if it can be agreed. Please consider relation to Issue 1-2-6 when answering here.

Companies’ comments 1st week:

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| **Company** | **Comments** |
| Qualcomm | Agree with modelling consistent UL LBT failure by setting UL LBT success probability equal to 0. Do not agree with the time dependent probability. |
| Ericsson | Support Option 1. UL LBT failures may not be needed in all time intervals of the test and also depends on the step of the UE procedure to be verified (e.g., ACK/NACK or CSI reporting?) |
| Nokia | Ok to model consistent UL CCA failures. In which test cases would consistent UL CCA failures need to be verified? |

### 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.*

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| **CR/TP number** | **Comments collection** |
| [**R4-2101431**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101431.zip)  Ericsson  draftCR | **Draft CR: RMC for NR-U test cases** |
| Ericsson: we can revise to account for the agreements and the discussion. |
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| [**R4-2102528**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102528.zip)  Ericsson  draftCR | **CCA model in NR-U test cases** |
| Ericsson: we can revise to account for the agreements and the discussion. |
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## 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.*

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|  | **Status summary** |
| **Sub-topic 1-1: General configuration of the RRM tests** | *Agreements from GTW session (26th Jan 2021):*  *Issue 1-1-3: SCS for data and SSB*  Configure the same SCS for data and SSB.  *Issue 1-1-4: Cell configuration SCS and channel bandwidth on carrier frequency with CCA*  RAN4 define NR-U RRM test cases with SCS=30kHz for both SSB and data transmission and 40 MHz bandwidth.  *Other issues:*  **Issue 1-1-1: Channel occupancy parameters**  One company disagreed with the proposal, another asked for clarification, and another agreed.  *Candidate options:*  Considering that only one company agreed with the proposals in the issue, consider the following options:   * Option 1: Agree with one of the following options   + Proposal 1: In each test case, the following parameters shall be present in the tables:     - network indication of the channel occupancy in SIB1,     - UE capability for the channel access mode indicative of that the UE supports the network-indicated channel occupancy.   + Proposal 2: The configuration of the CCA model (e.g., parameter PCCA,i) in the test shall match the network-indicated channel occupancy in time interval Ti. during which the requirement is tested. * Option 2: Network indication of the channel occupancy configuration in the test is FFS   *Recommendations for 2nd round:*  Discuss your preferences for Option 1 or Option 2, and clarify Proposals 1 and 2.  **Issue 1-1-2: Applicability of NR FDD test configurations**  Most companies agreed with Option 1. One company questioned if we should directly discuss the configurations, which are covered on Issue 1-1-5.  *Tentative agreements:*  NR FDD test configurations do not apply to the configuration of NR-U cells, but may apply to the configuration of NR cells in NR-U test cases.  *Recommendations for 2nd round:*  The tentative agreement is agreeable.  **Issue 1-1-5: E-UTRA, NR and NR-U configurations**  Most companies agreed with the configurations, either stating that Rel-15 configurations should be used, or directly referring to the configuration of cells without CCA.  *Tentative agreements:*  Configuration for cells without CCA in NR-U test cases:   * NR cells without CCA:   + NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode   + NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode   + NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode * LTE cells without CCA:   + LTE FDD   + LTE TDD   *Recommendations for 2nd round:*  The tentative agreement is agreeable.  **Issue 1-1-6: PRACH test configuration**  3 companies answered to the issue, out of the 6 companies answering the email thread. Since no objection nor concern was raised on that topic, may we agree on that issue?  *Tentative agreements:*  For handover and RRC re-establishment cases, RAN4 to assume PRACH configuration 1 and 2 as baseline for NR-U tests, as specified in Annex A.3.8.2 in TS 38.133.  For the random access test case: RAN4 to discuss the PRACH configuration after the core requirements are defined.  RAN4 to discuss defining a new test configuration with the new PRACH sequences introduced in NR Rel-16.  *Recommendations for 2nd round:*  The tentative agreement is agreeable.  **Issue 1-1-7: DRS transmission window duration**  Most companies agreed with 1 ms window. One company agreed with 1 ms and pointed out that more SSBs in one transmit window might be needed in some test cases. Due to the questioning and open issues on the value of Q, this would be better discussed jointly with Issue 1-1-15 for a technically correct choice.  *Recommendations for 2nd round:*  Merge this discussion on Discuss Q and DRS window jointly on Issue 1-1-15.  **Issue 1-1-8: SSB test configuration**  It was identified that Proposal 2 is not valid due to agreement on SCS. For proposal 3 it was questioned about the number of symbols containing SSB which may depend on Q, and that the number of candidate positions is not clear in the previous proposal.  *Candidate options:*  In order to address other companies comments, please consider the following option where some values are left FFS and can be included once decision in Issue 1-1-15 is reached   * Option 1 (new): RAN4 to define the following SSB configuration to be used in the 30 kHz NR-U test cases  |  |  | | --- | --- | | SSB Parameters | Values | | Channel bandwidth | 40 MHz | | SSB SCS | 30 kHz | | SSB periodicity (TSSB) | 20 ms | | **Number of SSB indexes per SS-burst ()** | **[FFS]** | | **Number of SSB candidate positions per index** | **2 for LBE**  **1 for FBE** | | DRS transmission window duration | [1] ms | | Highest SS/PBCH block index | [FFS: – 1 ] | | Symbol numbers containing SSB Note 2 | [FFS depending on and transmission window] Note 2 | | Slot numbers containing SSB Note 3 | [FFS depending on and transmission window] | | SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | | RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | | Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: Symbol 2-5 is chosen (1 SSB/slot).  Note 3: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | |     *Recommendations for 2nd round:*  Can we agree on Option 1 as a baseline?  **Issue 1-1-9: RMCs for PDSCH**  In the discussion, it was identified that Proposal 1 was not relevant due to GTW decision on Issue 1-1-4. No objections were raised on the Proposal 2, and further evaluation was requested for Proposal 3.  *Tentative agreements:*  Define new RMC for PDSCH for slots with RMSI under CCA   * SCS=30kHz * Reuse the same configuration as RMC for PDSCH for slots with RMSI (i.e., Type A, 24PRB, MCS4, dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 1, etc.).   *Candidate options:*  Companies requested more time to evaluate the following proposal:  Proposal 3: Define new RMC for PDSCH for slots without RMSI under CCA   * SCS=30kHz * Reusing SR.2.1 TDD (i.e., Type A, 24PRB, MCS4, dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 2, etc.)   *Recommendations for 2nd round:*  Discuss on Proposal 3 and try to reach an agreement.  **Issue 1-1-10: CORESET**  In the discussion, it was identified that Proposal 2 was not relevant due to GTW decision on Issue 1-1-4. No clear support for Proposals 1 and 3, with one company agreeing on Proposal 1 and another on Proposal 3.  *Candidate options:*   * Proposal 1: New RMSI COREST reference channel configurations shall be added for NR-U.   + Option 1: Specific parameters for the channel configuration is FFS   + Option 2: Define new RMC for CORESET for RMSI scheduling under CCA to transmit Type0-PDCCH in the discovery burst.     - SCS=30kHz     - Refers to TS38.213 Table 13-4A Index 4 (i.e., 2 OFDM symbols, RB offset = 0).     - Refers to TS38.213 Table 13-11 Index 0 (i.e., O=0, M=1)   *Recommendations for 2nd round:*  Discuss on the proposal above. Can we agree on Option 2?  **Issue 1-1-11: RMC transmission burst**  2 companies commented positively on the issue and no concerns were brought by other companies.  *Tentative agreements:*  For NR-U RRM tests, RMC is transmitted during the RMC transmission burst:   * The length of the RMC transmission burst in slots is defined as N. The RMC burst transmission format is determined according to the steps below:   1. Select N randomly from a given set of the number of slots S1 = {[1,3,5,8]} with equal probability as the total length of RMC burst transmission format.   2. A uniform random variable from 0 to 1 is generated. If the random variable is less than PCCA\_DL, a burst of N fully occupied slots is transmitted. Otherwise, the RMC transmission burst is muted and the muting duration is the same as the number N of slots for determined burst format. * RMC transmission burst is scheduled outside DBT window. * RAN4 discuss further the number of slots in S1.   *Recommendations for 2nd round:*  The tentative agreement is agreeable.  **Issue 1-1-12: TDD UL/DL configuration**  One company commented on that issue agreeing with the proposal.    *Tentative agreements:*  NR-U RRM tests does not configure tdd-UL-DL-ConfigurationCommon using RRC configuration. DL scheduling is configured by DCI 1\_1 slot by slot.  *Recommendations for 2nd round:*  The tentative agreement is agreeable.  **Issue 1-1-13: Existing configuration to be reused**  Some companies asked for time for double check.  *Recommendations for 2nd round:*  Keep discussion on 2nd round with the same text for the issue.  **Issue 1-1-14: Antenna configurations**  Two companies commented positively on Proposal 1.  *Tentative agreements:*  Define new subclause for antenna configurations with unlicensed bands. For 4Rx UE, apply the same applicability rule as Rel-15 RRM test.  *Recommendations for 2nd round:*  The tentative agreement is agreeable.  **Issue 1-1-15: PBCH DMRS**  Companies commented that Q should be at least 2. As this decision is also influencing other SSB configurations and DRS transmission window, it is important to discuss these parameters together in order to find technically correct parameter configurations.  *Candidate options:*  Taking into account the comments of the 1st round discussion, please consider the following options:   * Option 1: Configure PBCH DMRS sequence index with =1 with 1 SSB per slot and DRS transmission window 1 ms. * Option 2: Configure PBCH DMRS sequence index with =2 with 2 SSBs per slot and DRS transmission window 1 ms. * Option 3: Configure PBCH DMRS sequence index with =2 with 1 SSBs per slot and DRS transmission window 2 ms.   *Recommendations for 2nd round:*  Please consider the options above. For the companies proposing =2 please clarify why =2 is needed. |
| **Sub-topic 1-2: General issues on LBT models** | *Agreements from GTW session (26th Jan 2021):*  Issue 1-2-1: Differentiation between FBE and LBE  If needed, test parameter values for FBE and LBE (e.g., signaling-related) are specified in the same test case (a note to clarify their applicability can be added, if needed).  Issue 1-2-2: General approach for DL LBT/CCA models  DL LBT modelling procedures  Option 1: Probabilistic model. Define a parameter for CCA success probability, PCCA, to model the probability of successful attempt for acquiring the channel and transmitting the necessary signals.  Option 2: Deterministic LBT pattern with a repetitive pattern of n available SSBs for every m SSB occasions  Option 1 approach is used as a baseline approach. Option 2 can be used for selected test cases to guarantee proper UE behavior.  Issue 1-2-3: General approach for defining parameters of LBT models  Probabilistic DL LBT model   * The probability parameter PCCA is not a single fixed value in the model but a variable; the value(s) are configured to a relevant setting in each test. * The specific PCCA values should be defined among cell-specific test parameters in each test case. * The CCA model specifies a discrete set of possible values   + One or more specific values from the set are chosen in each test   + One value can be chosen as a default one and will apply to most of test cases * The set of values   + Option 1: {0%, 25%, 50%, 75%, 100%}   + Other options are not precluded   *Other issues*  Issue 1-2-4: General approach for defining parameters of LBT models  No comments were made on the first round. This issue also overlaps with Issue 1-3-6. So the discussion is better handed in that other issue.  *Recommendations for 2nd round:*  Close the issue and continue discussion as part of Issue 1-3-6.  Issue 1-2-5: DL LBT models parameter variation  Most of the companies presented concerns regarding Option 1, and want to keep parameters fixed during most of the test, while one company argues that it is important to keep a general model that can be adapted to different test cases.  *Candidate options:*  Considering the concerns of many companies, please discuss the following options considering a new Option 3:   * Option 1: One probability value (per transmitter) applies at any time point during a test; one or more probability values can be configured in the entire test, one value PCCA,i per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA=1.0 in T1 and PCCA=0.75 in T2). * Option 2: DL LBT model parameters are kept constant during a test. * Option 3 (new): As a baseline approach, DL LBT model parameters are kept constant during a test. In selected test cases parameters may be changed if necessity is identified as:   + One probability value (per transmitter) applies at any time point during a test; one or more probability values can be configured in the entire test, one value PCCA,i per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA=1.0 in T1 and PCCA=0.75 in T2).   *Recommendations for 2nd round:*  Can we agree on Option 3 as a compromise solution?  Issue 1-2-6: UL LBT models parameter variation  Most of the companies presented concerns regarding Option 1, and want to keep parameters fixed during most of the test. Please evaluate if this proposal is acceptable:  Option 3: As a baseline approach, UL LBT model parameters are kept constant during a test. In selected test cases parameters may be changed if necessity is identified.  Most companies disagreed.  *Candidate options:*  Considering the concerns of many companies, please discuss the following options considering a new Option 3:   * Option 1 (Ericsson): For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i. * Option 2: UL LBT model should be kept constant during a test. * Option 3 (new): As a baseline approach, UL LBT model parameters are kept constant during a test. In selected test cases parameters may be changed if necessity is identified as:   + For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i.   *Recommendations for 2nd round:*  Can we agree on Option 3 as a compromise solution?  Issue 1-2-7: LBT failure probability differences between UL and DL  2 companies agree with Option 1, while the other companies would like more explanation on why and which test cases require different LBT failure probability between UL and DL.  *Candidate options:*  Keep options from first round.  *Recommendations for 2nd round:*  Companies supporting Option 1, could you please elaborate on which test cases require such differentiation and why. |
| **Sub-topic 1-3: DL LBT model during RRM tests** | *Agreements from GTW session (26th Jan 2021):*  **Issue 1-3-1a: DL LBT model for LBE operation**  DL LBT model for LBE and FBE operation:  1) Define a probability equal to P1 for the transmission of the DRS in the first candidate position.  2) In case of LBT failure for transmission in the first candidate position, define a probability equal to P2 for the transmission in the second candidate position for a given SSB index.  Different probabilities can be used for LBE and FBE operation  Note: in case significant issues with this model are identified then the model with independent probabilities for LBT failure can be considered  *Tentative agreements:*  **Issue 1-3-1b: How to model different SSB candidate positions on DL-LBE-Model 2**  During the GTW it was decided a model that already included the different SSB positions, therefore there is no need to discuss this issue further.  *Recommendations for 2nd round:*  This issue can be closed.  **Issue 1-3-2: DL-LBE-Model 1 general idea for the definition of P1 and P2**  Two Companies expressed strong objection in agreeing with the proposal of defining P1 and P2 such that the overall LBT failure rate is reflected to be lower than LTE-LAA.  *Candidate options:*  Should RAN4 define P1 and P2 such that the overall LBT failure rate is reflected to be lower than LTE-LAA   * Option 1: Yes * Option 2: Do not assume that P1 and P2 is defined to reflect a lowed LBT failure rate of NR-U in compariton to LTE-LAA.   *Recommendations for 2nd round:*  Since there were concerns on Option 1, may we agree on Option 2 that is more generic and focus on the parameter values?  **Issue 1-3-3: DL-LBE-Model 1 parameters**  One company asked for further discussion and another questioned how can consecutive unavailable samples be avoided with these model.  *Candidate options:*  Decide for the probability among Options 1 and 2:   * Option 1: P1=0.75, P2=0.5 * Option 2: P1 = P2 = 0.75   New issue to be created about how to handle consecutive unavailable samples.  *Recommendations for 2nd round:*  Discuss the options above in combination with new issues 1-3-12 and 1-3-13.  **Issue 1-3-5: DL LBT model for FBE operation**  Many companies agreed with Option 1 and others referred to the agreement in the GTW. One company brought the concerns about consecutive unavailable samples, which is to be threated in Issues 1-3-12 and 1-3-13.  *Recommendations for 2nd round:*  Given that the GTW agreement included FBE and LBE operation, there is no need for further agreements and discussions on this issue.  **Issue 1-3-6: DL-FBE-Model 1 general idea for the definition of the SSB transmission probability**  One company agreed and another disagree bringing another proposal that was previously included as part of Issue 1-2-4.  *Candidate options:*  How should the LTE model probabilities differ amond LBE and FBE configurations?   * Option 1: define a SSB transmission probability in FBE to be higher than SSB transmission probability in LBE: P(FBE) > P(LBE) = P1 + (1-P1)\*P2 * Option 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:   + 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.   *Recommendations for 2nd round:*  The proponent of Option 2, please explain how this option differs from Option 1. Other companies please state your preferences.  **Issue 1-3-7: DL-FBE-Model 1 SSB transmission probability**  Opinions on that issue were diverging and no agreement can be made on the probability parameter. One company pointed out the GTW agreement pointed to Option 3, however the GTW agreement included that we define a default value to be used in most test cases.  *Candidate options:*  Given that in the GTW session we agreed that “One (probability) value can be chosen as a default one and will apply to most of test cases”, to define default values for the LBT probabilities among the options:   * Option 1: Define P(FBE) = 0.95 * Option 2: P(FBE) = 0.9   *Recommendations for 2nd round:*  Discuss the options above.  **Issue 1-3-9: DL LBT model when DRX is in use**  One company wants more time for this issue, so no decision can be made yet.  *Candidate options:*  Same as the ones in the 1st round discussion.  *Recommendations for 2nd round:*  Keep discussion using the same text as in the 1st round discussion.  **Issue 1-3-10: General approach in exceeding Lmax values during RRM tests**  Most companies agreed with option 2, and discussion was raised about how to avoid that Lmax is exceeded.    *Tentative agreements:*  For the test cases where no particular behaviour to be verified, exceeding Lmax shall be avoided.  *Candidate options:*  Consider the following candidate option regarding that agreement:   * Proposal 1: Add a note in the TC description (e.g., under tested requirement part, together with the sentence on 90%) that a test realization where Lmax is exceeded shall not be considered in the statistics.   *Recommendations for 2nd round:*  Discuss if the note in Proposal 1 can be added to the agreement.  **Issue 1-3-11: List of test cases in which exceeding Lmax values may be considered**  All companies commenting on the issue agreed with proposals 1 to 4.  *Tentative agreements:*   * Consider having particular test cases to verify the correct UE behaviour for the following cases:   + Initiating the measurements on neighbour upon exceeding Mp and Mq in Cell reselection   + Initiate cell selection procedures for the selected PLMN upon L1 exceeding L1,max in RRC release with redirection   + Report RSRP\_0 upon L1 exceeding L1,max for L1-RSRP measurement * For SCell activation in NR-U, exceeding Lmax should be avoided. * For SFTD measurement NR-U, exceeding Lmax should be avoided. * For intra-frequency and inter- frequency measurement for NR-U, exceeding LPSS/SSS,gaps,max should be avoided..   *Recommendations for 2nd round:*  The tentative agreement is agreeable.  *New issues created for the second round discussion:*  **Issue 1-3-12 (new) Should consecutive unavailable samples be avoided as a part of the LBT model?**  *Candidate options:*   * Option 1: Yes * Option 2: No * Option 3: No as a baseline, and yes only for specific test cases   *Recommendations for 2nd round:*  Discuss the options above.  **Issue 1-3-13 (new) H**ow to handle consecutive unavailable samples  *Candidate options:*   * Option 1: LBT model is a random process that doesn’t allow for more than a configured number of unavailable NUNAV   + NUNAV is FFS * Option 2: Other options   *Recommendations for 2nd round:*  Discuss the options above considering the possible outcome of issue 1-3-12. |
| **Sub-topic 1-4: UL LBT model during RRM tests** | **Issue 1-4-1: Need for an UL LBT model**  All companies agree that UL LBT model is necessary, but not on every test case.  *Tentative agreements:*  UL CCA model is needed for NR  UL CCA model is not necessary in every test case, but where the requirement depends on UL CCA failures.  *Recommendations for 2nd round:*  The tentative agreement is agreeable.  Further discussion on test cases to apply UL LBT on issues 1-4-5 and 1-4-6  **Issue 1-4-2: UL LBT model configuration**  Most companies support Option 1, and 1 company support Option 2. One company highlighted that Option 2 is more related to Issue 1-4-3, and is included as an iption there as well.  *Candidate options:*  Given that Option 2 is covered in Issue 1-4-3, please consider if we can agree on Option 1:   * Option 1: If RAN4 agrees to test UL LBT in the RRM tests, an UL LBT type configuration needs to be defined.   *Recommendations for 2nd round:*  Discuss option 2 as part of Issue 1-4-3 and evaluate if we can agree on Option 1.  **Issue 1-4-3: UL LBT model**  Some companies presented contradicting preferences but no strong opposition against any proposal. One comment was made suggesting to include consistent LBT failures in Option 1. Please consider for the 2nd round the modified Option 1 in the candidate options bellow:  *Candidate options:*  Given the comments from the proponents in the first round, consider the following options:   * Option 1 (new part in bold text): baseline UL LBT model as:   + Use DL FBE model to transmit a full band/LBT BW OCNG noise pattern 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 LBT 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 LBT success probability*.*** * Option 2: basic principles:   + For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i.   + 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].   + Consistent UL CCA failures are modelled by means of a low PCCA\_UL,i (e.g., 0%) during the relevant time interval Ti within the test.   + In the same time interval i, PCCA\_UL,I and PCCA\_DL,i can have different values.   *Recommendations for 2nd round:*  Discuss the options above.  **Issue 1-4-4: PRACH configuration in test-cases subject to UL LBT**  Some companies were confused with the proposal and would like to have further explanation on the issue.  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Keep text for the issue as in the 1st round discussion.  **Issue 1-4-5: Which test cases should include additional delay in acquiring PRACH resource due to UL LBT failures**  One company asked for more time for the discussion.  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Keep text for the issue as in the 1st round discussion.  **Issue 1-4-6: Which test cases should include UL LBT failures**  One company asked for more time for the discussion.  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Keep text for the issue as in the 1st round discussion.  **Issue 1-4-7: Consistent UL CCA failures**  Discussion didn’t converge on the Option 1. One company questioned the need for tiem dependent probability.  *Tentative agreements:*  Consistent UL CCA failures are modelled by means of a low PCCA\_UL (e.g., 0%).  FFS: List of test cases that need to model consistent UL CCA failures  *Recommendations for 2nd round:*  Please discuss a list of test cases that need to model consistent UL CCA failure. |

*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on LBT models for NR-U RRM performance requirements | Qualcomm |
| #2 | WF on general test configurations for NR-U RRM performance requirements | Nokia |

### CRs/TPs

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| [**R4-2101431**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101431.zip) | *to be revised* |
| [**R4-2102528**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102528.zip) | *to be revised* |

## Discussion on 2nd round (if applicable)

Please continue discussion in open issues summary, after the 2nd week/round delimiter.  
Please also continue the TP/CR discussions above.

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

**Issue 1-1-1: Channel occupancy parameters**

The following proposals were made concerning channel occupancy parameters:

* Option 1:
  + In each test case, the following parameters shall be present in the tables:
    - network indication of the channel occupancy in SIB1,
    - UE capability for the channel access mode indicative of that the UE supports the network-indicated channel occupancy.
  + The configuration of the CCA model (e.g., parameter PCCA,i) in the test shall match the network-indicated channel occupancy in time interval Ti. during which the requirement is tested.
* Option 2: Network indication of the channel occupancy configuration in the test is FFS

Recommended way forward for the second round:

* Please state your preferences.

Companies’ comments 2nd week:

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| **Company** | **Comments** |
| Qualcomm | Need more information. Prefer Option 2. |
| Ericsson | Proposals 1 and 2 are not mutually exclusive. We can further discuss this issue in the next meeting. |
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**Issue 1-1-8: SSB test configuration**

In order to address other companies comments, please consider the following option where some values are left FFS and can be included once decision in Issue 1-1-15 is reached

* Option 1 (new): RAN4 to define the following SSB configuration to be used in the 30 kHz NR-U test cases

|  |  |
| --- | --- |
| SSB Parameters | Values |
| Channel bandwidth | 40 MHz |
| SSB SCS | 30 kHz |
| SSB periodicity (TSSB) | 20 ms |
| **Number of SSB indexes per SS-burst ()** | **[FFS]** |
| **Number of SSB candidate positions per index** | **2 Note 4**  **1 Note 5** |
| DRS transmission window duration | [1] ms |
| Highest SS/PBCH block index | [FFS: – 1 ] |
| Symbol numbers containing SSB Note 2 | [FFS depending on and transmission window] Note 2 |
| Slot numbers containing SSB Note 3 | [FFS depending on and transmission window] |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 |
| RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 |
| NOTE 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  NOTE 2: Symbol 2-5 is chosen (1 SSB/slot).  NOTE 3: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves.  NOTE 4: Applies for dynamic channel access mode.  NOTE 5: Applies for semi-static channel access mode. | |

Recommended way forward for the 2nd round:

* Can we agree on Option 1 as a baseline?

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We agree with Option 1.  It makes the distinction between Q and the number of SSB candidate positions clear, which were ambiguous in the previous proposals.  We can adjust the FFS values if we reach agreement on the other issues afterwards. |
| Huawei | We are fine to take option 1 as the baseline for discussion. But the table in option1 is not mature to be captured in the spec. As for we may have different tables for different SSB configurations (e.g. 1 SSB index or 2 indexes) |
| Qualcomm | We are fine with Option 1. |
| Nokia (moderator) | Considering that we could agree on Options 1 and 2 from Issue 1-1-15: PBCH DMRS, can we agree on the revised tables as:   * SSB configuration table: * RAN4 to define the following SSB configuration to be used in the 30 kHz NR-U test cases for = 1  |  |  | | --- | --- | | SSB Parameters | Values | | Channel bandwidth | 40 MHz | | SSB SCS | 30 kHz | | SSB periodicity (TSSB) | 20 ms | | Number of SSB indexes per SS-burst () | 1 | | Number of SSB candidate positions per index | 2 for LBE  1 for FBE | | DRS transmission window duration | 1 ms | | Highest SS/PBCH block index | 0 | | Symbol numbers containing SSB Note 2 | 2-5 Note 2 | | Slot numbers containing SSB Note 3 | 0 and 1 | | SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | | RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | | Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: Symbols 2-5 are chosen (1 SSB/slot).  Note 3: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | |  * RAN4 to define the following SSB configuration to be used in the 30 kHz NR-U test cases for = 2  |  |  | | --- | --- | | SSB Parameters | Values | | Channel bandwidth | 40 MHz | | SSB SCS | 30 kHz | | SSB periodicity (TSSB) | 20 ms | | Number of SSB indexes per SS-burst () | 2 | | Number of SSB candidate positions per index | 2 for LBE  1 for FBE | | DRS transmission window duration | 1 ms | | Highest SS/PBCH block index | 1 | | Symbol numbers containing SSB Note 2 | 2-5 and 8-11 Note 2 | | Slot numbers containing SSB Note 3 | 0 and 1 | | SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | | RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | | Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: Symbols 2-5 and 8-11 are chosen (2 SSB/slot).  Note 3: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | | |
| Ericsson | There are no terms “FBE” or “LBE”, so these should not be used. We have dynamic and semi-static channel access only.  To avoid confusion, we propose to define 4 SSB configurations:   * SSB pattern 1 under CCA for semi-static channel access (Q=1) * SSB pattern 2 under CCA for dynamic channel access (Q=1) * SSB pattern 3 under CCA for semi-static channel access (Q=2) * SSB pattern 4 under CCA for dynamic channel access (Q=2)   Please refer to the exact table in our draft CR R4-2103521. |

**Issue 1-1-9: RMCs for PDSCH**

During the first round, companies requested more time to evaluate the following proposal:

* Proposal 1: Define new RMC for PDSCH for slots without RMSI under CCA
  + SCS=30kHz
  + Reusing SR.2.1 TDD (i.e., Type A, 24PRB, MCS4, dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 2, etc.)

Recommended way forward for the 2nd round:

* Discuss the proposal and decide if it can be agreed.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia (moderator) | Considering that no further comments were made so far, can we agree on Proposal 1?   * Define new RMC for PDSCH for slots without RMSI under CCA   + SCS=30kHz   + Reusing SR.2.1 TDD (i.e., Type A, 24PRB, MCS4, dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 2, etc.) |
| Ericsson | We support Proposal 1. |
|  |  |
|  |  |

**Issue 1-1-10: CORESET**

Considering the RMCs that are not for PDSCH, consider the following proposals:

* Proposal 1: New RMSI COREST reference channel configurations shall be added for NR-U.
  + Option 1: Specific parameters for the channel configuration is FFS
  + Option 2: Define new RMC for CORESET for RMSI scheduling under CCA to transmit Type0-PDCCH in the discovery burst.
    - SCS=30kHz
    - Refers to TS38.213 Table 13-4A Index 4 (i.e., 2 OFDM symbols, RB offset = 0).
    - Refers to TS38.213 Table 13-11 Index 0 (i.e., O=0, M=1)

Proposed way forward for the 2nd round:

* Discuss on the proposal above. Can we agree on Proposal 1 with Option 2?

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | Generally fine with the points in option 2, but prefer to FFS all specific parameters. |
| Nokia (moderator) | Considering Huawei’s request to leave it open, can we agree on that part:   * New RMSI COREST reference channel configurations shall be added for NR-U.   + Specific parameters for the channel configuration is FFS   And we leave Option 2 as a candidate option for next meeting:   * Option 1: Define new RMC for CORESET for RMSI scheduling under CCA to transmit Type0-PDCCH in the discovery burst.   + SCS=30kHz   + Refers to TS38.213 Table 13-4A Index 4 (i.e., 2 OFDM symbols, RB offset = 0).   + Refers to TS38.213 Table 13-11 Index 0 (i.e., O=0, M=1) |
| Ericsson | We support option 1. We suggest to agree with the new RMC for CORESET for RMC (i.e., CR 1.1 CCA in R4-2103521), where we the following values in []:   * SCS/PRB: [30]kHz, [48]PRB * Configuration of PDCCH monitoring occasions for RMSI CORESET: [Index 0] * Note 7: [index 4 in Table 13-4A] in TS 38.213 [3]. |
|  |  |

**Issue 1-1-13: Existing configuration to be reused**

Considering the existing configuration from NR tests that might be reused, consider the following proposals:

* Proposal 1: Reuse the existing OCNG patterns in A.3.2.1 for NR-U RRM tests..
* Proposal 2: Reuse the existing TCI state configuration in A.3.16.2 for NR-U RRM tests.
* Proposal 3: Reuse the existing CSI-RS configurations in A.3.13.2 and A.3.17.1.2 for NR-U RRM tests. If necessary RAN4 define new CSI-RS configuration e.g. transmitted inside DBT window.

Recommended way forward for the 2nd round:

* Discuss on the proposals above indicating which ones can be agreed considering that the proposals are not mutually exclusive.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Need more time to consider the proposals. For proposal 1, we may need additional OCNG patterns to configure UL LBT failures. |
| Ericsson | We support proposals 1, 2, and 3. But we can define new RMC if necessary. |
|  |  |

**Issue 1-1-15: PBCH DMRS**

Taking into account the comments of the 1st round discussion, please consider the following options:

* Option 1: Configure PBCH DMRS sequence index with =1 with 1 SSB per slot and DRS transmission window 1 ms.
* Option 2: Configure PBCH DMRS sequence index with =2 with 2 SSBs per slot and DRS transmission window 1 ms.
* Option 3: Configure PBCH DMRS sequence index with =2 with 1 SSBs per slot and DRS transmission window 2 ms.

Recommended way forward for the 2nd round:

* Please consider the options above. For the companies proposing =2 please clarify why =2 is needed.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We prefer Option 1.  We don’t think =2 is needed. We believe =1 is a much more typical case for the 5GHz band, and for the small-cells which we think would be more common for NR-U.  That also simplifies the configuration a 1ms DRS transmission window can be used for 30 kHz SCS. |
| Huawei | Fine with option 1 and option 2. Some questions to Nokia: Q =1 means all the candidate SSBs are QCL, then how to handle the test cases when 2 SSB index are needed? |
| Nokia (Moderator) | Considering Huawei’s comment, can we agree that Q=1 and Q=2 are both needed and agree with:   * Number of SSB indexes per SS-burst :   + Configure PBCH DMRS sequence index with = 1 with 1 SSB per slot and DRS transmission window 1 ms.   + Configure PBCH DMRS sequence index with = 2 with 2 SSBs per slot and DRS transmission window 1 ms. |
| Ericsson | We are fine with moderators suggestion. |

### Sub-topic 1-2: General issues on LBT models

**Issue 1-2-5: DL LBT models parameter variation**

Should the parameters of DL LBT models be allowed to vary during a test?

Considering the concerns of many companies, please discuss the following options considering a new Option 3:

* Option 1: One probability value (per transmitter) applies at any time point during a test; one or more probability values can be configured in the entire test, one value PCCA,i per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA=1.0 in T1 and PCCA=0.75 in T2).
* Option 2: DL LBT model parameters are kept constant during a test.
* Option 3 (new): As a baseline approach, DL LBT model parameters are kept constant during a test. In selected test cases parameters may be changed if necessity is identified as:
  + One probability value (per transmitter) applies at any time point during a test; one or more probability values can be configured in the entire test, one value PCCA,i per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA=1.0 in T1 and PCCA=0.75 in T2).
* Option 4: One probability value (per TRP) PCCA\_DL applies at any time point during a test;
  + At least one probability value is configured per test
  + FFS: more than one probability values can be configured in the entire test, one value PCCA\_DL per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA\_DL=1.0 in T1 and PCCA\_DL=0.75 in T2).

Recommended way forward for the 2nd round:

* Can we agree on Option 3 as a compromise solution?

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We support Option 3.  We prefer to keep as a baseline constant LBT parameters for most of the test cases. We don’t mind keeping the option open to discuss the necessity of variation of LBT parameters during specific tests whenever good technical reasons are provided to justify that. |
| Qualcomm | We are fine with Option 3. As Nokia pointed out, a good technical reason must be provided to justify using different LBT parameters during different test time. |
| Nokia (Moderator) | Since the companies commenting on that issue were fine with the compromising text of Option 3, can we agree with that as:   * As a baseline approach, DL LBT model parameters are kept constant during a test. In selected test cases parameters may be changed if necessity is identified as:   + One probability value (per transmitter) applies at any time point during a test; one or more probability values can be configured in the entire test, one value PCCA,i per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA=1.0 in T1 and PCCA=0.75 in T2). |
| Ericsson | We prefer option 4 |
|  |  |

**Issue 1-2-6: UL LBT models parameter variation**

Should the parameters of UL LBT models be allowed to vary during a test?

Considering the concerns of many companies, please discuss the following options considering a new Option 3:

* Option 1: For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i.
* Option 2: UL LBT model should be kept constant during a test.
* Option 3 (new): As a baseline approach, UL LBT model parameters are kept constant during a test. In selected test cases parameters may be changed if necessity is identified as:
  + For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i.
* Option 4: One probability value for PCCA\_UL applies at any time point during a test;
  + At least one probability value is configured per test
  + FFS: more than one probability values can be configured in the entire test, one value PCCA\_UL per time interval Ti where i≥1 and the multiple time intervals (when i>1) do not overlap (e.g., PCCA\_UL=1.0 in T1 and PCCA\_UL=0.75 in T2).

Recommended way forward for the 2nd round:

* Can we agree on Option 3 as a compromise solution?

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We support Option 3.  We prefer to keep as a baseline constant LBT parameters for most of the test cases. We don’t mind keeping the option open to discuss the necessity of variation of LBT parameters during specific tests whenever good technical reasons are provided to justify that. |
| Qualcomm | We are fine with Option 3. A good technical reason must be provided to justify using different LBT parameters during different test time. |
| Nokia (Moderator) | Since the companies commenting ont hat issue agree with Option 3 can we agree on that?   * As a baseline approach, UL LBT model parameters are kept constant during a test. In selected test cases parameters may be changed if necessity is identified as:   + For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i. |
| Ericsson | Prefer option 4 |

**Issue 1-2-7: LBT failure probability differences between UL and DL**

Should the probability of LBT failure for UL and DL be allowed to differ for a test or time instant within a test?

* Option 1: Yes
* Option 2: No

Recommended way forward for the 2nd round:

* Companies supporting Option 1, could you please elaborate on which test cases require such differentiation and why.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | It is ok to leave the option for differing UL and DL LBT probabilities open in case it is needed in some cases. So saying this, we support another option  Option 3 (new): DL and UL LBT probabilities are the same as a baseline. In selected test cases they can differ if it is identified that it is needed.  In the case that consistent UL LBT failures are modeled, it might be interesting to keep the probabilities different.  In that particular case of consistent UL LBT failures, it is beneficial to isolate the effect of losing SSBs and losing opportunities to transmit UL signals. If the probability is kept the same, the effect of losing SSBs for measuring could trigger other effects before the ones we would like to observe in consistent UL LBT failures. |
| Huawei | We are fine to consider the LBT failure probability for DL and UL separately. |
| Qualcomm | Support option 1.  The channel occupancy conditions may be very different at the gNB and the UE. In addition, since NR-U is a TDD system, either UL or DL transmission may happen during a time instant, hence the channel occupancy conditions may vary in time as well. Furthermore, in some cases, we may want to test only DL LBT failures, or only UL LBT failures or consistent UL LBT failures. These are different test cases and demand different probability values on UL and DL. |
| Nokia (Moderator) | Since the companies commenting on that issue support Option 1, can we agree on that text for this issue:  The probability of LBT failure for UL and DL is allowed to differ for a test or time instant within a test. |
| Ericsson | Obviously, we need separate probabilities for DL and UL, e.g., if we need to verify the measurement period but not the reporting delay. |

### Sub-topic 1-3: DL LBT model during RRM tests

**Issue 1-3-2: DL-LBE-Model 1 general idea for the definition of P1 and P2**

Should RAN4 define P1 and P2 such that the overall LBT failure rate is reflected to be lower than LTE-LAA

* Option 1: Yes
* Option 2: Do not assume that P1 and P2 is defined to reflect a lower LBT failure rate of NR-U in comparison to LTE-LAA.
* Option 3: The model is generic. The probability configuration in the tests (but not in the model) may be different for dynamic and semi-static channel access modes, if there is a need for two tests and the signal conditions are low in the test, otherwise they can be the same.

Recommended way forward for the 2nd round:

* Since there were concerns on Option 1, may we agree on Option 2 that is more generic and focus on the parameter values?

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We prefer Option 2  We don’t think that it is needed to discuss how the final LBT probabilities will be in comparison to LTE-LAA tests. We should focus on the technical aspects that help testing the NR-U functionalities. If that ends up happening it is fine, we would only not like to limit our options for discussion of P1 and P2. |
| Qualcomm | We are okay to compromise to Option 2. |
| Nokia (Moderator) | Since companies are fine compromising to Option 2, may we agree with that as:  Do not assume that P1 and P2 is defined to reflect a lower LBT failure rate of NR-U in comparison to LTE-LAA. |
| Ericsson | We think a generic CCA model should be defined. Then, we could have different parameter settings to reflect LBE and FBE, upon the need.  Prefer option 3. |

**Issue 1-3-3: DL-LBE-Model 1 parameters**

Decide for the probability among Options 1 and 2:

* Option 1: P1=0.75, P2=0.5
* Option 2: P1 = P2 = 0.75

New issue to be created about how to handle consecutive unavailable samples.

Recommended way forward for the 2nd round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We think there is little difference among both options.  We have calculated the final probability each candidate position in each case, and there is a 6% difference on the use of 2nd candidate position or use of no position with LBT failure. We don’t think that this will make a big impact on the capacity of the test to verify NRU functionality.   |  |  |  | | --- | --- | --- | |  | P1=75% , P2=50% | P1=75% , P2=75% | | 1st candidate | 75% | 75% | | 2nd candidate | 12.5% | 18.75% | | LBT failure | 12.5% | 6.25% | |
| Qualcomm | Support Option 1  As analyzed in our paper (R4-2102921), P1=0.75 and P2=0.5 appears to be a better candidate.   |  |  |  |  | | --- | --- | --- | --- | | P1 | P2 | P = P1+(1-P1)\*P2 | Comment | | 0.75 | 0.75 | 0.9375 | 1) Increased test time  2) P2=P1 may not be the right assumption | | 0.75 | 0.5 | 0.875 | 1) Not a significant increase in test time  2) P2<P1 and P2=0.5 may be close to reality | |
| MediaTek | Prefer to Option 2 as the baseline. And unclear why P is time-varying within DRS window (i.e. suddenly changes in few ms). |
| Ericsson | These details need more discussion, depend also on specific tests. Postpone to the next meeting. |
|  |  |

**Issue 1-3-6: DL-FBE-Model 1 general idea for the definition of the SSB transmission probability**

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

* Option 1: define a SSB transmission probability in FBE to be higher than SSB transmission probability in LBE: P(FBE) > P(LBE) = P1 + (1-P1)\*P2
* Option 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:
  + 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.
* Option 4: The model is generic. The probability configuration in the tests (but not in the model) may be different for dynamic and semi-static channel access modes, if there is a need for two tests and the signal conditions are low in the test, otherwise they can be the same.

Recommended way forward for the 2nd round:

* The proponent of Option 2, please explain how this option differs from Option 1. Other companies please state your preferences.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We prefer Option 3. We would prefer to focus on the values, not to restrict how to choose them in relation to each other.  With Option 2, we have defined in the GTW agreement that we would use P1 and P2 for modeling LBT in LBE mode. So it is not agreeable as it is. |
| Qualcomm | Support option 1.  For clarification we can modify Option 1 as :   * Option 1: Define the **default** SSB transmission probability in FBE to be higher than **default** SSB transmission probability in LBE: P(FBE) > P(LBE) = P1 + (1-P1)\*P2   Since the typical channel occupancy conditions are very much different in FBE and LBE – operators would deploy FBE only when it can be ensured that there is no interference from external neighbors (e.g. Wifi), it makes perfect sense to define P(FBE) > P(LBE) as the default values. As discussed in LBE, different probability values(e.g. P(FBE) = 0% or 100%) may be used to test a few particular scenarios. |
| Ericsson | We think a generic CCA model should be defined. Then, we could have different parameter settings to reflect LBE and FBE, upon the need.  Prefer option 4. |
|  |  |

**Issue 1-3-7: DL-FBE-Model 1 SSB transmission probability**

Given that in the GTW session we agreed that “One (probability) value can be chosen as a default one and will apply to most of test cases”, to define default values for the LBT probabilities among the options:

* Option 1: Define P(FBE) = 0.95
* Option 2: P(FBE) = 0.9

Recommended way forward for the 2nd round:

* Discuss on the options above indicating which one can be agreed.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We prefer option 2, P(FBR)=0.9.  We think it is true that option 1 reflects many typical use cases of FBE in controlled environments.  Our concern with Option 1 is that with P(FBE)=0.95 only 1 SSBs out of 20 will be lost. So it will be very hard to get into the situations that we want to test. |
| Qualcomm | Prefer Option 1. Our comments on Issue 1-3-3 and 1-3-6 supports our stand for this option.  @Nokia proposed P1=P2=0.75 for LBE, giving P(LBE) = 0.935. With that, the concern with Option 1 here is not justified. |
| Ericsson | These details need more discussion, depend also on specific tests. Postpone to the next meeting. |

**Issue 1-3-9: DL LBT model when DRX is in use**

Considering the following options for DL LBT model when DRX is in use:

* Option 1: For test cases with DRX in use, the LBT can be modelled as either all SMTCs are with available SSBs or all SMTCs are with no SSBs available during one DRX cycle.
* Other options?

Recommended way forward for the 2nd round:

* Discuss on the option above indicating if it can be agreed or if another option should be considered.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We would prefer to concentrate on non-DRX in this meeting and continue discussion about DRX later. |
| Huawei | We are fine with option 1. |
| Qualcomm | Need more time on this. Agree with Nokia that we can focus on non-DRX in this meeting. |
| MediaTek | Support Option 1 but fine to focus on non-DRX this meeting. |
| Ericsson | Let’s focus on non-DRX can in this meeting. For DRX, we can further discuss. Generally, we do not think that CCA model should depend on DRX. |

**Issue 1-3-10: General approach in exceeding Lmax values during RRM tests**

Considering the agreement on the 1st round

For the test cases where no particular behaviour to be verified, exceeding Lmax shall be avoided.

Consider the extension of that agreement with Proposal 1:

* Proposal 1: Add a note in the TC description (e.g., under tested requirement part, together with the sentence on 90%) that a test realization where Lmax is exceeded shall not be considered in the statistics.

Recommended way forward for the 2nd round:

* Can we agree on Proposal 1?

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We would like to leave the details of exceeding Lmax FFS in this meeting and consider more carefully in the next meeting what would be an efficient way to do this. |
| Huawei | We believe the note in proposal 1 is needed using the probability model. We also agree with Nokia’s comments that the details should be FFS. We have another concern that exceeding Lmax could happened in any point during the test duration, so can TE do the traversal to tell whether the test is counted or not? |
| Qualcomm | We cannot agree with Proposal 1 as of now. Need careful consideration before putting any statements of this sort. |
| Ericsson | We can have this proposal as FFS in the WF, and further discuss in the next meeting. |
|  |  |

**Issue 1-3-12: (new) Should consecutive unavailable samples be avoided as a part of the LBT model?**

Candidate options:

* Option 1: Yes
* Option 2: No
* Option 3: No as a baseline, and yes only for specific test cases

Recommended way forward:

* Discuss the options above.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We would like to leave these details FFS in this meeting and concentrate on the basic principles of the LBT model. We can then consider more carefully in the next meeting what would be an efficient way to do this. |
| Ericsson | Do not agree in general, e.g., we need a possibility to mode consistent CCA failures in some test cases. |
|  |  |
|  |  |
|  |  |

**Issue 1-3-13 (new) How to handle consecutive unavailable samples**

Candidate options:

* Option 1: LBT model is a random process that doesn’t allow for more than a configured number of unavailable NUNAV
  + NUNAV is FFS
* Option 2: Other options

Recommended way forward:

* Discuss the options above considering the possible outcome of issue 1-3-12.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We would like to leave these details FFS in this meeting and concentrate on the basic principles of the LBT model. We can then consider more carefully in the next meeting what would be an efficient way to do this. |
| Ericsson | This is not needed. |
|  |  |
|  |  |
|  |  |

### Sub-topic 1-4: UL LBT model during RRM tests

**Issue 1-4-2: UL LBT model configuration**

About the LBT model configuration, please consider the following option:

* Option 1: If RAN4 agrees to test UL LBT in the RRM tests, an UL LBT type configuration needs to be defined.

Recommended way forward:

* Please consider if we can agree with Option 1.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We agree with Option 1.  Details on the UL LBT configuration can be discussed in the next issues. |
| Qualcomm | Do we actually need to consider this as an issue since the group is already discussing an UL LBT model? |
| MediaTek | Fine with Option 1. |
| Ericsson | We agree on:   * RAN4 needs to define UL CCA model. |

**Issue 1-4-3: UL LBT model**

The following models is proposed as an option for the UL LBT model (with revised options in comparison to the 1st round discussion):

* Option 1a: baseline UL LBT model as:
  + Use DL FBE model to transmit a full band/LBT BW OCNG noise pattern 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 LBT 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
* Option 1b (new part in bold text): baseline UL LBT model as:
  + Use DL FBE model to transmit a full band/LBT BW OCNG noise pattern 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 LBT 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 LBT success probability*.***
  + **The test equipment is only required to send noise bursts in the time periods when the UE is expected to be performing LBT (with the agreed probability).**
* Option 2: basic principles:
  + For UL CCA, the modelling approach is based on a probability PCCA\_UL,i of successful access during the corresponding time Ti of the time interval i.
  + 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].
  + Consistent UL CCA failures are modelled by means of a low PCCA\_UL,i (e.g., 0%) during the relevant time interval Ti within the test.
  + In the same time interval i, PCCA\_UL,I and PCCA\_DL,i can have different values.
* Option 3: basic principles:
* Prior to each UL transmission burst in the test:

1. Generate a uniform random variable *p* from the range [0, 1].
2. If p<PCCA\_UL, 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].

* The above steps are repeated for each UL transmission burst in the test.
* FFS The probability can be different in different time intervals Ti during a test case.

Recommended way forward:

* Discuss on the option above indicating if it can be agreed or if another option should be considered.

Companies’ comments 2nd week:

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| **Company** | **Comments** |
| Nokia | We agree with the new text for Option 1b.  We think that option addresses the comments that were made during the 1st round. |
| Qualcomm | We support option 1a.  The two new sentences in bold added in option 1b are already covered in the following in option 1a:   * + Use DL FBE model to transmit a full band/LBT BW OCNG noise pattern in one or more of the scheduled/configured UL resource with probability P.     - P is FFS   For clarification, we may just modify this bullet as follows:   * + Use DL FBE model to transmit a LBT BW OCNG noise pattern in one or more of the scheduled/configured UL resource with probability P.     - P is FFS |
| Ericsson | Prefer Option 3. We can further discuss the details in the next meeting. |

**Issue 1-4-4: PRACH configuration in test-cases subject to UL LBT**

The following option is proposed for the PRACH configuration when using an UL LBT mode:

* Option 1: Test equipment to configure preambleReceivedTargetPower for msg1 and msgA-PreambleReceivedTargetPower for msgA to the highest value for UL LBT test cases.
* Other options

Recommended way forward for the 2nd round:

* Discuss on the option above indicating if it can be agreed or if another option should be considered.
* Clarified why the UE would incorrectly calculate the power for PRACH.

Companies’ comments 2nd week:

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| **Company** | **Comments** |
| Nokia | We need further clarification on why Option 1 is needed. |
| Qualcomm | As discussed in our paper (R4-2102921) and commented in the first round, during Random access, if the UE wrongly calculates the UL transmission power for Msg1/Msg A and the decoding fails at the test equipment, then there is no way for the TE to tell whether there was an UL LBT failure or transmit power issue. This proposal addresses this ambiguity at the TE.  It was questioned why UE would wrongly estimate the UL transmission power, we would like to mention that it’s a known issue during RA and preamble power ramping procedure is used to address the issue (See Clause 5.1.3 of TS 38.321). |
| Ericsson | We need more time to check. If necessary, we can add new RMC. |

**Issue 1-4-5: Which test cases should include additional delay in acquiring PRACH resource due to UL LBT failures**

As a part of the discussion, please comment on which of the following proposals related to that topic can be agreed:

* Proposal 1: 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
  + FFS: Random access
  + RRC connection release with re-direction
  + BWP switch delay on consistent UL LBT recovery
* Proposal 2: Suggest RAN4 to test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirement:
  + Handover to target cell using CCA
* Proposal 3: (Based on proposal 2) Suggest RAN4 to not test – Additional delay in acquiring PRACH resource due to UL LBT failures in the following requirements:
  + RRC re-establishment using CCA
  + FFS: Random access
  + RRC connection release with re-direction
  + BWP switch delay on consistent UL LBT recovery

Recommended way forward for the 2nd round:

* Discuss if the proposals above can be agreed, and what should be added/removed from the test case list.

Companies’ comments 2nd week:

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| **Company** | **Comments** |
| Nokia | We think this issue needs further verification for the next meeting. |
| Qualcomm | Support proposals 1-3 |
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**Issue 1-4-6: Which test cases should include UL LBT failures**

As a part of the discussion, please comment on the following proposal related to test cases to include UL LBT failures:

* Proposal 1: 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
* Proposal 2:

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| Clause with UL LBT failure impact | Comments |
| 6.1B NR Handover | UL LBT failure is considered in the time uncertainty for acquiring the first available PRACH occasion |
| 6.2.1A RRC re-establishment with CCA delay requirement | The number of consecutive SSB to PRACH occasions not available due to UL LBT failure is considered in the delay uncertainty |
| 6.2.3.2.3 RRC connection release with redirection to NR carrier subject to CCA | The number of consecutive SSB to PRACH occasions not available due to UL LBT failure is considered in the delay uncertainty |
| 8.3A.2 SCell Activation and Deactivation in carriers with CCA | UL LBT failures are considered in THARQ. |
| 8.6.4 BWP switch delay on consistent UL LBT recovery | The consistent UL LBT detection / recovery mechanism will trigger the active BWP switch. |
| 8.10A Active TCI state switching delay with CCA | UL LBT failures are considered in THARQ. |
| 9.2A NR Intra-frequency measurements with CCA | UL LBT failures are considered in the reporting delay |
| 9.3A NR Inter-frequency measurements with CCA | UL LBT failures are considered in the reporting delay |

Recommended way forward for the 2nd round:

* Discuss if the proposal can be agreed, and what should be added/removed from the test case list.

Companies’ comments 2nd week:

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| **Company** | **Comments** |
| Nokia | No strong preference which of the test cases is chosen, but it needs to be made sure that all NR-U scenarios A, B and C have at least one test case with UL LBT failures. |
| Ericsson | In this meeting, we can agree on   * + SCell activation     - Additional delay in transmission of ACK/NACK and/or CSI reporting due to CCA failure   + MAC CE based TCI state switch delay     - Additional delay in sending HARQ feedback transmissions   Other test cases are not precluded in this meeting and could be further discussed in the next meeting. |
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**Issue 1-4-7: Consistent UL CCA failures**

Considering tentative agreement on 1st round

* Consistent UL CCA failures are modelled by means of a low PCCA\_UL (e.g., 0%).
* FFS: List of test cases that need to model consistent UL CCA failures

Please comment on a list of test cases that need to model consistent UL CCA failure.

Companies’ comments 2nd week:

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| **Company** | **Comments** |
| Ericsson | Fine with the tentative agreement |
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### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [**R4-2101431**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101431.zip)  revised to  R4-210xxx  Ericsson  draftCR | **Draft CR: RMC for NR-U test cases** |
| Nokia: At least these parts need to be updated after the agreements related to Topic #1:  - A.3.10A SSB Configurations under CCA  - A.3.21 Discovery Burst Transmission Window configuration under CCA |
| Huawei: Depends on the conclusion of the related issues. |
|  |
| [**R4-2102528**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102528.zip)  revised to  R4-210xxx  Ericsson  draftCR | **CCA model in NR-U test cases** |
| Nokia: Needs updates based on the agreements in this meeting. |
| Huawei: Depends on the conclusion of the related issues. |
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## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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|  | **Status summary** |
| **Sub-topic 1-1: General configuration of the RRM tests** |  |
| **Sub-topic 1-2: General issues on LBT models** |  |
| **Sub-topic 1-3: DL LBT model during RRM tests** |  |
| **Sub-topic 1-4: UL LBT model during RRM tests** |  |

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: NR-U RRM test cases

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

## Companies’ contributions summary

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| **AI 7.1.6.3.1, Test cases, General** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2100773**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100773.zip)  MediaTek inc. | Proposal 1: A.9 is also used for the test cases for when Pcell is in FR1 and no SCell under CCA has been configured, e.g. inter-frequency measurement under CCA. | Issue 3-2-1 |
| Proposal 2: For cell reselection, tests for “4. NR-U -> NR(FR1)” and “5. NR(FR1) -> NR-U” are not necessary while the case of “Cell reselection to FR1 inter-frequency NR when CCA is used on the serving and target cell” has been tested. | Issue 2-1-1 |
| Proposal 3: For cell reselection, tests for “6. NR-U - > E-UTRAN (FDD,TDD)” are not necessary while the case of “Cell reselection to FR1 intra-/inter-frequency NR when CCA is used on the serving and target cell” has been tested. | Issue 2-1-1 |
| Proposal 4: For handover, tests for target cells without CCA (case 8, 9, 10) are not necessary while UE has passed R15 tests. | Issue 2-1-2 |
| Proposal 5: For inter-frequency handover, tests for “from NR to NR-U (case 6, 7)” are not necessary while UE has passed the tests for “from NR-U to NR-U (case 3, 5)”. | Issue 2-1-2 |
| Proposal 6: For inter-frequency handover, only to test either known cell or unknown cell. | Issue 2-1-2 |
| Proposal 7: Tests for “Redirection from NR in FR1 with CCA to NR in FR1 with CCA” are not necessary, while UE has passed the tests of “Redirection from NR in FR1 to NR in FR1 with CCA”. | Issue 2-1-5 |
| Proposal 8: Legacy DCI/timer/RRC-based BWP switching tests on NR-U cell are not necessary while UE has passed the corresponding R15 tests. | Issue 2-1-7 |
| Proposal 9: Not to specify test cases for unknown case PSCell addition/release delay. | Issue 2-1-8 |
| Proposal 10: Test cases for the interruption as the legacy requirement are not necessary, while UE has passed the lacy tests. | Issue 2-1-10 |
| Proposal 11: For Intra-frequency measurement accuracy/procedure test cases, test configuration of “NR-U SCC, with NR-U PCC” is not needed while it can be replaced by “NR-U SCC, with NR PCC (FR1)” and “NR-U PCC”. | Issue 2-1-11, Issue 2-1-14 |
| Proposal 12: For Intra-frequency measurement accuracy/procedure test cases, test configuration of “NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)” is not needed while it can be replaced by “NR-U PSCC, with E-UTRAN PCC (FDD,TDD)”. | Issue 2-1-11, Issue 2-1-14 |
| Proposal 13: Test cases for SS-RSRQ/SS-SINR measurement accuracy under CCA are not necessary. | Issue 2-1-14 |
| [**R4-2100833**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100833.zip)  ZTE Corporation | Observation 1: Procedures for 2-step RACH under NR-U have already been captured in RAN2 specifications. | - |
| Proposal 1: RAN4 shall define in Rel-16 test cases for 2-step RA in NR-U as it is already a supported feature in R16. | Issue 2-1-4 |
| [**R4-2101134**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101134.zip)  Nokia | Proposal 1: RAN4 to define cell-reselection test cases for: NR(FR1) -> NR-U, NR-U -> NR(FR1) and NR-U - > E-UTRAN (FDD,TDD). | Issue 2-1-1 |
| Proposal 2: RAN4 to define contention based and non-contention based test cases for at least 4 step RA type in NR-U. | Issue 2-1-4 |
| Proposal 3: RAN4 to define inter-frequency measurement procedure test cases also for SS-RSRQ and SS-SINR measurements. | Issue 2-1-12 |
| Proposal 4: RAN4 to define inter-frequency measurement accuracy test cases also for SS-RSRQ and SS-SINR measurements. | Issue 2-1-15 |
| [**R4-2102524**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102524.zip)  Ericsson | Return to;  Moderator’s note: This paper proposes a list of test cases resembling the Table 2-1-2 in section 2.2.1. The proposals from this paper were reflected in issues of Sub-topic 2-1 and the list of test cases will be updated as a result of the discussion during this meeting. | Sub-topic 2-1 |

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| **AI 7.1.6.3.2, Test cases, RRC IDLE, cell re-selection** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2100839**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100839.zip)  ZTE Corporation | Proposal 1: RAN4 shall define test cases for cases 1-6 under cell re-selection. | Issue 2-1-1 |
| [**R4-2102244**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102244.zip)  Ericsson | 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: RAN4 to agree on test cases for following types of cell reselections:   * NR-U → E-UTRAN, * NR-U → NR (FR1) * NR (FR1) →o NR-U | Issue 2-1-1 |
| Proposal #2: The standalone cell reselection test cases are defined based on the test configurations shown in Table 1, Table 2 and Table 3. | Issue 2-2-1 |
| Proposal #3: Cell specific test parameters should contain following new or modified parameters to account for the LBT impact:   * DL CCA model * UL CCA model * DBT Window Configuration * DL CCA probability PCCA\_DL * UL CCA probability PCCA\_UL * New RMCs | Issue 2-2-2 |
| Proposal #4: Reselection test shall verify that maximum allowed CCA failures for Md, Mm and Me. | Issue 2-2-3 |

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| **AI 7.1.6.3.3, Test cases, HO delay and interruptions** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2100840**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100840.zip)  ZTE Corporation | Proposal 1: Define test cases for all scenarios corresponding to core requirements for handover in NR-U. | Issue 2-1-2 |
| [**R4-2102242**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102242.zip)  Ericsson | Proposal #1: RAN4 to agree on test cases for following types of handovers:   * NR-U to NR-U, inter-frequency known cell * NR (FR1) to NR-U for known and unknown cases * NR-U to NR (FR1) for known and unknown cases * NR-U to E-UTRAN * E-UTRAN to NR-U | Issue 2-1-2 |
| Proposal #2: Handover test case configurations are aligned with the configurations used in IDLE mode cell reselection test cases. | Issue 2-3-1 |
| Proposal #3: Cell specific test parameters should contain following new or modified parameters to account for the LBT impact:   * DL CCA model * UL CCA model * DBT Window Configuration * DL CCA probability PCCA\_DL * UL CCA probability PCCA\_UL * New RMCs | Issue 2-3-2 |
| Proposal #4: 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. | Issue 2-3-3 |

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| **AI 7.1.6.3.4, Test cases, RRC re-establishment** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2102647**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102647.zip)  Ericsson | 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:   * TC1: Intra-frequency RRC Re-establishment in FR1 with known target cell subject to CCA * TC2: Inter-frequency RRC Re-establishment in FR1 with unknown target cell subject to CCA * TC3: Intra-frequency RRC Re-establishment in FR1 with unknown target cell subject to CCA | Issue 2-3-1 |
| 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 | | Issue 2-3-2 |
| Proposal 3: NR-U to NR-U RRC re-establishment tests are defined for the following LBT configuration/setting:   1. 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 | Issue 2-3-3 |

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| **AI 7.1.6.3.5, Test cases, RRC connection release with re-direction** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| **[R4-2100842](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100842.zip)**  ZTE Corporation | Proposal 1: Define test cases for the scenario of NR-U to NR-U corresponding to core requirements for RRC Connection Release with redirection. | Issue 2-1-5 |
| [**R4-2102648**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102648.zip)  Ericsson | Proposal 1: At least the following NR-U 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:   * TC1: Redirection from NR with CCA in FR1 to NR in CCA in FR1 | Issue 2-5-1 |
|  | Proposal 2: NR-U 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 | Description | | 1 | With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | Issue 2-5-2 |
|  | Proposal 3: NR-U to NR-U RRC connection release with redirection test is defined for the following LBT configuration/setting:   * Serving cell: PCCA\_UL=1 and PCCA\_DL=1 in all test times * Target cell: PCCA\_UL=1 and PCCA\_DL< 1 (e.g. 0.75) in all test times | Issue 2-5-3 |
|  | Proposal 4: In NR-U 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. | Issue 2-5-3 |

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| **AI 7.1.6.3.6, Test cases, Timing** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2100843**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100843.zip)  ZTE Corporation | Proposal 1: Define test cases on TA only for NR-U PCell. | Issue 2-1-6 |
| [**R4-2102649**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102649.zip)  Ericsson | Proposal 1: At least the following UE transmit timing tests to verify core requirements in clause 7.1, TS 38.133, are defined:   * TC1: UE Transmit Timing Test with NR PSCell subject to CCA in EN-DC * TC2: UE Transmit Timing Test with NR PCell subject to CCA in SA | Issue 2-6-1 |
| Proposal 2: The UE transmit timing tests are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:  Table 1: Configuration related to SSB SCS and BW in UE tranmit timing tests in 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 | | Note 1: The UE is only required to be tested in one of the supported test configurations. | |   Table 2: Configuration related to SSB SCS and BW in UE transmit timing tests in SA   |  |  | | --- | --- | | Configuration | Description | | 1 | With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | Issue 2-6-1 |
| Proposal 3: UE transmit timing tests are defined for the following LBT configuration/setting in SpCell:   * PCCA\_UL=1 and PCCA\_DL < 1 depending on SSB periodicity (e.g. 0.5% for TSSB=20 ms) in all test times | Issue 2-6-2 |
| Proposal 4: At least the following UE timing advance adjustment accuracy tests to verify core requirements in clause 7.3, TS 38.133, are defined. The tests are applicale for UE supporting only FR1 bands subject to CCA.   * TC1: UE Transmit Timing Test with NR PSCell subject to CCA in EN-DC * TC2: UE Transmit Timing Test with NR PCell subject to CCA in SA | Issue 2-1-6 |
| Proposal 5: The timing advance adjustment accuracy tests are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:  Table 1: Configuration related to SSB SCS and BW in UE timing advance tests in 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 | | Note 1: The UE is only required to be tested in one of the supported test configurations. | |   Table 2: Configuration related to SSB SCS and BW in UE advance timing tests in SA   |  |  | | --- | --- | | Configuration | Description | | 1 | With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | Issue 2-6-3 |
| Proposal 6: UE timing advance adjustment accuracy tests are defined for the following LBT configuration/setting in SpCell:   * PCCA\_UL=1 and PCCA\_DL =1 in all test times | Issue 2-6-4 |

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| **AI 7.1.6.3.7, Test cases, BWP switching delay and interruptions** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2100841**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100841.zip)  ZTE Corporation | Proposal 1: The DCI/timer/RRC-based BWP switching can be tested only by UEs supporting NR-U SA mode. The other test cases can be de-prioritized. | Issue 2-1-7 |
| [**R4-2102651**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102651.zip)  Ericsson | Proposal 1: At least the following tests to verify BWP switching requirements under consistent UL LBT failure in clause 8.6.4, TS 38.133, are defined:   1. TC1: UL active BWP switch delay with consistent UL LBT failure on PSCell subject to UL CCA in EN-DC 2. TC2: UL active BWP switch delay with consistent UL LBT failure on PCell subject to UL CCA in SA | Issue 2-1-7 |
| Proposal 2: The tests for BWP switching under consistent UL failure are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:  Table 1: Configuration related to SSB SCS and BW in 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 | | Note 1: The UE is only required to be tested in one of the supported test configurations. | |   Table 2: Configuration related to SSB SCS and BW iin SA   |  |  | | --- | --- | | Configuration | Description | | 1 | With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | Issue 2-7-1 |
| Proposal 3: The tests on BWP switching under consistent UL failure are defined for the following LBT configuration/setting in SpCell:  Table 3: LBT settings in UL and DL BWPs in SpCell   |  |  |  | | --- | --- | --- | | Active BWP in SpCell | PCCA\_UL | PCCA\_DL | | UL active BWP before active BWP switching (UL BWP-1) | 0 | 1 | | UL active BWP after active BWP switching (UL BWP-2) | 1 | 1 | | DL active BWP before active BWP switching (DL BWP-1) | 1 | 1 | | DL active BWP after active BWP switching (DL BWP-2) | 1 | 1 | | Issue 2-7-2 |
| Proposal 4: Periodic SRS is configured in the SpCell to enable the UE to detect consistent UL LBT failure in the SpCell. | Issue 2-7-2 |

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| **AI 7.1.6.3.8, Test cases, PSCell addition/release** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2100838**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100838.zip)  ZTE Corporation | Proposal 1: When defining test cases for features in NR-U, R15 UE test cases shall be taken as baseline. | Issue 2-1-8 |
| Proposal 2: Define test cases for known cells in PSCell addition. | Issue 2-1-8 |
| [**R4-2102370**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102370.zip)  Ericsson | Proposal 1: In Rel-16, test case for NR-U PSCell addition and release is ony introduced for the known cell case. | Issue 2-1-8 |
| Proposal 2: In Rel-16 NR-U, test cases for active TCI state switching are introduced for the following cases:   1. EN-DC, NR PSCell under CCA, known TCI state, MAC-based triggering 2. EN-DC, NR PSCell under CCA, known TCI state, RRC-based triggering 3. NR SA, PCell under CCA, known TCI state, MAC-based triggering 4. NR SA, PCell under CCA, known TCI state, RRC-based triggering 5. NR SA, SCell under CCA, known TCI state, MAC-based triggering 6. NR SA, SCell under CCA, known TCI state, RRC-based triggering | Issue 2-8-1 |
| Proposal 3: It shall be investigated whether some of the test cases for active TCI state switching are redundant for UE supporting both EN-DC and NR SA scenarios for NR-U. | Issue 2-1-9 |

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| **AI 7.1.6.3.9, Test cases, Interruptions** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2102368**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102368.zip)  Ericsson | Proposal 1 : During interruption tests, a deactivated Scell measurement cycle of 160ms is used | Issue 2-9-1 |
| Proposal 2 : LBT model is configured in interruption tests, with a channel access success probability P=[0.75] | Issue 2-9-2 |
| Proposal 3 : The interruption requirements are verified in tests with the following phases  T1 : UE is configured with PCell and PScell if applicable, and measures/reports candidate Scell such that it will be known in T2  T2 : Scell is added, interruption requirement verified  T3 : Scell is activated, interruption requirement verified  T4 : Scell is deactivated, interruption requirement verified  T5 : Deactivated Scell measurement interruption requirement is verified  T6 : Scell is released, interruption requirement verified | Issue 2-9-3 |
| Proposal 4: Define test cases for SCell (de)activation of known SCell in NR-U for both measurement cycles 160 and 320ms. | Issue 2-10-1 |
| Proposal 5: Test cases for SCell (de)activation testing with NR PCC in FR1 with SCC under CCA are modeled with only DL CCA in SCell. | Issue 2-10-2 |
| Proposal 6: Test cases for SCell (de)activation testing with NR PCC under CCA with SCC under CCA are modeled with DL CCA in SCell and UL CCA in PCell. | Issue 2-10-2 |
| Proposal 7: Test cases for SCell (de)activation testing with NR PSCC under CCA with SCC under CCA are modeled with DL CCA in SCell and UL CCA in PSCell. | Issue 2-10-2 |
| Proposal 8: For UL CCA model in SCell (de)activation testing, PCCA\_UL = [0.75] is used for all time intervals. | Issue 2-10-2 |
| Proposal 9: For DL CCA model in SCell (de)activation testing, PCCA\_DL = [0.75] is used for all time intervals. | Issue 2-10-2 |

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| **AI 7.1.6.3.10, Test cases, RLM** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2102529**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102529.zip)  Ericsson | Proposal 1: the following sections for NR-U RLM are added: | Issue 2-11-1 |
| Proposal 2: For RLM out-of-sync, Test 1 and Test 2 (with different SNR combinations) are developed for testing both requirements. | Issue 2-11-2 |
| Proposal 3: For RLM out-of-sync, Test 1 SNRs: (1 dB, [-7 dB], [-15 dB]). | Issue 2-11-2 |
| Proposal 4: For RLM out-of-sync, Test 2 SNRs: (1 dB, [-3 dB], [-7 dB]). | Issue 2-11-2 |
| Proposal 5: Test configurations for NR PCell (Scenario C) and NR PSCell (Scenario B) in all NR-U RLM test cases:   * <TDD, SSB SCS 30 kHz, data SCS 30 kHz, bandwidth 40 MHz> Note: in Scenario B, the above configuration is further combined with LTE FDD and LTE TDD, resulting in two configurations in test cases for Scenario B. | Issue 2-11-3 |
| Proposal 6: DL CCA model for RLM in-sync:   * T1: DL PCCA=1.0, * T2-T5: DL PCCA=TBD. | Issue 2-11-4 |
| Proposal 7: UL CCA model for RLM in-sync: UL PCCA=1.0 in T1-T5. | Issue 2-11-4 |
| Proposal 8: DL CCA model for RLM out-of-sync:   * T1: DL PCCA=1.0, * T2, T3: DL PCCA=TBD. | Issue 2-11-4 |
| Proposal 9: UL CCA model for RLM out-of-sync: UL PCCA=1.0 in T1-T3. | Issue 2-11-4 |
| Proposal 10: Use PCCA=0.75 and PCCA=0.5 in RLM out-of-sync test cases. | Issue 2-11-5 |
| Proposal 11: Use PCCA=0.6 in RLM in-sync test cases. | Issue 2-11-5 |
| Proposal 12: For NR-U, all relevant test cases (e.g., RLM test cases) have to also cover 4 RX UEs (similar to legacy Rel-16 NR). | Issue 2-11-5 |

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| **AI 7.1.6.3.11, Test cases, Beam management** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2101432**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101432.zip)  Ericsson | Proposal 1: Define the following BFD and LR test cases for NR-U:  A.10.3.4.1 EN-DC Beam Failure Detection and Link Recovery Test for FR1 PSCell configured with SSB-based BFD and LR in non-DRX mode  A.10.3.4.2 EN-DC Beam Failure Detection and Link Recovery Test for FR1 PSCell configured with SSB-based BFD and LR in DRX mode  A.11.4.4.1 Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in non-DRX mode  A.11.4.4.2 Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in DRX mode | Issue 2-12-1 |
| Proposal 2: Define the test cases with 1) BFD-RS SSB Es/Iot ≥ -7 dB and 2) BFD-RS SSB Es/Iot < -7 dB to verify the different evaluation period. | Issue 2-12-2 |
| Proposal 3: For the case with BFD-RS SSB Es/Iot < -7 dB, set SSB Es/Iot = -3dB in T2 and set SSB Es/Iot = -12dB in T2/T2/T3, by reusing the test cases defined in Rel-15. | Issue 2-12-2 |
| Proposal 4: For the case with BFD-RS SSB Es/Iot ≥ -7 dB, set SSB Es/Iot = [-1]dB in T2 and set SSB Es/Iot = [-7]dB in T2/T2/T3. | Issue 2-12-2 |
| Proposal 5: SNR test points for BFD and LR tests with CCA should be adjusted for UEs capable of 4Rx, i.e., set SNR 3dB lower than the tests for 2Rx UEs. | Issue 2-12-3 |
| Proposal 6: BFD and LR tests specify the DL/UL CCA success rate given by PCCA\_DL and PCCA\_UL. | Issue 2-12-3 |
| Proposal 7: BFD and LR tests set different PCCA according to the assumed channel access mode, i.e., LBE and FBE. Set higher DL CCA success rate (e.g. 0.75) for FBE and lower DL CCA success rate (e.g. 0.5) for LBE during the tests. | Issue 2-12-3 |
| Proposal 8: Assume no UL CCA failure during the BFD and LR tests, that is, PCCA\_UL=1.0. | Issue 2-12-3 |
| Proposal 9: Define the following L1-RSRP measurement procedure test cases for NR-U:  A.9.3.3.1 SSB based L1-RSRP measurement when DRX is not used (SA SCell with NR PCell)  A.9.3.3.2 SSB based L1-RSRP measurement when DRX is used (SA SCell with NR PCell)  A.10.4.3.1 SSB based L1-RSRP measurement on PSCC when DRX is not used (EN-DC PSCell)  A.10.4.3.2 SSB based L1-RSRP measurement on PSCC when DRX is used (EN-DC PSCell)  A.10.4.3.3 SSB based L1-RSRP measurement on SCC when DRX is not used (EN-DC SCell with LTE PCell and NR-U PSCell)  A.10.4.3.4 SSB based L1-RSRP measurement on SCC when DRX is used (EN-DC SCell with LTE PCell and NR-U PSCell)  A.11.5.4.1 SSB based L1-RSRP measurement when DRX is not used (SA PCell)  A.11.5.4.2 SSB based L1-RSRP measurement when DRX is used (SA PCell)  A.11.5.4.3 SSB based L1-RSRP measurement on SCC when DRX is not used (SA SCell with NR-U PCell)  A.11.5.4.4 SSB based L1-RSRP measurement on SCC when DRX is used (SA SCell with NR-U PCell) | Issue 2-12-4 |
| Proposal 10: For L1-RSRP measurement procedure tests with CCA, reuse the same Es/Ioc as Rel-15 tests. | Issue 2-12-5 |
| Proposal 11: For NR-U L1-RSRP measurement procedure tests with DRX and non-DRX cases, RAN4 sets the same T1/T2 and reporting timing requirements as Rel-15 test, that is,  T1=5s, T2=1s.  TReport=80 slots (Periodic L1-RSRP reporting with PUCCH)  The UE shall send L1-RSRP report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the absolute accuracy requirement. | Issue 2-12-5 |
| Proposal 12: L1-RSRP measurement procedure tests specify the DL/UL CCA success rate given by PCCA\_DL and PCCA\_UL. | Issue 2-12-6 |
| Proposal 13: L1-RSRP measurement procedure tests set PCCA\_DL < 1 (e.g., 0.75). Set the common PCCA\_DL applicable for both FBE and LBE. | Issue 2-12-6 |
| Proposal 14: RAN4 discuss whether L1-RSRP measurement procedure tests consider UL CCA failure or not during the tests. If not considered, set PCCA\_UL=1.0 in the test cases. | Issue 2-12-6 |

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| **AI 7.1.6.3.12, Test cases, Intra-frequency, inter-frequency and inter-RAT measurement requirements** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2100836**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100836.zip)  ZTE Corporation | Proposal 1: When defining test cases for features in NR-U, R15 UE test cases shall be taken as baseline. | Issue 2-1-12 |
| Proposal 2: RAN4 shall define test cases for SS-SINR and SS-RSRQ for inter-frequency and inter-RAT measurements. | Issue 2-1-12 |
| [**R4-2102531**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102531.zip)  Ericsson | Observation 1: RAN4 has already agreed to define test cases for intra-frequency and inter-RAT SS-RSRQ and SS-SINR, but inter-frequency test cases for SS-RSRQ and SS-SINR are still FFS. | - |
| Proposal 1: RAN4 specifies test cases for inter-frequency SS-RSRQ and SS-SINR measurements. | Issue 2-1-12 |
| Proposal 2: RAN4 specifies test cases for inter-frequency SS-RSRQ and SS-SINR measurements accuracy. | Issue 2-1-14 |
| Proposal 3: The inter-frequency SS-RSRQ and SS-SINR measurement and measurement test cases for NR-U include:   |  | | --- | | Inter-frequency SS-RSRQ, SS-SINR on: | |  NR-U inter-frequency, with NR PCC (FR1) | |  NR-U inter-frequency, with NR-U PCC | |  NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) | |  NR (FR1) inter-frequency, with NR-U PCC | |  NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) | | Issue 2-1-12 |
| Proposal 4: RAN4 defines test cases for E-UTRA-NR-U RSRP/RSRQ measurements. | Issue 2-1-12 |
| Proposal 5: RAN4 defines test cases for E-UTRA-NR-U RSRP/RSRQ measurements accuracy. | Issue 2-1-14 |
| Proposal 6: The following test cases are defined for NR-U intra-frequency RRM measurements for PCC, SCC, and PSCC:   * SA event triggered reporting test without gaps under non-DRX, * SA event triggered reporting test without gaps under DRX, * SA event triggered reporting test with per-UE gaps under non-DRX, * SA event triggered reporting test with per-UE gaps under DRX. | Issue 2-13-1 |
| Proposal 7: Each test case (among RRM measurements test cases) is conducted for three A3 measurement quantities: SS-RSRP, SS-RSRQ, SS-SINR. | Issue 2-13-1 |
| Proposal 8: Test configurations for RRM measurements:  Scenario A:   |  |  | | --- | --- | | Configuration | Description | | 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | NOTE: The UE is only required to be tested in one of the supported test configurations. | |   Scenario B:   |  |  | | --- | --- | | Configuration | Description | | 1 | LTE FDD; NR: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | LTE TDD; NR: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | NOTE: The UE is only required to be tested in one of the supported test configurations. | |   Scenario C:   |  |  | | --- | --- | | Configuration | Description | | 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |   Inter-RAT E-UTRAN-NR-U:   |  |  | | --- | --- | | Configuration | Description | | 1 | LTE FDD; NR: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | LTE TDD; NR: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | NOTE: The UE is only required to be tested in one of the supported test configurations. | | | Issue 2-13-2 |
| Proposal 9: UL CCA model in RRM measurements test cases: PCCA\_UL=1.0 in all time intervals (T1 and T2). | Issue 2-13-3 |
| Proposal 10: DL CCA model in RRM measurements test cases: PCCA\_DL=[0.75] in all time intervals (T1 and T2). | Issue 2-13-3 |
| Proposal 11: In RSSI and CO test cases, the test configurations are the same as for RRM measurement:  Scenario A:   |  |  | | --- | --- | | Configuration | Description | | 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | NOTE: The UE is only required to be tested in one of the supported test configurations. | |   Scenario B:   |  |  | | --- | --- | | Configuration | Description | | 1 | LTE FDD; NR: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | LTE TDD; NR: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | NOTE: The UE is only required to be tested in one of the supported test configurations. | |   Scenario C:   |  |  | | --- | --- | | Configuration | Description | | 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |   Inter-RAT E-UTRAN-NR-U:   |  |  | | --- | --- | | Configuration | Description | | 1 | LTE FDD; NR: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | LTE TDD; NR: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | NOTE: The UE is only required to be tested in one of the supported test configurations. | | | Issue 2-14-1 |
| Proposal 12: In RSSI and CO test cases, UL CCA model: PCCA\_UL=1.0 | Issue 2-14-2 |
| Proposal 13: In RSSI and CO test cases, DL CCA model: PCCA\_DL=1.0 | Issue 2-14-2 |
| Proposal 14: Number of cells in RSSI/CO test cases:   * Scenario A: * Intra-frequency RSSI/CO: 2 cells (PCell, SCell) * Inter-frequency RSSI/CO: 2 cells (PCell, SCell) and 1 inter-frequency for RSSI/CO * Scenario B:   + Intra-frequency RSSI/CO: 2 cells (E-UTRAN PCell, NR PSCell)   + Inter-frequency RSSI/CO: 2 cells (E-UTRAN PCell, NR PSCell) and 1 inter-frequency for RSSI/CO * Scenario C:   + Intra-frequency RSSI/CO: 1 cell (PCell)   + Inter-frequency RSSI/CO: 1 cell (PCell) and 1 inter-frequency for RSSI/CO * Standalone Inter-RAT E-UTRAN-NR-U:   + Inter-RAT RSSI/CO: 1 cell (E-UTRAN PCell) and 1 inter-RAT frequency for RSSI/CO | Issue 2-14-3 |
| Proposal 15: The following test coverage is proposed for intra-frequency RSSI and CO test cases:   * RSSI:   + Test 1: Non-DRX, SMTC and RMTC are overlapping   + Test 2: DRX, SMTC and RMTC are not overlapping * CO:   + Test 1: DRX, SMTC and RMTC are overlapping   + Test 2: Non-DRX, SMTC and RMTC are not overlapping | Issue 2-14-4 |
| Proposal 16: The following test coverage is proposed for inter-frequency RSSI and CO test cases:   * RSSI:   + Non-DRX * CO:   + DRX | Issue 2-14-4 |
| Proposal 17: Include the following missing RSSI and CO test cases (based on the requirements in TS 36.133) into the earlier agreed test case list:   |  | | --- | | E-UTRA-NR-U RSSI measurements requirements: | |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC | |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC | | E-UTRA-NR-U CO measurements requirements: | |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC | |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC | | E-UTRA-NR-U RSSI measurement accuracy requirements: | |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC | |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC | | E-UTRA-NR-U CO measurement accuracy requirements: | |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC | |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC | | Issue 2-1-13, Issue 2-1-16 |
| Proposal 18: The following test configurations are used for inter-RAT SFTD reporting delay test with NR target under CCA   |  |  | | --- | --- | | Config | Description | | 1 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | Note: The UE is only required to be tested in one of the supported test configurations | | | Issue 2-15-1 |
| Proposal 19: Inter-RAT SFTD reporting delay test cases are based on SFTD reporting only, i.e. no additional SS-RSRP reporting. | Issue 2-15-2 |
| Proposal 20: Test case for inter-RAT SFTD reporting delay for SFTD between EUTRA PCell and NR neighbour cell on NR carrier under CCA is modelled with DL CCA on the NR carrier. | Issue 2-15-3 |
| Proposal 21: For DL CCA model in inter-RAT SFTD reporting delay test, PCCA\_DL = [0.75] is used as initial assumption. | Issue 2-15-3 |

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| **AI 7.1.6.3.13, Test cases, Accuracy requirements for Intra-frequency, inter-frequency and inter-RAT measurements** | | |
| **T-doc number/company** | **Proposals / Observations** | **Issue mapping** |
| [**R4-2100837**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100837.zip)  ZTE Corporation | Proposal 1: When defining test cases for features in NR-U, R15 UE test cases shall be taken as baseline. |  |
|  | Proposal 2: RAN4 shall define test cases for SS-SINR and SS-RSRQ for intra-frequency, inter-frequency and inter-RAT measurement accuracy. | Issue 2-1-15, Issue 2-1-16 |
| **[R4-2102371](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102371.zip)**  Ericsson | Proposal 1: Add NR unlicensed bands to SFTD accuracy requirements in TS 36.133 clause 9.1.27. | Core part proposal? |
|  | Proposal 2: The following test configurations for NR-U Inter-RAT SFTD accuracy testing are to be supported:   |  |  | | --- | --- | | Config | Description | | 1 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | Note: The UE is only required to be tested in one of the supported test configurations | | | Issue 2-16-1 |
|  | Proposal 3: In test cases for NR-U Inter-RAT SFTD measurement accuracy, as initial assumption the NR target cell is modelled with DL CCA PCCA\_DL = [0.75]. | Issue 2-16-2 |

## Open issues summary and view’s collection for the 1st round

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

### Sub-topic 2-1: Test case list

*Sub-topic description:*

*Continue discussion on the test case list for NR-U RRM. Discussion is based on the test case list that was agreed in R4-2017089 in RAN4#97e meeting and the proposed updated list in R4-2102524.*

*Issues discussed under this sub-topic:*

*Issue 2-1-1: Test cases on RRC\_IDLE, cell re-selection*

*Issue 2-1-2: Test cases on handover delay and interruptions*

*Issue 2-1-3: Test cases on RRC re-establishment*

*Issue 2-1-4: Test cases on Random access*

*Issue 2-1-5: Test cases on RRC release with re-direction*

*Issue 2-1-6: Test cases on timing*

*Issue 2-1-7: Test cases on BWP switching and interruption*

*Issue 2-1-8: Test cases on PSCell addition/release delay*

*Issue 2-1-9: Test cases on active TCI state switching delay*

*Issue 2-1-10: Test cases for interruptions*

*Issue 2-1-11: Test cases for intra-frequency measurement procedure*

*Issue 2-1-12: Test cases for inter-frequency measurement procedure*

*Issue 2-1-13a: Test cases for inter-RAT measurement procedure*

*Issue 2-1-13b: Test cases for inter-RAT measurement procedure: RSSI and CO*

*Issue 2-1-14a: Test cases for accuracy for NR-U intra-frequency measurements – SS-RSRQ/SS-SINR*

*Issue 2-1-14b: Test cases for accuracy for NR-U intra-frequency measurements – NR-U SCC with NR-U PCC, and N-RU SCC with NR-U PSCC and E-UTRAN PCC*

*Issue 2-1-15: Test cases for accuracy for NR-U inter-frequency measurements*

*Issue 2-1-16a: Test cases for accuracy for NR-U inter-RAT measurements*

*Issue 2-1-16b: Test cases for accuracy for NR-U inter-RAT measurements: RSSI and CO*

*Please note that the discussion under sub-topic 2-1 is about which test cases are to be introduced for NR-U. The details of the test cases are to be discussed under other sub-topics of Topic #2. Below is a table with the agreed and proposed test cases with issue mapping to help with tracking the proposals.*

Table 2-1-1: Colour coding for Table 2-1-2.

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| **Colour coding for the test case table below** |
| Test case marked as FFS in RAN4#97e |
| Test case proposed to be added in this meeting |
| Test case agreed in RAN4#97e, but proposed to be removed in this meeting |

Table 2-1-2: Issue and sub-topic mapping for RRM test cases, with colour coding described in Table 2-1-1, reflecting the status of the agreements *before* the decisions of RAN4 #98 NOTE: This table is only for information and for helping to keep track of Issues versus test case list. Please make your comments under the Issues, not directly in the table.

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| --- | --- | --- | --- | --- | --- | --- |
| **Group of requirements** | **Test cases** |  | **Requirements section** | **Agreed** | **Issue nbr for whether to include on TC list** | **Sub-topic nbr for detailed discussion** |
| RRC\_IDLE, cell re-selection | NR-U -> NR-U | intra-frequency | 4.2A | Yes |  | 2-2 |
| inter-frequency | Yes |  |
| NR(FR1) -> NR-U |  | FFS | 2-1-1 |
| NR-U -> NR(FR1) |  | FFS | 2-1-1 |
| NR-U - > E-UTRAN (FDD,TDD) |  | FFS | 2-1-1 |
| E-UTRAN (FDD,TDD) -> NR-U |  | TS 36.133 | Yes |  |
| RRC\_INACTIVE, cell re-selection | Not needed |  | 5.1A |  |  | - |
| HO (delay and interruptions) | NR-U-> NR-U | intra-frequency, known | 6.1B | Yes |  | 2-3 |
| intra-frequency, unknown | Yes |  |
| inter-frequency, unkown | Yes |  |
| Inter-frequency, known | FFS | 2-1-2 |
| NR(FR1) -> NR-U | known | 6.1B | FFS | 2-1-2 |
| unkown | FFS | 2-1-2 |
| NR-U -> NR(FR1) | known |  | FFS | 2-1-2 |
| unknown | 6.1.1.2 | FFS | 2-1-2 |
| NR-U - > E-UTRAN (FDD,TDD) |  | 6.1.2.1 | FFS | 2-1-2 |
| E-UTRAN (FDD,TDD) -> NR-U |  | TS 36.133 | Yes |  |
| RRC Re-establishment | NR-U-> NR-U |  | 6.2.1A | Yes |  | 2-4 |
| NR(FR1) -> NR-U |  | FFS | 2-1-3 |
| Random access | (*requirements not available yet, being discussed in thread 205*) |  | 6.2.2A [1] | Depends on CORE requirements |  | - |
| Contention-based and non-contention based RA: |  |  |  |
|         to NR-U PCell |  | FFS | 2-1-4 |
|         to NR-U PSCell |  | FFS | 2-1-4 |
| RRC Connection Release with Redirection |         NR-U-> NR-U |  | 6.2.3.2.3 | Yes |  | 2-5 |
|         NR(FR1) -> NR-U |  | FFS | 2-1-5 |
| Timing (transmit timing) |         NR-U PCell |  | 7.1, 7.3 | Yes |  | 2-6 |
|         NR-U PSCell |  | Yes |  |
| Timing (timing advance) |         NR-U PCell |  | FFS | 2-1-6 |
|         NR-U PSCell |  | FFS | 2-1-6 |
| BWP switching delay and interruptions |        E-UTRAN – NR-U PSCell UL active BWP switch based on persistent UL LBT failure |  | 8.6 | Yes |  | 2-7 |
|        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 | 2-1-7 |
|         NR-U PCC | **** | FFS | 2-1-7 |
|         NR-U PSCC and E-UTRAN PCC (FDD, TDD) | **** | FFS | 2-1-7 |
| RLM (in-syn and out-of-sync) |         On NR-U PSCC, with E-UTRAN PCC (FDD,TDD) | OOS, non-DRX | 8.1A | Yes |  | 2-11 |
| IS, non-DRX | Yes |  |
| OOS, DRX | Yes |  |
| IS, DRX | Yes |  |
|         On NR-U PCC | OOS, non-DRX | Yes |  |
| IS, non-DRX | Yes |  |
| OOS, DRX | Yes |  |
| IS, DRX | Yes |  |
| BM |         On NR-U PCC |  | 8.5A | Yes |  | 2-12 |
|         On NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| SCell activation/deactivation delay |         NR PCC (FR1) | known | 8.3A | Yes |  | 2-10 |
| unknown | Yes |  |
|         NR-U PCC | known | Yes |  |
| unknown | Yes |  |
|         NR-U PSCC and E-UTRAN PCC (FDD, TDD) | known | Yes |  |
| unknown | Yes |  |
| PSCell addition/release delay | NR-U PSCell with E-UTRA PCC | konwn | TS 36.133 | Yes |  |
| unknown | FFS | 2-1-8 |
| Active TCI state switching delay | For known and unknown target TCI state in NR-U, on: |  | 8.10A |  |  | - |
|         NR-U PCC |  | FFS | 2-1-9 |
|         NR-U SCC, with NR PCC (FR1) |  | FFS | 2-1-9 |
|         NR-U PSCC, with E-UTRAN PCC (FDD, TDD) |  | FFS | 2-1-9 |
| Interruptions | Due to NR-U SCell addition/release, with: |  | 8.2.1, 8.2.2 |  |  | 2-9 |
|         NR PCC (FR1) |  | FFS | 2-1-10 |
|         NR-U PCC |  | FFS | 2-1-10 |
|         NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-10 |
| 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 | 2-1-10 |
|         NR-U PCC |  | FFS | 2-1-10 |
|         NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-10 |
| Due to inter-RAT SFTD measurements between: |  | TS 36.133 |  |  |
|         NR-U PCell and E-UTRAN PCell (FDD,TDD) |  | Yes |  |
| Due to NR-U PSCell addition/release, with: |  | TS 36.133 | Yes |  |
|         E-UTRA PCell |  | Yes |  |
| Intra-frequency measurement procedure (SS-RSRP, SS-RSRQ, SS-SINR, L1-RSRP, RSSI, CO) | Intra-frequency SS-RSRP, measurements on: |  | 9.2A.5, 9.2A.6 |  |  | 2-13 |
|         NR-U SCC, with NR PCC (FR1) |  | Yes |  |
|         NR-U PCC |  | Yes |  |
|         NR-U SCC, with NR-U PCC |  | Yes | 2-1-11 |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | 2-1-11 |
| Intra-frequency SS-RSRQ, SS-SINR measurements on: |  | 9.2A.5, 9.2A.6 |  |  |
|         NR-U SCC, with NR PCC (FR1) |  | Yes |  |
|         NR-U PCC |  | Yes |  |
|         NR-U SCC, with NR-U PCC |  | Yes | 2-1-11 |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | 2-1-11 |
| L1-RSRP measurements on: |  | [9.5.4A] |  |  |
|         NR-U SCC, with NR PCC (FR1) |  | Yes |  |
|         NR-U PCC |  | Yes |  |
|         NR-U SCC, with NR-U PCC |  | Yes | 2-1-11 |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | 2-1-11 |
| Intra-frequency RSSI measurements on: |  | 9.2A.7.1 |  |  |
|         NR-U SCC, with NR PCC (FR1) |  | Yes |  |
|         NR-U PCC |  | Yes |  |
|         NR-U SCC, with NR-U PCC |  | Yes | 2-1-11 |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | 2-1-11 |
| Intra-frequency CO measurements on: |  | 9.2A.7.2 |  |  |
|         NR-U SCC, with NR PCC (FR1) |  | Yes |  |
|         NR-U PCC |  | Yes |  |
|         NR-U SCC, with NR-U PCC |  | Yes | 2-1-11 |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR-U SCC measurements, with E-UTRAN PCC (FDD,TDD) and NR-U PSCC |  | Yes | 2-1-11 |
| Inter-frequency measurement procedure (SS-RSRP, SS-RSRQ, SS-SINR, SFTD, RSSI, CO) | Inter-frequency SS-RSRP measurements on: |  | 9.3A.4, 9.3A.5 |  |  | 2-13 |
|         NR-U inter-frequency, with NR PCC (FR1) |  | Yes |  |
|         NR-U inter-frequency, with NR-U PCC |  | Yes |  |
|         NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR (FR1) inter-frequency, with NR-U PCC |  | Yes |  |
|         NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Inter-frequency SS-RSRQ, SS\_SINR measurements on: |  | FFS | 2-1-12 |
|         NR-U inter-frequency, with NR PCC (FR1) |  | FFS | 2-1-12 |
|         NR-U inter-frequency, with NR-U PCC |  | FFS | 2-1-12 |
|         NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-12 |
|         NR (FR1) inter-frequency, with NR-U PCC |  | FFS | 2-1-12 |
|         NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-12 |
| Inter-frequency RSSI measurements on: |  | 9.3A.8 |  |  |
|         NR-U inter-frequency, with NR PCC (FR1) |  | Yes |  |
|         NR-U inter-frequency, with NR-U PCC |  | Yes |  |
|         NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Inter-frequency CO measurements on: |  | 9.3A.9 |  |  |
|         NR-U inter-frequency, with NR PCC (FR1) |  | Yes |  |
|         NR-U inter-frequency, with NR-U PCC |  | Yes |  |
|         NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Inter-RAT measurement procedure (SFTD, E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR, E-UTRA-NR-U RSSI and CO, NR-U-E-UTRA RSRP/RSRQ) | Inter-RAT SFTD between: |  | TS 36.133 |  |  | 2-15 |
|         E-UTRAN PCell (FDD,TDD) and NR-U neighbor |  | Yes |  |
| NOTE: under the condition of stationary paths |  | Yes |  |
| NR-U-E-UTRA RSRP/RSRQ (needed for HO): |  | 9.4.2, 9.4.3 |  |  |
|         On E-UTRA (FDD,TDD), with NR-U PCC |  | FFS | 2-1-13a |
|         On E-UTRA (FDD,TDD), with NR-U PSCC |  | FFS | 2-1-13a |
| E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR: |  | TS 36.133 |  |  |
|         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | Yes |  |
|         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes |  |
| E-UTRA-NR-U RSSI measurements requirements: |  | TS 36.133 |  |  | 2-14 |
|         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | FFS | 2-1-13b |
|         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | FFS | 2-1-13b |
| E-UTRA-NR-U CO measurements requirements: |  | TS 36.133 |  |  |
|         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | FFS | 2-1-13b |
|         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | FFS | 2-1-13b |
| 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 |  |
|         NR-U PCC |  | Yes |  |
|         NR-U SCC, with NR-U PCC |  | Yes | 2-1-14b |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes | 2-1-14b |
| Intra-frequency absolute accuracies for SS-RSRQ on: |  | [10.1.29] |  |  |
|         NR-U SCC, with NR PCC (FR1) |  | FFS | 2-1-14a |
|         NR-U PCC |  | FFS | 2-1-14a |
|         NR-U SCC, with NR-U PCC |  | FFS | 2-1-14a & b |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-14a |
|         NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-14a & b |
| Intra-frequency absolute accuracies for SS-SINR on: |  | [10.1.31] |  |  |
|         NR-U SCC, with NR PCC (FR1) |  | FFS | 2-1-14a |
|         NR-U PCC |  | FFS | 2-1-14a |
|         NR-U SCC, with NR-U PCC |  | FFS | 2-1-14a & b |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-14a |
|         NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-14a & b |
| Absolute and relative accuracies for L1-RSRP on: |  | [10.1.33] |  |  |
|         NR-U SCC, with NR PCC (FR1) | **** | Yes |  |
|         NR-U PCC | **** | Yes |  |
|         NR-U SCC, with NR-U PCC | **** | Yes |  |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) | **** | Yes |  |
|         NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) | **** | Yes |  |
| Intra-frequency RSSI on: |  | [10.1.34.1] |  |  |
|         NR-U SCC, with NR PCC (FR1) |  | Yes |  |
|         NR-U PCC |  | Yes |  |
|         NR-U SCC, with NR-U PCC |  | Yes |  |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Intra-frequency CO on: |  | [10.1.35.1] |  |  |
|         NR-U SCC, with NR PCC (FR1) |  | Yes |  |
|         NR-U PCC |  | Yes |  |
|         NR-U SCC, with NR-U PCC |  | Yes |  |
|         NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
|         NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| 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 |  |
|         NR-U neighbor, with NR-U PCC |  | Yes |  |
|         NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Inter-frequency absolute and relative accuracies for SS-RSRQ on: |  | [10.1.30] |  |  |
|         NR-U neighbor, with NR PCC (FR1) |  | FFS | 2-1-15 |
|         NR-U neighbor, with NR-U PCC |  | FFS | 2-1-15 |
|         NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-15 |
| Inter-frequency absolute and relative accuracies for SS-SINR on: |  | [10.1.32] |  |  |
|         NR-U neighbor, with NR PCC (FR1) |  | FFS | 2-1-15 |
|         NR-U neighbor, with NR-U PCC |  | FFS | 2-1-15 |
|         NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-15 |
|         NR (FR1) inter-frequency, with NR-U PCC |  | FFS | 2-1-15 |
|         NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD) |  | FFS | 2-1-15 |
| Inter-frequency RSSI on: |  | [10.1.34.2] |  |  |
|         NR-U neighbor, with NR PCC (FR1) |  | Yes |  |
|         NR-U neighbor, with NR-U PCC |  | Yes |  |
|         NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Inter-frequency CO on: |  | [10.1.35.2] |  |  |
|         NR-U neighbor, with NR PCC (FR1) |  | Yes |  |
|         NR-U neighbor, with NR-U PCC |  | Yes |  |
|         NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD) |  | Yes |  |
| Accuracy for inter-RAT measurements (SFTD, E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR, E-UTRA-NR-U RSSI and CO, NR-U-E-UTRA RSRP/RSRQ) | Inter-RAT SFTD between: |  | TS 36.133 |  |  | 2-16 |
|         E-UTRAN PCell (FDD,TDD) and NR-U neighbor |  | Yes |  |
| NOTE: under the condition of stationary paths |  |  |  |
| E-UTRA RSRP/RSRQ (needed for HO) with: |  | 10.2.2, 10.2.3 |  |  | - |
|         NR-U PCC |  | FFS | 2-1-16a |
|         NR-U PSCC |  | FFS | 2-1-16a |
| E-UTRA-NR-U SS-RSRP/SS-RSRQ/SS-SINR: |  | TS 36.133 |  |  |
|         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | Yes |  |
|         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | Yes |  |
|  | E-UTRA-NR-U RSSI measurement accuracy requirements: |  | TS 36.133 |  |  | - |
|  |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | FFS | 2-1-16b |
|  |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | FFS | 2-1-16b |
|  | E-UTRA-NR-U CO measurement accuracy requirements: |  | TS 36.133 |  |  |
|  |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC |  | FFS | 2-1-16b |
|  |         On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC |  | FFS | 2-1-16b |

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

**Issue 2-1-1: Test cases on RRC\_IDLE, cell re-selection**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2100839 (ZTE), R4-2101134 (Nokia), R4-2100773 (MediaTek)*

Should the test cases left FFS for RRC IDLE mode cell re-selection be included in the NR-U test case list?

* + Option 1 (Ericsson, Nokia, ZTE): Add the following test cases on the test case list for NR-U:
    - RRC\_IDLE, cell re-selection
      1. NR (FR1) -> NR-U
      2. NR-U -> NR (FR1)
      3. NR-U - > E-UTRAN (FDD,TDD)
  + Option 2 (MediaTek): The test cases listed in Option 1 for NR-U are *not* necessary:
    - 1) and 2) in case test case for “Cell reselection to FR1 inter-frequency NR when CCA is used on the serving and target cell” has been passed.
    - 3) in case test case for “Cell reselection to FR1 intra-/inter-frequency NR when CCA is used on the serving and target cell” has been passed
* Recommended WF
  + Discuss the listed options. Can majority view (Option 1) be agreed?

Issue 2-1-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Agree with option 2.  There is no reason to test the same requirement multiple times. RAN4 should work on prioritizing the test cases and avoid any un-necessary test cases |
| ZTE | Support Option 1. We don’t support to assume that the UE can pass one test if it can pass another. And if such assumption is correct then it doesn’t harm the UE to be tested, it doesn’t add any extra work to UE implementation. We don’t see strong technical reasons why some tests should be omitted. |
| Huawei | We support option 2. And it is also a general principle for all test cases on whether to have test cases when the target Cell/Frequency are on the carrier without CCA. We suggest not to have such test cases as the corresponding behavior are already tested in other cases. The same behavior as legacy requirements are not needed. |
| MediaTek | Support option 2.  There are already test cases for NRU -> NRU, E-UTRAN (FDD, TDD) -> NRU.  The UE support NR -> NR and NRU -> NRU can also pass 1) & 2). |
| Ericsson | Support option 1. The test configurations contain parameters that are specific to the cell type, e.g. serving cell or target cell that are subject to CCA which makes it difficult to capture all the possible cell changes with a generic applicability rules especially given that these are both individual and practical scenarios that may only support a certain type of cell reselection and certain type of operation mode (e.g. only NR-U, or only NR, etc.). Therefore, we support option 1. |
| Nokia | Since these requirements are defined for NR-U, they need to be tested, thus Option 1. |

**Issue 2-1-2: Test cases on handover delay and interruptions**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2100840 (ZTE), R4-2101134 (Nokia), R4-2100773 (MediaTek)*

Should the test cases left FFS for handover be included in the NR-U test case list?

* + Option 1 (Ericsson, Nokia, ZTE): Add the following test cases on the test case list for NR-U:
    - Handover

1) NR-U -> NR-U, Inter-frequency, known

2a) NR (FR1) -> NR-U, known

2b) NR (FR1) -> NR-U, unknown

3a) NR-U -> NR (FR1), known

3b) NR-U -> NR (FR1), known

4) NR-U - > E-UTRAN (FDD,TDD)

* + Option 2 (MediaTek): The test cases listed in Option 1 for NR-U are *not* necessary:
    - 1), 2a) and 2b) in case the UE has passed test cases for NR-U to NR-U handovers.
    - 3a), 3b) and 4) in case the UE has passed R-15 tests.
* Recommended WF
  + Discuss the listed options. Can majority view (Option 1) be agreed?

Issue 2-1-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Agree with option 2.  There is no reason to test the same requirement multiple times. RAN4 should work on prioritizing the test cases and avoid any un-necessary test cases |
| ZTE | Support Option 1. We don’t support to assume that the UE can pass one test if it can pass another. And if such assumption is correct then it doesn’t harm the UE to be tested, it doesn’t add any extra work to UE implementation. We don’t see strong technical reasons why some tests should be omitted. |
| Huawei | We support the second bullet in option 2. |
| MediaTek | Support option 2.  For HO, the requirements is only impacted by the target Cell under CCA.  1: unknown case has been tested  2a/2b, NR-U - NR-U has been tested  3a/3b/4, NR - NR-U has been checked, why it still need to check NR-U - NR again? |
| Ericsson | Support Option 1. The test configurations contain parameters that are specific to the cell type, e.g. serving cell or target cell that are subject to CCA which makes it difficult to capture all the possible cell changes with a generic applicability rules especially given that these are both individual and practical scenarios that may only support a certain type of handover and certain type of operation mode (e.g. only NR-U, or only NR, etc.). Therefore, we support option 1. |
| Nokia | Since these requirements are defined for NR-U, they need to be tested, thus Option 1. |

**Issue 2-1-3: Test cases on RRC re-establishment**

*The listed proposals are discussed in R4-2102524 (Ericsson)*

* Proposal 1 (Ericsson): Add the following test case on the test case list for NR-U:
  + RRC re-establishment
    - NR (FR1) -> NR-U
* Recommended WF
  + Can Option 1 be agreed?

Issue 2-1-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Do not agree with proposal 1. It doesn’t test any requirement that is not tested by already agreed tests: NR-U-> NR-U Inter-frequency, known/unknown |
| Ericsson | Support option 1. Do not agree with Qualcomm RRC re-establishment is a different feature and requirements compared to Inter-frequency test. |

**Issue 2-1-4: Test cases on Random access**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2101134 (Nokia), R4-2101134 (ZTE)*

Background: Random access requirements have not yet been introduced in the core part.

* Proposal 1 (Ericsson, Nokia): Add the following test cases on the test case list for NR-U:
  + Random access

1) to NR-U PCell

2) to NR-U PSCell

* Proposal 2:
  + Option 2.1 (ZTE, [Nokia]): Define random access test cases for 4-step *and* 2-step RA in Rel-16.
  + Option 2.2 (): Define random access test cases *only* for 4 step RA in Rel-16.
* Recommended WF
  + Discuss the proposals further in the comment section. Can Option 1-1 for Proposal 1 be agreed? Which option to choose for Proposal 2?

Issue 2-1-4 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Support Proposal 1 and Option 2.1 since 2-step RACH has been agreed to be included into NR-U as per earlier discussion and this is already captured in RAN2 spec. |
| MediaTek | Ok with proposal 1. |
| Ericsson | Support Proposal 1. |
| Nokia | Since these requirements are to be defined for NR-U, they need to be tested, thus Option 1. It was agreed in the core part that requirements for 2-step RACH will be included in Rel-16 NR-U, so the corresponding test case is also needed, thus Option 2.1. |

**Issue 2-1-5: Test cases on RRC connection release with re-direction**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2100773 (MediaTek), R4-2100842 (ZTE)*

Should the test cases left FFS for RRC connection release with re-direction be included in the NR-U test case list?

* Option 1 (Ericsson): Add the following test case on the test case list for NR-U:
  + RRC connection release with re-direction
    - NR (FR1) -> NR-U
* Option 2 (MediaTek): The test case listed in Option 1 for NR-U is *not* necessary if the UE has passed test case for “Redirection from NR in FR1 to NR in FR1 with CCA”.
* Option 3 (ZTE): Define test cases for the scenario of NR-U to NR-U corresponding to core requirements for RRC Connection Release with redirection.
* Recommended WF
  + Discuss the options in the comment section. NOTE: Option 3 is already agreed in the last meeting.

Issue 2-1-5 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Agree with option 2 with the correction - Redirection from NR in FR1 with CCA to NR in FR1 with CCA (NR-U -> NR-U)  There is no reason to test the same requirement multiple times. RAN4 should work on prioritizing the test cases and avoid any un-necessary test cases |
| ZTE | We can support Option 1. We don’t support to assume that the UE can pass one test if it can pass another. And if such assumption is correct then it doesn’t harm the UE to be tested, it doesn’t add any extra work to UE implementation. We don’t see strong technical reasons why some tests should be omitted. |
| Huawei | Support option 2. |
| MediaTek | Support Option 2.  NR-U to NR-U is not necessary, and NR-> NR-U has been agreed. |
| Ericsson | Support option 1. |

**Issue 2-1-6: Test cases on timing**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2100843 (ZTE)*

Which test cases for timing should be added on the NR-U test case list?

* Proposal 1: (Ericsson, ZTE): Add the following test case on the test case list for NR-U:
  + Timing (timing advance)
    - NR-U PCell
* Proposal 2 (Ericsson): Add the following test case on the test case list for NR-U:
  + Timing (timing advance)
    - NR-U PSCell
* Recommended WF
  + Discuss the proposals in the comment section. Can Proposals 1-2 be agreed?

Issue 2-1-6 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | We can support proposal 1 and 2. |
| Ericsson | Support Proposal 1 and Proposal 2. |

**Issue 2-1-7: Test cases on BWP switching and interruption**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2100841 (ZTE), R4-2100773 (MediaTek)*

Should the test cases left FFS for BWP switching be included in the NR-U test case list?

* Option 1 (Ericsson): Add the following test cases on the test case list for NR-U:
  + BWP switching delay and interruption
    - NR PCC (PCC)
    - NR-U PCC
    - NR-U PSCC and E-UTRAN PCC (FDD, TDD)
* Option 2 (MediaTek): Legacy DCI/timer/RRC-based BWP switching tests on NR-U cell are *not* necessary while UE has passed the corresponding R15 tests.
* Option 3 (ZTE): The DCI/timer/RRC-based BWP switching can be tested only by UEs supporting NR-U SA mode. The other test cases can be de-prioritized.
* Recommended WF
  + Discuss the options in the comment section.

Issue 2-1-7 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | We see option 3 as a possible compromise here. Don’t support Option 2 since we can’t assume that the UE passing R15 tests can pass NR-U tests. |
| Huawei | Support option 2 |
| MediaTek | Option 2.  No need to test the legacy requirement multiple times. |
| Ericsson | Support option 1.  To MediaTek: we still need these test cases, but later we will work on rules to prevent unnecessary multiple testing. For example, these tests are needed only for the SA UE-U UE capable of only NR-U bands. Such UE cannot pass the legacy tests. |

**Issue 2-1-8: Test cases on PSCell addition/release delay**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2102370 (Ericsson), R4-2100773 (MediaTek), R4-2100841 (ZTE)*

Should the test case for PSCell addition/release delay for unknown cell be included in the NR-U test case list?

* Proposal 1 (Ericsson, MediaTek, ZTE): Do *not* define the following test case for NR-U:
* PSCell addition/release delay
  + NR-U PSCell with E-UTRA PCC, unknown
* Recommended WF
  + Discuss the proposal in the comment section. Can Proposal 1 be agreed?

Issue 2-1-8 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Support Proposal 1. |
| MediaTek | Proposal 1. |
| Ericsson | Support Proposal 1 |
| Nokia | Ok with Proposal 1. |

**Issue 2-1-9: Test cases on active TCI state switching delay**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2102370 (Ericsson)*

Which test cases on TCI state switching delay should be included on the NR-U test case list?

* Proposal 1:
  + Option 1.1 (Ericsson): Add the following test cases on the test case list for NR-U:
    - TCI state switching delay
      * NR-U PCC
      * NR-U SCC, with NR PCC (FR1)
      * NR-U PSCC, with E-UTRAN PCC (FDD, TDD)
* Proposal 2:
  + Option 2.1 (Ericsson): It shall be investigated whether some of the test cases for active TCI state switching are redundant for UE supporting both EN-DC and NR SA scenarios for NR-U.
* Recommended WF
  + Discuss the proposals in the comment section. Can Proposal 1 be agreed? What are the company views on Proposal 2?

Issue 2-1-9 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | No need to have TCI state switching test cases as we even don’t have such cases for NR FR1. |
| MediaTek | Suggest low priority for TCI test in FR1, since no R15 baseline. |
| Ericsson | Support proposal 1 and proposal 2. |

**Issue 2-1-10: Test cases for interruptions**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2100773 (MediaTek)*

Should the test cases left FFS for interruptions be included in the NR-U test case list?

* Option 1 (Ericsson): Add the following test cases on the test case list for NR-U:
  + Interruptions
    - 1a. Due to NR-U SCell addition/release, with:
      * NR PCC (FR1)
      * NR-U PCC
      * NR-U PSCC and E-UTRAN PCC (FDD,TDD)
    - 1b. During measurements no deactivated NR-U SCell, with:
      * NR PCC (FR1)
      * NR-U PCC
      * NR-U PSCC and E-UTRAN PCC (FDD,TDD)
* Option 2 (MediaTek): Test cases for the interruption as the legacy requirement are not necessary, while UE has passed the legacy tests.
* Recommended WF
  + Discuss the options in the comment section.

Issue 2-1-10 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Suggest low priority because the requirements are the same as R15’s. |
| Ericsson | Support option 1. |

**Issue 2-1-11: Test cases for intra-frequency measurement procedure**

*The listed proposals are discussed in R4-2100773 (MediaTek)*

Should the test cases agreed in RAN4#97e for intra-frequency measurement procedure with the cell setup discussed in the proposals below be included on the test case list for NR-U?

* Proposal 1
  + Option 1.1 (MediaTek): For Intra-frequency measurement procedure test cases, test configuration of “NR-U SCC, with NR-U PCC” is not needed while it can be replaced by “NR-U SCC, with NR PCC (FR1)” and “NR-U PCC”.
  + Option 1.2: Keep the agreed test cases for intra-frequency measurement procedure.
* Proposal 2
  + Option 2.1 (MediaTek) For Intra-frequency measurement procedure test cases, test configuration of “NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)” is not needed while it can be replaced by “NR-U PSCC, with E-UTRAN PCC (FDD,TDD)”.
  + Option 2.2: Keep the agreed test cases for intra-frequency measurement procedure.
* Recommended WF
  + Discuss the proposals in the comment section.

Issue 2-1-11 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | Agree with option 1 and option 2. |
| MediaTek | Support Option 1.1 and 2.1.  “NR-U SCC, with NR-U PCC” is very similar to “NR-U PCC”, and there is no different impact on the requirement of measurement procedure.  “NR-U SCC, with NR-U PSCC” is very similar to “NR-U PSCC”. |
| Ericsson | Do not agree, not Ok to revert the earlier agreement.  We still need test cases, but later we will add rules to avoid unnecessary multiple testing. |
| Nokia | We prefer to keep the agreed test cases, thus support Option 1.2 and 2.2. |

**Issue 2-1-12: Test cases for inter-frequency measurement procedure**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2102531 (Ericsson), R4-2101134 (Nokia), R4-2100836 (ZTE)*

Should the test cases left FFS for SS-RSRQ and SS-SINR inter-frequency measurements be included in the NR-U test case list?

* Proposal 1 (Ericsson, Nokia, ZTE): Add the following test cases on the test case list for NR-U:
  + Inter-frequency SS-RSRQ, SS-SINR measurements on:
    - NR-U inter-frequency, with NR PCC (FR1)
    - NR-U inter-frequency, with NR-U PCC
    - NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)
    - NR (FR1) inter-frequency, with NR-U PCC
    - NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)
* Recommended WF
  + Can Proposal 1 be agreed?

Issue 2-1-12 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Support proposal 1. |
| MediaTek | Not agree to Proposal 1. In R15, the test for measurement procedures are based on RSRP, why it should do differently in NR-U? It will introduce too-many tests.  Besides, the measurements on NR (FR1) inter-frequency (4th and 5th sub-bullets) have the same requirement as R15 and thus are not necessary. |
| Ericsson | Support Proposal 1, it’s aligned with the GTW agreement from the last meeting on intra-frequency. |
| Nokia | Support Proposal 1. |

**Issue 2-1-13a: Test cases for inter-RAT measurement procedure**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2102531 (Ericsson), R4-2100836 (ZTE)*

Should the test cases left FFS for inter-RAT RSRP/RSRQ measurements be included on the NR-U test case list?

* Proposal 1 (Ericsson, ZTE): Add the following test cases on the test case list for NR-U:
  + Inter-RAT measurement procedure
    - NR-U-E-UTRA RSRP/RSRQ (needed for HO):
      * On E-UTRA (FDD,TDD), with NR-U PCC
      * On E-UTRA (FDD,TDD), with NR-U PSCC
* Recommended WF
  + Discuss the proposals in the comment section. Can Proposal 1 be agreed?

Issue 2-1-13a Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Support proposal 1 (this is the only proposal available now). |
| MediaTek | Not agree for RSRQ but fine with RSRP.  In R15, the test for measurement procedures are based on RSRP, why should it introduce more cases separately for RSRQ in NR-U? It will introduce too-many tests. |
| Ericsson | Support Proposal 1.  Do not agree with MediaTek on not defining TCs for RSRQ in general and in this specific case too. |

**Issue 2-1-13b: Test cases for inter-RAT measurement procedure: RSSI and CO**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2102531 (Ericsson)*

Should test cases for inter-RAT RSSI and CO measurements be included on the NR-U test case list?

* Proposal 1 (Ericsson): Add the following test cases on the test case list for NR-U:
  + Inter-RAT measurement procedure
    - E-UTRA-NR-U RSSI measurements requirements:
      * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC
      * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC
    - E-UTRA-NR-U CO measurements requirements:
      * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC
      * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC
* Recommended WF
  + Discuss the proposals in the comment section. Can Proposal 1 be agreed?

Issue 2-1-13b Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Suggest low priority with the 2nd bullet “E-UTRA (FDD,TDD) PCC and NR-U PSCC”, because it can be included in “E-UTRA (FDD,TDD) PCC” |
| Ericsson | Support Proposal 1. Disagree with MediaTek, this is the basic NR-U functionality and therefore must be tested. |
| Nokia | Support Proposal 1. Similarly as for LTE LAA, we think it is ok to add test cases for RSSI and CO. |

**Issue 2-1-14a: Test cases for accuracy for NR-U intra-frequency measurements – SS-RSRQ/SS-SINR**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2100837 (ZTE), R4-2100773 (MediaTek)*

Should the test cases left FFS for intra-frequency SS-RSRQ and SS-SINR measurement accuracy be included in the NR-U test case list?

* Proposal 1
  + Option 1.1 (Ericsson, ZTE): Add the following test cases on the test case list for NR-U:
    - Accuracy for NR-U intra-frequency measurements
      * 1a. Intra-frequency absolute accuracies for SS-RSRQ on:
        + 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)
      * 1b. Intra-frequency absolute accuracies for SS-SINR on:
        + 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)
  + Option 1.2 (MediaTek): Test cases for SS-RSRQ/SS-SINR measurement accuracy under CCA are not necessary.
* Recommended WF
  + Discuss the proposals and options in the comment section.

Issue 2-1-14a Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Support Option 1.1. We don’t support to assume that the UE can pass one test if it can pass another. And if such assumption is correct then it doesn’t harm the UE to be tested, it doesn’t add any extra work to UE implementation. We don’t see strong technical reasons why some tests should be omitted.  In legacy test cases, we have SS-RSRP, SS-RSRQ and SS-SINR which means one metric cannot represent the other two. |
| MediaTek | Do not agree on Proposal 1, because there is no need to test RSRQ/SINR for both measurement procedure and accuracy. It is not the same approach as in R15. We can accept to test RSRQ/SINR for measurement accuracy but not in measurement procedure.  Besides, for Proposal 1, same comment as 2-1-11.  “NR-U SCC, with NR-U PCC” is very similar to “NR-U PCC”, and there is no different impact on the requirement of measurement procedure.  “NR-U SCC, with NR-U PSCC” is very similar to “NR-U PSCC”. |
| Ericsson | Support option 1.1. Do not agree with MediaTek. RSRQ must be tested and it was already agreed in the last meeting.  To MediaTek: this is on accuracy, so MediaTek should be fine at least here. Also, we need the TCs, but then we agreed to define rules to avoid multiple unnecessary testing. |
| Nokia | Ok with Option 1.1. |

**Issue 2-1-14b: Test cases for accuracy for NR-U intra-frequency measurements – NR-U SCC with NR-U PCC, and N-RU SCC with NR-U PSCC and E-UTRAN PCC**

Should the test cases agreed in RAN4#97e for intra-frequency measurement accuracy with the cell setup discussed in the proposals below be included on the test case list for NR-U?

* Proposal 1
  + Option 2.1 (MediaTek): For Intra-frequency measurement accuracy test cases, test configuration of “NR-U SCC, with NR-U PCC” is not needed while it can be replaced by “NR-U SCC, with NR PCC (FR1)” and “NR-U PCC”.
  + Option 2.2: Keep the agreed test cases for intra-frequency measurement accuracy.
* Proposal 2
  + Option 3.1 (MediaTek) For Intra-frequency measurement accuracy test cases, test configuration of “NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)” is not needed while it can be replaced by “NR-U PSCC, with E-UTRAN PCC (FDD,TDD)”.
  + Option 3.2: Keep the agreed test cases for intra-frequency measurement accuracy.
* Recommended WF
  + Discuss the proposals and options in the comment section.

Issue 2-1-14b Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Same comment as in 2-1-14a. |
| Ericsson | Do not agree.  In general: we need these test cases, but we agreed to define rules to avoid unnecessary multiple testing. |
| Nokia | We prefer to keep the agreed test cases on the test case list, thus support options 2.2 and 3.2. |

**Issue 2-1-15: Test cases for accuracy for NR-U inter-frequency measurements**

*The listed proposals are discussed in R4-2102524 (Ericsson), R4-2100837 (ZTE), R4-2101134 (Nokia), R4-2100773 (MediaTek)*

Should the test cases left FFS for inter-frequency SS-RSRQ and SS-SINR measurement accuracy be included in the NR-U test case list?

* Option 1 (Ericsson, ZTE, Nokia): Add the following test cases on the test case list for NR-U:
  + Accuracy for NR-U inter-frequency measurements
    - 1a. Inter-frequency absolute and relative accuracies for SS-RSRQ on:
      * NR-U neighbor, with NR PCC (FR1)
      * NR-U neighbor, with NR-U PCC
      * NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD)
    - 1b. Inter-frequency absolute and relative accuracies for SS-SINR on:
      * NR-U neighbor, with NR PCC (FR1)
      * NR-U neighbor, with NR-U PCC
      * NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD)
      * NR (FR1) inter-frequency, with NR-U PCC
      * NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)
* Option 2 (MediaTek): Test cases for SS-RSRQ/SS-SINR measurement accuracy under CCA are not necessary.
* Recommended WF
  + Discuss the options in the comment section.

Issue 2-1-15 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Support Option 1. We don’t support to assume that the UE can pass one test if it can pass another. And if such assumption is correct then it doesn’t harm the UE to be tested, it doesn’t add any extra work to UE implementation. We don’t see strong technical reasons why some tests should be omitted.  In legacy test cases, we have SS-RSRP, SS-RSRQ and SS-SINR which means one metric cannot represent the other two. |
| MediaTek | Do not agree on Proposal 1, because there is no need to test RSRQ/SINR for both measurement procedure and accuracy. It is not the same approach as in R15. We can accept to test RSRQ/SINR for measurement accuracy but not in measurement procedure.  Besides, for Proposal 1b, same comment as 2-1-12.  The measurements on NR (FR1) inter-frequency (4th and 5th sub-bullets) have the same requirement as R15 and thus are not necessary. |
| Ericsson | Support Option 1.  Do not agree with MediaTek. This needs to be discussed in GTW, since it’s the same MediaTek’s comment on many issues. |
| Nokia | Support Option 1. |

**Issue 2-1-16a: Test cases for accuracy for NR-U inter-RAT measurements**

*The listed proposals are discussed in R4-2102524 (Ericsson)*

Should the test cases left FFS for inter-RAT E-UTRA RSRP/RSRQ measurement accuracy be included in the NR-U test case list?

* Proposal 1 (Ericsson): Add the following test cases on the test case list for NR-U:
  + Accuracy for NR-U inter-RAT measurements
    - 1a. NR-U – E-UTRA RSRP/RSRQ (needed for HO) with:
      * NR-U PCC
      * NR-U PSCC
* Recommended WF
  + Discuss the proposals in the comment section. Can Proposal 1 be agreed?

Issue 2-1-16a Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Same comment as 2-1-13a.  Not agree for RSRQ but fine with RSRP.  In R15, the test for measurement procedures are based on RSRP, why should it introduce more cases separately for RSRQ in NR-U? It will introduce too-many tests. |
| Ericsson | Support Proposal 1.  Do not agree with MediaTek. This needs to be discussed in GTW, since it’s the same MediaTek’s comment on many issues. |

**Issue 2-1-16b: Test cases for accuracy for NR-U inter-RAT measurements: RSSI and CO**

*The listed proposals are discussed in R4-2102524 (Ericsson)*

Should the test cases for E-UTRA-NR-U RSSI and CO measurement accuracy be included in the NR-U test case list?

* Proposal 1 (Ericsson): Add the following test cases on the test case list for NR-U:
  + 1b. E-UTRA-NR-U RSSI measurement accuracy requirements:
    - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC
    - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC
  + 1c. E-UTRA-NR-U CO measurement accuracy requirements:
    - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC
    - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC
* Recommended WF
  + Discuss the proposals in the comment section. Can Proposal 1 be agreed?

Issue 2-1-16b Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Same comment as 2-1-13b.  Suggest low priority with the 2nd bullet “E-UTRA (FDD,TDD) PCC and NR-U PSCC”, because it can be included in “E-UTRA (FDD,TDD) PCC” |
| Ericsson | Support Proposal 1, do not agree with MediaTek. |
| Nokia | Support Proposal 1. Ok to include test cases for RSSI and CO accuracy. |

### Sub-topic 2-2: Test case details for cell re-selection

*Sub-topic description: Proposals related to SFTD measurement test cases are discussed under this sub-topic:*

*Issue 2-2-1: Test configurations for cell re-selection*

*Issue 2-2-2: Cell specific test parameters for cell re-selection*

*Issue 2-2-3: Test requirements for cell re-selection*

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

**Issue 2-2-1: Test configurations for cell re-selection**

*The listed proposals are discussed in R4-2102244 (Ericsson)*

Which test configurations are to be included for cell re-selection test cases?

* Proposal 1 (Ericsson): The standalone cell reselection test cases are defined based on the test configurations shown in Table 1, Table 2 and Table 3.

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

Table 1 Configuration for cell change from NR-U to NR-U

|  |  |  |
| --- | --- | --- |
| 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 2 Configuration for cell change from NR-U to NR

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell without CCA | Description of a cell with CCA |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 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 Configuration for cell change from NR to NR-U

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-2-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Agreeable in our view. |
| Ericsson | Support Proposal 1. |

**Issue 2-2-2: Cell specific test parameters for cell re-selection**

*The listed proposals are discussed in R4-2102244 (Ericsson)*

Which cell specific test parameters should be included in cell re-selection test cases to account for LBT impact?

* Proposal 1 (Ericsson): 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
  + Discuss the proposal in the comment section. Can Proposal 1 be agreed?

Issue 2-2-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Can further check. The “DBT window” means LBT window right? |
| Huawei | Depends on the CCA model. |
| Ericsson | Support Proposal 1. |

**Issue 2-2-3: Test requirements for cell re-selection**

*The listed proposals are discussed in R4-2102244 (Ericsson)*

How to define test requirements for cell re-selection?

* Proposal 1 (Ericsson): Reselection test shall verify that maximum allowed CCA failures for Md, Mm and Me.
* Recommended WF
  + Discuss the proposal in the comment section. Can Proposal 1 be agreed?

Issue 2-2-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1 |

### Sub-topic 2-3: Test case details for handover

*Sub-topic description: Proposals related to handover test cases are discussed under this sub-topic:*

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

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

*Issue 2-3-3: Test requirements for handover*

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

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

*The listed proposals are discussed in R4-2102242 (Ericsson)*

Which test configurations are to be included in handover test cases?

* Proposal 1 (Ericsson): Handover test case configurations are aligned with the configurations used in IDLE mode cell reselection test cases.
* For cell change from NR-U to NR-U:

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

Table 1 Configuration for cell change from NR-U to NR-U

|  |  |  |
| --- | --- | --- |
| 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 2 Configuration for cell change from NR-U to NR

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell without CCA | Description of a cell with CCA |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 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 Configuration for cell change from NR to NR-U

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-3-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Agreeable to us. |
| Ericsson | Support proposal 1 |
| Nokia | Proposal 1 is ok, but configurations also need to be agreed for E-UTRAN - NR-U handover. Here we propose:  LTE FDD - NR with CCA 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  LTE TDD - NR with CCA 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  However, we should refer to higher level agreement for Issue 1-1-5. |

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

*The listed proposals are discussed in R4-2102242 (Ericsson)*

Which cell specific test parameters should be included in handover test cases to account for LBT impact?

* Proposal 1 (Ericsson): 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
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-3-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | DBT window means LBT window? A typo? |
| Ericsson | Support Proposal 1.  To ZTE: DBT window is the RAN1 terminology. |

**Issue 2-3-3: Test requirements for handover**

*The listed proposals are discussed in R4-2102242 (Ericsson)*

How to define test requirements for handover test cases?

* Proposal 1: (Ericsson): 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
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-3-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | Fine with proposal 1, and it may apply to test cases. |
| Ericsson | Support Proposal 1. |
| Nokia | Ok with L1, L1’ and L2, but definition of L3 in the test case depends on whether UL LBT failures are to be tested in these test cases. |

### Sub-topic 2-4: Test case details for RRC re-establishment

*Sub-topic description: Proposals related to RRC re-establishment test cases are discussed under this sub-topic:*

*Issue 2-4-1: Test cases to be introduced for RRC re-establishment*

*Issue 2-4-2: Test configurations for RRC re-establishment test cases*

*Issue 2-4-3: LBT (CCA) model for RRC re-establishment test cases*

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

**Issue 2-4-1: Test cases to be introduced for RRC re-establishment**

*The listed proposals are discussed in R4-2102647 (Ericsson)*

Which test cases are to be included for RRC re-establishment?

* Proposal 1 (Ericsson): 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:
  + TC1: Intra-frequency RRC Re-establishment in FR1 with known target cell subject to CCA
  + TC2: Inter-frequency RRC Re-establishment in FR1 with unknown target cell subject to CCA
  + TC3: Intra-frequency RRC Re-establishment in FR1 with unknown target cell subject to CCA
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-4-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |
| Nokia | Ok with Proposal 1. We have included these test cases in our draft CR for RRC re-establishment. |

**Issue 2-4-2: Test configurations for RRC re-establishment test cases**

*The listed proposals are discussed in R4-2102647 (Ericsson)*

Which test configurations are to be included for RRC re-establishment test cases?

* Proposal 1: (Ericsson): 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 |

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-4-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1 |
| Nokia | After the agreement for Issue 1-1-4, Proposal 1 is ok. |

**Issue 2-4-3: LBT (CCA) model for RRC re-establishment test cases**

*The listed proposals are discussed in R4-2102647 (Ericsson)*

How to define the details of LBT (CCA) model for RRC re-establishment test cases?

* Proposal 1 (Ericsson): NR-U to NR-U RRC re-establishment tests are defined for the following LBT configuration/setting:
  + - 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
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-4-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | The P value depends on the CCA model. |
| Ericsson | Support Proposal 1, it’s now also aligned with the GTW agreements. |
| Nokia | This depends on the agreements under Topic #1. LBT success probability for this test case can be discussed after agreement about default value and the other possible values is made. |

### Sub-topic 2-5: Test case details for RRC connection release with re-direction

*Sub-topic description: Proposals related to RRC connection release with re-direction test cases are discussed under this sub-topic:*

*Issue 2-5-1: Test cases to be introduced for RRC connection release with re-direction*

*Issue 2-5-2: Test configurations for RRC connection release with re-direction test cases*

*Issue 2-5-3: LBT (CCA) model for RRC connection release with re-direction test cases*

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

**Issue 2-5-1: Test cases to be introduced for RRC connection release with re-direction**

*The listed proposals are discussed in R4-2102648 (Ericsson)*

Which test cases are to be introduced for RRC connection release with re-direction?

* Proposal 1: (Ericsson): At least the following NR-U 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:
  + - TC1: Redirection from NR with CCA in FR1 to NR in CCA in FR1
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-5-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

**Issue 2-5-2: Test configurations for RRC connection release with re-direction test cases**

*The listed proposals are discussed in R4-2102648 (Ericsson)*

Which test configurations are to be included in test cases for RRC connection release with re-direction?

* Proposal 1 (Ericsson): NR-U 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 | Description |
| 1 | With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-5-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. But this is related to similar issue in general configurations under topic #1. |

**Issue 2-5-3: LBT (CCA) model for RRC connection release with re-direction test cases**

*The listed proposals are discussed in R4-2102648 (Ericsson)*

How to define the details of LBT (CCA) model for test cases for RRC connection release with re-direction?

* Proposal 1 (Ericsson): NR-U to NR-U RRC connection release with redirection test is defined for the following LBT configuration/setting:
  + - Serving cell: PCCA\_UL=1 and PCCA\_DL=1 in all test times
    - Target cell: PCCA\_UL=1 and PCCA\_DL< 1 (e.g. 0.75) in all test times
* Proposal 2 (Ericsson): In NR-U 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
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-5-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1 and 2. |

### Sub-topic 2-6: Test case details for timing

*Sub-topic description: Proposals related to timing test cases are discussed under this sub-topic:*

*Issue 2-6-1: Test configurations for UE transmit timing test cases*

*Issue 2-6-2: LBT (CCA) model for UE transmit timing test cases*

*Issue 2-6-3: Test configurations for UE timing advance adjustment accuracy test cases*

*Issue 2-6-4: LBT (CCA) model for UE timing advance adjustment accuracy test cases*

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

**Issue 2-6-1: Test configurations for UE transmit timing test cases**

*The listed proposals are discussed in R4-2102649 (Ericsson)*

Which test configurations to include for UE transmit timing test cases?

* Proposal 1 (Ericsson): The UE transmit timing tests are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:

**Table 1: Configuration related to SSB SCS and BW in UE transmit timing tests in 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 |
| Note 1: The UE is only required to be tested in one of the supported test configurations. | |

**Table 2: Configuration related to SSB SCS and BW in UE transmit timing tests in SA**

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

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-6-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. Bu this is related to general test configuration discussion in Topic #1. |

**Issue 2-6-2: LBT (CCA) model for UE transmit timing test cases**

*The listed proposals are discussed in R4-2102649 (Ericsson)*

How to define the details of LBT (CCA) model for UE transmit timing test cases?

* Proposal 1 (Ericsson): UE transmit timing tests are defined for the following LBT configuration/setting in SpCell:
  + - PCCA\_UL=1 and PCCA\_DL < 1 depending on SSB periodicity (e.g. 0.5% for TSSB=20 ms) in all test times
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-6-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

**Issue 2-6-3: Test configurations for UE timing advance adjustment accuracy test cases**

*The listed proposals are discussed in R4-2102649 (Ericsson)*

Which test configurations to include for UE timing advance adjustment accuracy test cases?

* Proposal 1 (Ericsson): The timing advance adjustment accuracy tests are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:

**Table 1: Configuration related to SSB SCS and BW in UE timing advance tests in 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 |
| Note 1: The UE is only required to be tested in one of the supported test configurations. | |

**Table 2: Configuration related to SSB SCS and BW in UE advance timing tests in SA**

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

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-6-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1, but it’s related to the general configuration discussion in Topic #1. |

**Issue 2-6-4: LBT (CCA) model for UE timing advance adjustment accuracy test cases**

*The listed proposals are discussed in R4-2102649 (Ericsson)*

How to define the details for LBT model for UE timing advance adjustment accuracy test cases?

* Proposal 1 (Ericsson): UE timing advance adjustment accuracy tests are defined for the following LBT configuration/setting in SpCell:
  + - PCCA\_UL=1 and PCCA\_DL =1 in all test times
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-6-4 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

#### Sub-topic 2-7: Test case details for BWP switching

*Sub-topic description: Proposals related to BWP switching test cases are discussed under this sub-topic:*

*Issue 2-7-1: Test configurations for BWP switching test cases*

*Issue 2-7-2: LBT (CCA) model for BWP switching test cases*

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

**Issue 2-7-1: Test configurations for BWP switching test cases**

*The listed proposals are discussed in R4-2102651 (Ericsson)*

Which test configurations to include for BWP switching delay test cases?

* Proposal 1 (Ericsson): The tests for BWP switching under consistent UL failure are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:

**Table 1: Configuration related to SSB SCS and BW in 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 |
| Note 1: The UE is only required to be tested in one of the supported test configurations. | |

**Table 2: Configuration related to SSB SCS and BW iin SA**

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

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-7-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1, but it’s related to the more general configuration discussion in Topic #1. |

**Issue 2-7-2: LBT (CCA) model for BWP switching test cases**

*The listed proposals are discussed in R4-2102651 (Ericsson)*

How to define the details of LBT (CCA) model for BWP switching test cases?

* Proposal 1 (Ericsson): The tests on BWP switching under consistent UL failure are defined for the following LBT configuration/setting in SpCell:

**Table 3: LBT settings in UL and DL BWPs in SpCell**

|  |  |  |
| --- | --- | --- |
| 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 |

* Proposal 2 (Ericsson): Periodic SRS is configured in the SpCell to enable the UE to detect consistent UL LBT failure in the SpCell.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-7-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1 and 2. |

### Sub-topic 2-8: Test case details for TCI state switching delay

*Sub-topic description: Proposals related to TCI state switching delay test cases are discussed under this sub-topic:*

*Issue 2-8-1: Test cases to be introduced for TCI state switching*

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

**Issue 2-8-1: Test cases to be introduced for TCI state switching**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

Which test cases to introduce for TCI state switching delay?

* Proposal 1 (Ericsson): In Rel-16 NR-U, test cases for active TCI state switching are introduced for the following cases:
  + EN-DC, NR PSCell under CCA, known TCI state, MAC-based triggering
  + EN-DC, NR PSCell under CCA, known TCI state, RRC-based triggering
  + NR SA, PCell under CCA, known TCI state, MAC-based triggering
  + NR SA, PCell under CCA, known TCI state, RRC-based triggering
  + NR SA, SCell under CCA, known TCI state, MAC-based triggering
  + NR SA, SCell under CCA, known TCI state, RRC-based triggering
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussion is to agree on test configurations on a general level i.e. issues on Sub-topic 1.1.

Issue 2-8-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. We can also define a rule to avoid multiple unnecessary testing. |

### Sub-topic 2-9: Test case details for Interruptions

*Sub-topic description: Proposals related to interruption test cases are discussed under this sub-topic:*

*Issue 2-9-1: Deactivated SCell measurement cycle for interruption test cases*

*Issue 2-9-2: LBT (CCA) model for interruption test cases*

*Issue 2-9-3: Phases of interruption test cases*

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

**Issue 2-9-1: Deactivated SCell measurement cycle for interruption test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

What should be the measurement cycle for deactivated SCell in interruption test cases?

* Proposal 1 (Ericsson): During interruption tests, a deactivated SCell measurement cycle of 160ms is used.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-9-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

**Issue 2-9-2: LBT (CCA) model for interruption test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

How to define the details of LBT model for interruption test cases?

* Proposal 1 (Ericsson): LBT model is configured in interruption tests, with a channel access success probability P=[0.75]
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-9-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

**Issue 2-9-3: Phases of interruption test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

How to define the different phases of interruption test cases?

* Proposal 1 (Ericsson): The interruption requirements are verified in tests with the following phases
  + - T1 : UE is configured with PCell and PScell if applicable, and measures/reports candidate Scell such that it will be known in T2
    - T2 : Scell is added, interruption requirement verified
    - T3 : Scell is activated, interruption requirement verified
    - T4 : Scell is deactivated, interruption requirement verified
    - T5 : Deactivated Scell measurement interruption requirement is verified
    - T6 : Scell is released, interruption requirement verified
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-9-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

### Sub-topic 2-10: Test case details for SCell activation/deactivation

*Sub-topic description: Proposals related to SCell activation/deactivation test cases are discussed under this sub-topic:*

*Issue 2-10-1: Measurement cycles for SCell (de)activation test cases*

*Issue 2-10-2: LBT (CCA) model for SCell (de)activation test cases*

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

**Issue 2-10-1: Measurement cycles for SCell (de)activation test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

How to take into account different measurement cycles for SCell (de)activation in the test cases?

* Proposal 1 (Ericsson): Define test cases for SCell (de)activation of known SCell in NR-U for both measurement cycles 160 and 320ms.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-10-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

**Issue 2-10-2: LBT (CCA) model for SCell (de)activation test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

How to model LBT (CCA) in SCell (de)activation test cases?

* Proposal 1 (Ericsson): Test cases for SCell (de)activation testing with NR PCC in FR1 with SCC under CCA are modeled with only DL CCA in SCell.
* Proposal 2 (Ericsson): Test cases for SCell (de)activation testing with NR PCC under CCA with SCC under CCA are modeled with DL CCA in SCell and UL CCA in PCell.
* Proposal 3 (Ericsson): Test cases for SCell (de)activation testing with NR PSCC under CCA with SCC under CCA are modeled with DL CCA in SCell and UL CCA in PSCell.
* Proposal 4 (Ericsson): For UL CCA model in SCell (de)activation testing, PCCA\_UL = [0.75] is used for all time intervals.
* Proposal 5 (Ericsson): For DL CCA model in SCell (de)activation testing, PCCA\_DL = [0.75] is used for all time intervals.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-10-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1-5. |

### Sub-topic 2-11: Test case details for RLM

*Sub-topic description: Proposals related to RLM test cases are discussed under this sub-topic:*

*Issue 2-11-1: Test case sections to be introduced for RLM*

*Issue 2-11-2: SNR combinations for RLM tests*

*Issue 2-11-3: Test configurations for RLM tests*

*Issue 2-11-4: LBT (CCA) model for RLM tests*

*Issue 2-11-5: Testing for UE with different capabilities and under different channel occupancy*

*Issue 2-11-6: Test cases for 4RX UEs*

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

**Issue 2-11-1: Test case sections to be introduced for RLM**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

Which test cases are to be introduced for RLM?

* Proposal 1(Ericsson):
  + The following sections for NR-U RLM are added:
    - For PSCell in Scenario B:
      * A.10.3.1.2 Radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode
      * A.10.3.1.3 Radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode
      * A.10.3.1.4 Radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode
      * A.10.3.1.5 Radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode
    - For PCell in Scenario C:
      * A.11.4.1.2 Radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in non-DRX mode
      * A.11.4.1.3 Radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in non-DRX mode
      * A.11.4.1.4 Radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in DRX mode
      * A.11.4.1.5 Radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in DRX mode
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-11-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

**Issue 2-11-2: SNR combinations for RLM tests**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

Which SNR combinations are to be tested for each RLM test?

* Proposal 1 (Ericsson): For RLM out-of-sync, Test 1 and Test 2 (with different SNR combinations) are developed for testing both requirements (RLM-RS SSB Es/Iot ≥-7 dB and for RLM-RS SSB Es/Iot <-7 dB).
  + 1a. For RLM out-of-sync, Test 1 SNRs: (1 dB, [-7 dB], [-15 dB]).
  + 1b. For RLM out-of-sync, Test 2 SNRs: (1 dB, [-3 dB], [-7 dB]).
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-11-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | Some question to the second bullet of proposal 1. What is the expected outcome of the test as OOS will not be triggered. |
| Ericsson | Support proposal 1.  To Huawei: whether it is triggered or not depends on NW-configured parameters. The requirement is different for the two cases, and both needs to be tested. |

**Issue 2-11-3: Test configurations for RLM tests**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

Which test configurations are to be included in the RLM tests?

* Proposal 1 (Ericsson): Test configurations for NR PCell (Scenario C) and NR PSCell (Scenario B) in all NR-U RLM test cases:
  + <TDD, SSB SCS 30 kHz, data SCS 30 kHz, bandwidth 40 MHz>
  + Note: in Scenario B, the above configuration is further combined with LTE FDD and LTE TDD, resulting in two configurations in test cases for Scenario B.

EN-DC:

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR: TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| 2 | LTE TDD; NR: TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| NOTE: The UE is only required to pass in one of the supported test configurations above. | |

SA:

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | TDD, SSB SCS 30 kHz, data SCS 30 kHz, bandwidth 40 MHz |

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level, i.e. issues on Sub-topic 1-1.

Issue 2-11-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1, related to the general configuration in Topic #1. |

**Issue 2-11-4: LBT (CCA) model for RLM tests**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

Details of LBT (CCA) model for RLM tests?

* Proposal 1 (Ericsson): DL CCA model for RLM in-sync:
  + T1: DL PCCA=1.0,
  + T2-T5: DL PCCA=TBD.
* Proposal 2 (Ericsson): UL CCA model for RLM in-sync: UL PCCA=1.0 in T1-T5.
* Proposal 3: (Ericsson): DL CCA model for RLM out-of-sync:
  + T1: DL PCCA=1.0,
  + T2, T3: DL PCCA=TBD.
* Proposal 4 (Ericsson): UL CCA model for RLM out-of-sync: UL PCCA=1.0 in T1-T3.

Recommended WF

* Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-11-4 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1-4. |

**Issue 2-11-5: Testing for UE with different capabilities and under different channel occupancy**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

How to test RLM for a UE with different capabilities?

* Proposal 1 (Ericsson): Use PCCA=0.75 and PCCA=0.5 in RLM out-of-sync test cases.
* Proposal 2 (Ericsson): Use PCCA=0.6 in RLM in-sync test cases.

Recommended WF

* + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-11-5 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposals 1 and 2. |

**Issue 2-11-6: Test cases for 4RX UEs**

* Proposal 1 (Ericsson): For NR-U, all relevant test cases (e.g., RLM test cases) have to also cover 4 RX UEs (similar to legacy Rel-16 NR).

Recommended WF

* + Can proposal 1 be agreed?

Issue 2-11-6 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. It’s supported by RF, so should not be controvercial. |

### Sub-topic 2-12: Test case details for link recovery

*Sub-topic description: Proposals related to link recovery test cases are discussed under this sub-topic:*

*Issue 2-12-1: Test case sections to be introduced for BFD and link recovery*

*Issue 2-12-2: Tests to be introduced for BFD and link recovery and test details*

*Issue 2-12-3: LBT (CCA) model for BFD and link recovery and test details*

*Issue 2-12-4: Test case sections to be introduced for L1-RSRP reporting*

*Issue 2-12-5: Reporting requirements for L1-RSRP measurement procedure test cases*

*Issue 2-12-6: LBT (CCA) model for L1-RSRP measurement reporting tests*

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

**Issue 2-12-1: Test case sections to be introduced for BFD and link recovery**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

Which test cases are to be included for BFD and link recovery?

* Proposal 1 (Ericsson):
  + Define the following BFD and LR test cases for NR-U:
    - A.10.3.4.1 EN-DC Beam Failure Detection and Link Recovery Test for FR1 PSCell configured with SSB-based BFD and LR in non-DRX mode
    - A.10.3.4.2 EN-DC Beam Failure Detection and Link Recovery Test for FR1 PSCell configured with SSB-based BFD and LR in DRX mode
    - A.11.4.4.1 Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in non-DRX mode
    - A.11.4.4.2 Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in DRX mode
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-12-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

**Issue 2-12-2: Tests to be introduced for BFD and link recovery and test details**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

How to define BFD and link recovery tests for different evaluation period depending on different BFD-RS SSB ES/Iot?

* Proposal 1 (Ericsson): To verify the different evaluation period (for BFD-RS SSB Es/Iot ≥ -7 dB and (BFD-RS SSB Es/Iot < -7 dB) in Table 8.5A.2.2-1, define the test cases with
  + 1) BFD-RS SSB Es/Iot ≥ -7 dB and
  + 2) BFD-RS SSB Es/Iot < -7 dB to verify the different evaluation period.
* Proposal 2 (Ericsson): For the case with BFD-RS SSB Es/Iot < -7 dB, set SSB Es/Iot = -3dB in T2 and set SSB Es/Iot = -12dB in T3/T4/T5, by reusing the test cases defined in Rel-15.
* Proposal 3 (Ericsson): For the case with BFD-RS SSB Es/Iot ≥ -7 dB, set SSB Es/Iot = [-1]dB in T2 and set SSB Es/Iot = [-7]dB in T3/T4/T5.
* Proposal 4 (Ericsson): SNR test points for BFD and LR tests with CCA should be adjusted for UEs capable of 4Rx, i.e., set lower SNR test point than the tests for 2Rx UEs.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-12-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1-4. |

**Issue 2-12-3: LBT (CCA) model for BFD and link recovery and test details**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

How to define LBT (CCA) model details for BFD and link recovery tests?

* Proposal 1 (Ericsson): BFD and LR tests specify the DL/UL CCA success rate given by PCCA\_DL and PCCA\_UL.
* Proposal 2 (Ericsson): BFD and LR tests set different PCCA according to the assumed channel access mode, i.e., LBE and FBE. Set higher DL CCA success rate (e.g. 0.75) for FBE and lower DL CCA success rate (e.g. 0.5) for LBE during the tests.
* Proposal 3 (Ericsson): Assume no UL CCA failure during the BFD and LR tests, that is, PCCA\_UL=1.0.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-12-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1-3. |

**Issue 2-12-4: Test case sections to be introduced for L1-RSRP reporting**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

Which test cases are to be defined for L1-RSRP measurement procedure?

* Proposal 1 (Ericsson): Define the following L1-RSRP measurement procedure test cases for NR-U:
  + A.9.3.3.1 SSB based L1-RSRP measurement when DRX is not used (SA SCell with NR PCell)
  + A.9.3.3.2 SSB based L1-RSRP measurement when DRX is used (SA SCell with NR PCell)
  + A.10.4.3.1 SSB based L1-RSRP measurement on PSCC when DRX is not used (EN-DC PSCell)
  + A.10.4.3.2 SSB based L1-RSRP measurement on PSCC when DRX is used (EN-DC PSCell)
  + A.10.4.3.3 SSB based L1-RSRP measurement on SCC when DRX is not used (EN-DC SCell with LTE PCell and NR-U PSCell)
  + A.10.4.3.4 SSB based L1-RSRP measurement on SCC when DRX is used (EN-DC SCell with LTE PCell and NR-U PSCell)
  + A.11.5.4.1 SSB based L1-RSRP measurement when DRX is not used (SA PCell)
  + A.11.5.4.2 SSB based L1-RSRP measurement when DRX is used (SA PCell)
  + A.11.5.4.3 SSB based L1-RSRP measurement on SCC when DRX is not used (SA SCell with NR-U PCell)
  + A.11.5.4.4 SSB based L1-RSRP measurement on SCC when DRX is used (SA SCell with NR-U PCell)
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.§

Issue 2-12-4 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

**Issue 2-12-5: Reporting requirements for L1-RSRP measurement procedure test cases**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

Es/Ioc to be used in L1-RSRP measurement procedure tests with CCA?

* Proposal 1 (Ericsson): For L1-RSRP measurement procedure tests with CCA, reuse the same Es/Ioc as Rel-15 tests.

How to define reporting requirements for L1-RSRP measurement procedure test cases?

* Proposal 2 (Ericsson): For NR-U L1-RSRP measurement procedure tests with DRX and non-DRX cases, RAN4 sets the same T1/T2 and reporting timing requirements as Rel-15 test, that is,
  + T1=5s, T2=1s.
  + TReport=80 slots (Periodic L1-RSRP reporting with PUCCH)
  + The UE shall send L1-RSRP report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the absolute accuracy requirement.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-12-5 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1 and 2. |

**Issue 2-12-6: LBT (CCA) model for L1-RSRP measurement reporting tests**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

How to define the details of LBT (CCA) model for L1-RSRP measurement procedure tests?

* Proposal 1 (Ericsson): L1-RSRP measurement procedure tests specify the DL/UL CCA success rate given by PCCA\_DL and PCCA\_UL.
* Proposal 2 (Ericsson): L1-RSRP measurement procedure tests set PCCA\_DL < 1 (e.g., 0.75). Set the common PCCA\_DL applicable for both FBE and LBE.
* Proposal 3 (Ericsson): RAN4 discuss whether L1-RSRP measurement procedure tests consider UL CCA failure or not during the tests. If not considered, set PCCA\_UL=1.0 in the test cases.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3. Issue 2-12-6 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1-3. |

### Sub-topic 2-13: Test case details for RRM measurements: Intra-frequency, inter-frequency and inter-RAT

*Sub-topic description: Proposals related to RRM measurement test cases are discussed under this sub-topic:*

*Issue 2-13-1: Test case sections to be introduced for intra-frequency measurements*

*Issue 2-13-2: Test configurations for RRM measurements*

*Issue 2-13-3: LBT (CCA) configuration for RRM measurement test cases*

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

**Issue 2-13-1: Test case sections to be introduced for intra-frequency measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which test cases are to be defined for intra-frequency measurements?

* Proposal 1 (Ericsson): The following test cases are defined for NR-U intra-frequency RRM measurements for PCC, SCC, and PSCC:
  + SA event triggered reporting test without gaps under non-DRX,
  + SA event triggered reporting test without gaps under DRX,
  + SA event triggered reporting test with per-UE gaps under non-DRX,
  + SA event triggered reporting test with per-UE gaps under DRX.
* Proposal 2 (Ericsson): Each test case is conducted for three A3 measurement quantities: SS-RSRP, SS-RSRQ, SS-SINR.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-13-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |
| Nokia | Proposal 1 is ok, Proposal 2 depends on agreements in Sub-topic 2-1. |

**Issue 2-13-2: Test configurations for RRM measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which test configurations are to be added for RRM measurements?

* Proposal 1 (Ericsson): Test configurations to be introduced for RRM measurements:

Scenario A:

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| NOTE: The UE is only required to be tested in one of the supported test configurations. | |

Scenario B:

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

Scenario C:

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

Inter-RAT E-UTRAN-NR-U:

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

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level, i.e. issues on Sub-topic 1-1.

Issue 2-13-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support the proposal. Also related to the general configuration discussion in Topic #1. |
| Nokia | Refer to agreement for issue 1-1-5. |

**Issue 2-13-3: LBT (CCA) configuration for RRM measurement test cases**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define the details of LBT (CCA) model for RRM measurement test cases?

* Proposal 1 (Ericsson): UL CCA model: PCCA\_UL=1.0 in all time intervals (T1 and T2).
* Proposal 2: (Ericsson): DL CCA model: PCCA\_DL=[0.75] in all time intervals (T1 and T2).
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-13-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |
| Nokia | The proposal should be aligned with the agreements made in GTW session for the LBT model. Probabilities can be discussed after the default probability and the set of alternative probabilities are agreed. |

### Sub-topic 2-14: Test case details for RSSI and CO measurements

*Sub-topic description: Proposals related to RSSI and CO measurement test cases are discussed under this sub-topic:*

*Issue 2-14-1: Test case sections to be introduced for RSSI and CO measurements*

*Issue 2-14-2: LBT (CCA) model for RSSI and CO measurements*

*Issue 2-14-3: Number of cells for RSSI and CO measurements*

*Issue 2-14-4: Test coverage for RSSI and CO measurements*

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

**Issue 2-14-1: Test configurations to be introduced for RSSI and CO measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which test configurations are to be included for RSSI and CO measurements?

* Proposal 1 (Ericsson): In RSSI and CO test cases, the test configurations are the same as for RRM measurement:

Scenario A:

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| NOTE: The UE is only required to be tested in one of the supported test configurations. | |

Scenario B:

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

Scenario C:

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

Inter-RAT E-UTRAN-NR-U:

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

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level, i.e. issues on Sub-topic 1-1.

Issue 2-14-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support the proposal, related to the general configuration discussion in Topic #1. |

**Issue 2-14-2: LBT (CCA) model for RSSI and CO measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define LBT (CCA) model details for RSSI and CO measurement test cases?

* Proposal 1 (Ericsson): UL CCA model: PCCA\_UL=1.0
* Proposal 2 (Ericsson): DL CCA model: PCCA\_DL=1.0
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-14-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |

**Issue 2-14-3: Number of cells for RSSI and CO measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define the number of cells for RSSI and CO measurement test cases?

* Proposal 1 (Ericsson): Number of cells for RSSI and CO measurements:
  + Scenario A:
    - Intra-frequency RSSI/CO: 2 cells (PCell, SCell)
    - Inter-frequency RSSI/CO: 2 cells (PCell, SCell) and 1 inter-frequency for RSSI/CO
  + Scenario B:
    - Intra-frequency RSSI/CO: 2 cells (E-UTRAN PCell, NR PSCell)
    - Inter-frequency RSSI/CO: 2 cells (E-UTRAN PCell, NR PSCell) and 1 inter-frequency for RSSI/CO
  + Scenario C:
    - Intra-frequency RSSI/CO: 1 cell (PCell)
    - Inter-frequency RSSI/CO: 1 cell (PCell) and 1 inter-frequency for RSSI/CO
  + Standalone Inter-RAT E-UTRAN-NR-U:
    - Inter-RAT RSSI/CO: 1 cell (E-UTRAN PCell) and 1 inter-RAT frequency for RSSI/CO
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-14-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1 |

**Issue 2-14-4: Test coverage for RSSI and CO measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define the test coverage for intra- and inter-frequency RSSI and CO measurement test cases?

* Proposal 1 (Ericsson): The following test coverage is proposed for *intra-frequency* RSSI and CO:
  + RSSI:
    - Test 1: Non-DRX, SMTC and RMTC are overlapping
    - Test 2: DRX, SMTC and RMTC are not overlapping
  + CO:
    - Test 1: DRX, SMTC and RMTC are overlapping
    - Test 2: Non-DRX, SMTC and RMTC are not overlapping
* Proposal 2 (Ericsson): The following test coverage is proposed for *inter-frequency* RSSI and CO:
  + - RSSI:
      * Non-DRX
    - CO:
      * DRX
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-14-4 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |

### Sub-topic 2-15: Test case details for SFTD measurements

*Sub-topic description: Proposals related to SFTD measurement test cases are discussed under this sub-topic:*

*Issue 2-15-1: Test configurations for SFTD measurements*

*Issue 2-15-2: Reporting in SFTD measurements*

*Issue 2-15-3: LBT (CCA) model for SFTD measurements*

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

**Issue 2-15-1: Test configurations for SFTD measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which test configurations are to be included in SFTD measurement test cases?

* Proposal 1 (Ericsson): The following test configurations are used for inter-RAT SFTD reporting delay test with NR target under CCA

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

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level, i.e. issues on Sub-topic 1-1.

Issue 2-15-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1, related to the general configuration discussion in topic #1. |

**Issue 2-15-2: Reporting in SFTD measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which reporting types are inter-RAT reporting delay test cases to be based on?

* Proposal 1 (Ericsson): Inter-RAT reporting delay test cases are based on SFTD reporting only, i.e. no additional SS-RSRP reporting.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level.

Issue 2-15-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

**Issue 2-15-3: LBT (CCA) model for SFTD measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define the details of LBT (CCA) model for SFTD measurement test cases?

* Proposal 1 (Ericsson): Test case for inter-RAT SFTD reporting delay for SFTD between EUTRA PCell and NR neighbour cell on NR carrier under CCA is modelled with DL CCA on the NR carrier.
* Proposal 2 (Ericsson): For DL CCA model in inter-RAT SFTD reporting delay test, PCCA\_DL = [0.75] is used as initial assumption.
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3. Issue 2-15-3 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |

### Sub-topic 2-16: Test case details for SFTD measurement accuracy

*Sub-topic description: Proposals related to SFTD measurement test cases are discussed under this sub-topic:*

*Issue 2-16-1: Test configurations for inter-RAT SFTD measurement accuracy*

*Issue 2-16-2: LBT (CCA) model for inter-RAT SFTD measurement accuracy*

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

**Issue 2-16-1: Test configurations for inter-RAT SFTD measurement accuracy**

*The listed proposals are discussed in R4-2102371 (Ericsson)*

Which test configurations are to be included in inter-RAT SFTD measurement accuracy test cases?

* Proposal 1 (Ericsson): The following test configurations for NR-U Inter-RAT SFTD accuracy testing are to be supported:

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

* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on test configurations on a general level, i.e. issues on Sub-topic 1-1.

Issue 2-16-1 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1, related to the general discussion in Topic #1 (aligned with the current discussion). |

**Issue 2-16-2: LBT (CCA) model for inter-RAT SFTD measurement accuracy**

*The listed proposals are discussed in R4-2102371 (Ericsson)*

How to define the details of LBT (CCA) model for inter-RAT SFTD measurement accuracy test cases?

* Proposal 1 (Ericsson): In test cases for NR-U Inter-RAT SFTD measurement accuracy, as initial assumption the NR target cell is modelled with DL CCA PCCA\_DL = [0.75].
* Recommended WF
  + Comments on the proposal to be collected in the comment section, but priority for the first round discussions is to agree on the LBT model on a general level, i.e. issues on Sub-topic 2-1, 2-2 and 2-3.

Issue 2-16-2 Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

### 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** | **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”* |
| AI 7.1.6.1, General | |
| AI 7.1.6.3.2, RRC IDLE, cell re-selection | |
| [**R4-2102243**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102243.zip)  Ericsson  CR | Introduction of NR-U cell reselection tests |
| Huawei: General comments to. It is better to come back next meeting before we have concrete test cases list, general configurations including LBT models, and general rules on how to define the test requirements with L,max.  Ericsson: At least one test case in each area (including the CRs below) can be discussed in the 2nd round, if revised and aligned with the agreements in this meeting. |
| AI 7.1.6.3.3, HO delay and interruptions | |
| [**R4-2101135**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101135.zip)  Nokia  draftCR | Draft TC E-UTRAN - NR-U Handover |
|  |
| [**R4-2101649**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101649.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for HO delay and interruption for NR-U |
|  |
| AI 7.1.6.3.4, RRC re-establishment | |
| [**R4-2101136**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101136.zip)  Nokia  draftCR | Draft TC RRC re-establishment with CCA |
|  |
| AI 7.1.6.3.5, RRC connection release with re-direction | |
| [**R4-2101650**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101650.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for RRC release with redirection for NR-U |
|  |
| AI 7.1.6.3.6, Timing | |
| [**R4-2100774**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100774.zip)  MediaTek inc.  draftCR | Introduction of test cases for UE transmit timing requirements with CCA |
|  |
| [**R4-2102650**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102650.zip)  Ericsson  draftCR | UE timing tests for NR-U |
|  |
| AI 7.1.6.3.7, BWP switching delay and interruptions | |
| [**R4-2102652**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102652.zip)  Ericsson  draftCR | Test cases on BWP switching with consistent UL LBT failures |
|  |
| AI 7.1.6.3.8, PSCell addition/release | |
| [**R4-2101651**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101651.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for PSCell addition and release for NR-U |
|  |
| AI 7.1.6.3.9, Interruptions | |
| [**R4-2102369**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102369.zip)  Ericsson  draftCR | DraftCR Introduction of NR-U SCell interruption and SCell (de)activation tests |
|  |
| AI 7.1.6.3.10, RLM | |
| [**R4-2102530**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102530.zip)  Ericsson  draftCR | RLM test cases |
|  |
| AI 7.1.6.3.11, Beam management | |
| [**R4-2101433**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101433.zip)  Ericsson  draftCR | Draft CR: test cases for beam management in NR-U |
|  |
| AI 7.1.6.3.12, Intra-frequency, inter-frequency and inter-RAT measurement requirements | |
| [**R4-2101137**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101137.zip)  Nokia  draftCR | Draft TC NR-U inter-frequency measurements |
|  |
| [**R4-2101652**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101652.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for inter-RAT measurement for NR-U |
|  |
| [**R4-2102532**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102532.zip)  Ericsson  draftCR | NR-U RRM, SFTD, RSSI, and CO measurements test cases |
|  |
| AI 7.1.6.3.13, Accuracy requirements for NR-U intra-frequency, inter-frequency and inter-RAT measurements | |
| [**R4-2101015**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101015.zip)  Apple  draftCR | TCs for RSSI and CO measurement accuracy in NR-U R16 |
|  |
| [**R4-2101653**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101653.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for intra-frequency measurement accuracy for NR-U |
|  |
| [**R4-2102372**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102372.zip)  Ericsson  draftCR | DraftCR 38.133 NR-U Inter-RAT SFTD accuracy TC |
|  |
| [**R4-2100775**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100775.zip)  MediaTek inc.  draftCR | Introduction of test cases for Accuracy for NR-U inter-frequency SS-RSRP measurements |
|  |
| [**R4-2100776**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100776.zip)  MediaTek inc.  draftCR | Introduction of test cases for L1-RSRP measurement accuracy with CCA serving cell |
|  |

## 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.*

|  |  |
| --- | --- |
| **Sub-topic** | **Status summary** |
| **Sub-topic 2-1: Test case list** | *General recommendation for the 2nd round for Sub-topic 2-1:*  For multiple proposed test cases, objecting companies repeated similar comments such as:   * Same requirement/behaviour is already tested in some other test case. * Requirements for NR-U are the same as the requirements for NR so no need to test twice. * A corresponding test case does not exist for FR1 NR and is thus not needed for NR-U either. * Related to measurement procedure test cases: Since Rel-15 test cases are based on RSRP, why include also RSRQ for NR-U?   To avoid the need to repeat the discussion about the same issues on the 2nd round, an additional new Issue 2-1-0 will be added on the 2nd round with the purpose to collect views on the listed questions on a general level. Possible agreements under this issue can then be reflected to the specific test cases.  Moderator proposal is to discuss the new Issue 2-1-0 in GTW session on the 2nd round.  **Issue 2-1-1: Test cases on RRC\_IDLE, cell re-selection**  *Based on the 1st round discussion, Option 1 has 3 supporting companies and Option 2 has 3 supporting companies.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since the number of supporting companies is equal for both options, suggestion is to continue the discussion on the 2nd round. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  **Issue 2-1-2: Test cases on handover delay and interruptions**  *Based on the 1st round discussion, Option 1 has 3 supporting companies and Option 2 has 2 supporting companies for the complete proposal and 1 supporting company for the second bullet.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since the number of supporting companies is basically equal for both options, suggestion is to continue the discussion on the 2nd round. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  **Issue 2-1-3: Test cases on RRC re-establishment**  *Based on the 1st round discussion, Option 1 has 1 supporting company and Option 2 has 1 supporting company.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since the number of supporting companies is equal for both options, suggestion is to continue the discussion on the 2nd round. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  **Issue 2-1-4: Test cases on Random access**  *Based on the 1st round discussion, Proposal 1 has 4 supporting companies and Proposal 2, Option 2.1 has 2 supporting companies. No objection for the proposals is shown in the comments.*  *Tentative agreements:*   * 1. Add the following test cases on the test case list for NR-U:      + Random access to NR-U PCell      + Random access to NR-U PSCell   2. Define random access test cases for 4-step *and* 2-step RA in Rel-16.   *Recommendations for 2nd round:*  Tentative agreement is agreed, and the issue will be closed.  **Issue 2-1-5: Test cases on RRC release with re-direction**  *Based on the 1st round discussion, Option 1 has 2 supporting companies and Option 2 has 3 supporting companies. Qualcomm wanted to clarify Option 2 to “Redirection from NR in FR1* ***with CCA*** *to NR in FR1 with CCA* ***(NR-U -> NR-U)****”*  *Candidate options:*   * Option 1 (Ericsson, ZTE): Add the following test case on the test case list for NR-U:   + RRC connection release with re-direction     - NR (FR1) -> NR-U * Option 2 (MediaTek, Qualcomm, Huawei): The test case listed in Option 1 for NR-U is *not* necessary if the UE has passed test case for “Redirection from NR in FR1 **with CCA** to NR in FR1 with CCA” **(NR-U -> NR-U)**.   *Recommendations for 2nd round:*  Since no clear majority for any of the options, suggestion is to continue the discussion on the 2nd round. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  Could the companies supporting Option 2 indicate if the correction suggested by Qualcomm is not ok?  **Issue 2-1-6: Test cases on timing**  *Based on the 1st round discussion, Proposals 1 and 2 have 2 supporting companies. No objection is shown in the comments.*  *Tentative agreements:*   * Add the following test cases on the test case list for NR-U:   1. Timing (timing advance) – NR-U PCell   2. Timing (timing advance) – NR-U PSCell   *Recommendations for 2nd round:*  Tentative agreement is agreed, and the issue will be closed.  **Issue 2-1-7: Test cases on BWP switching and interruption**  *Based on the 1st round discussion, Option 1 has 1 supporting company, Option 2 has 2 supporting companies and Option 3 has 1 supporting company.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since no clear majority for any of the options, suggestion is to continue the discussion on the 2nd round. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  **Issue 2-1-8: Test cases on PSCell addition/release delay**  *Based on the 1st round discussion, Proposal 1 has 4 supporting companies and no objection.*  *Tentative agreements:*   * Do *not* define the following test case for NR-U: * PSCell addition/release delay   1. NR-U PSCell with E-UTRA PCC, unknown   *Recommendations for 2nd round:*  Tentative agreement is agreed, and the issue will be closed.  **Issue 2-1-9: Test cases on active TCI state switching delay**  *Based on the 1st round discussion, Proposals 1 and 2 have 1 supporting company. 1 company commented that TCI state switching test cases are not needed, and 1 company suggested to have low priority for them.*  *Candidate options:*   * Proposal 1:   + Option 1.1: (Ericsson): Add the following test cases on the test case list for NR-U:     - TCI state switching delay       * NR-U PCC       * NR-U SCC, with NR PCC (FR1)       * NR-U PSCC, with E-UTRAN PCC (FDD, TDD)   + Option 1.2 (new, based on 1st round comment): (Mediatek) TCI state switching delay test cases have low priority.   + Option 1.3 (new, based on 1st round comment): (Huawei) TCI state switching delay test cases are not included on the test case list. * Proposal 2: (Ericsson): It shall be investigated whether some of the test cases for active TCI state switching are redundant for UE supporting both EN-DC and NR SA scenarios for NR-U.   *Recommendations for 2nd round:*  Since no clear majority for any of the options, suggestion is to continue the discussion on the 2nd round. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  **Issue 2-1-10: Test cases for interruptions**  *Based on the 1st round discussion, Option 1 has 1 supporting company, and 1 company suggests low priority for interruption test cases.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since no clear majority for any of the options, suggestion is to continue the discussion on the 2nd round. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  **Issue 2-1-11: Test cases for intra-frequency measurement procedure**  *Based on the 1st round discussion, Option 1.1 and 2.1 have 2 supporting companies (assuming Huawei means these with “Option 1 and 2”?), and Option 1.2 and 2.2 have 2 supporting companies.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since no clear majority for any of the options, suggestion is to continue the discussion on the 2nd round. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  **Issue 2-1-12: Test cases for inter-frequency measurement procedure**  *Based on the 1st round discussion, Proposal 1 has 3 supporting companies and 1 company objects.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since there is some objection towards Option 1, suggestion is to continue the discussion on the 2nd round and confirm if majority view could be agreed after further discussion. New issue 2-1-0 is added for the purpose of discussing on general level whether a certain test case should be included or not.  **Issue 2-1-13a: Test cases for inter-RAT measurement procedure**  *Based on the 1st round discussion, Proposal 1 has 2 supporting companies. 1 company supports including test cases only with RSRP.*  *Candidate options:*  Option 1: (Ericsson, Nokia) Include the following test cases on the test case list for NR-U:   * + Inter-RAT measurement procedure     - NR-U-E-UTRA **RSRP/RSRQ** (needed for HO):       * On E-UTRA (FDD,TDD), with NR-U PCC       * On E-UTRA (FDD,TDD), with NR-U PSCC   Option 2 (new): (MediaTek) Include the following test cases on the test case list for NR-U:   * + Inter-RAT measurement procedure     - NR-U-E-UTRA **RSRP** (needed for HO):       * On E-UTRA (FDD,TDD), with NR-U PCC       * On E-UTRA (FDD,TDD), with NR-U PSCC   *Recommendations for 2nd round:*  Discuss the RSRQ part further on the second round i.e. whether to agree on Option 1 or Option 2. Refer here to the discussion under new Issue 2-1-0.  **Issue 2-1-13b: Test cases for inter-RAT measurement procedure: RSSI and CO**  *Based on the 1st round discussion, Options 2.1 and 3.1 have 1 supporting company, and Options 2.2 and 3.2 have2 supporting companies.*  *Tentative agreements:*   * Add the following test cases on the test case list for NR-U:   + Inter-RAT measurement procedure     - E-UTRA-NR-U RSSI measurements requirements:       * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC     - E-UTRA-NR-U CO measurements requirements:       * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC   *Candidate options:*   * Option 1 (Ericsson, Nokia): Add the following test cases on the test case list for NR-U:   + Inter-RAT measurement procedure     - E-UTRA-NR-U RSSI measurements requirements:       * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC     - E-UTRA-NR-U CO measurements requirements:       * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC * Option 2 (MediaTek): Low priority for test cases listed in Option 1.   *Recommendations for 2nd round:*  Tentative agreement is agreed. Continue the discussion on the remaining options. Further discussion for the remaining options is suggested to be taken based on new issue 2-1-0.  **Issue 2-1-14a: Test cases for accuracy for NR-U intra-frequency measurements – SS-RSRQ/SS-SINR**  *Based on the 1st round discussion, Option 1.1 has 3 supporting companies and Option 1.2 has 1 supporting company.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since there is still some objection towards the majority view (Option 1.1), suggestion is to continue discussion on the 2nd round and try to clarify if majority view could be agreed.  **Issue 2-1-14b: Test cases for accuracy for NR-U intra-frequency measurements – NR-U SCC with NR-U PCC, and N-RU SCC with NR-U PSCC and E-UTRAN PCC**  *Based on the 1st round discussion, Options 2.1 and 3.1 have 1 supporting company and Options 2.2 and 3.2 have 2 supporting companies.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since there is support for all options, suggestion is to continue the discussion on the 2nd round. From moderator perspective the priority should be to keep the agreed test cases on the test case list, unless there is a clear consensus to remove them.  **Issue 2-1-15: Test cases for accuracy for NR-U inter-frequency measurements**  *Based on the 1st round discussion, Option 1 has 3 supporting companies and 1 objecting company.*  *Candidate options:*  Same as in the 1st round discussion  *Recommendations for 2nd round:*  Since there is still some objection towards the majority view, suggestion is to continue the discussion on the 2nd round and check if based on further discussions majority view could be agreed.  **Issue 2-1-16a: Test cases for accuracy for NR-U inter-RAT measurements**  *Based on the 1st round discussion, Proposal 1 has 1 supporting company. 1 company is ok with RSRP part, but not RSRQ.*  *Candidate options:*   * Option 1 (Ericsson, Nokia): Add the following test cases on the test case list for NR-U:   + Accuracy for NR-U inter-RAT measurements     - 1a. NR-U – E-UTRA **RSRP/RSRQ** (needed for HO) with:       * NR-U PCC       * NR-U PSCC * Option 2 (new) (MediaTek): Add the following test cases on the test case list for NR-U:   + Accuracy for NR-U inter-RAT measurements     - 1a. NR-U – E-UTRA **RSRP** (needed for HO) with:       * NR-U PCC       * NR-U PSCC   *Recommendations for 2nd round:*  Continue discussion in including RSRQ on the 2nd round also based on new issue 2-1-0.  **Issue 2-1-16b: Test cases for accuracy for NR-U inter-RAT measurements: RSSI and CO**  *Based on the 1st round discussion, Proposal 1 has 2 supporting companies. 1 company suggests low priority for “E-UTRA (FDD,TDD) PCC and NR-U PSCC”.*  *Tentative agreements:*   * Add the following test cases on the test case list for NR-U:   + 1b. E-UTRA-NR-U RSSI measurement accuracy requirements:     - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC   + 1c. E-UTRA-NR-U CO measurement accuracy requirements:     - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC   *Candidate options:*   * Option 1 (Ericsson, Nokia): Add the following test cases on the test case list for NR-U:   + 1b. E-UTRA-NR-U RSSI measurement accuracy requirements:     - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC   + 1c. E-UTRA-NR-U CO measurement accuracy requirements:     - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC * Option 2 (MediaTek): Test cases listed in Option 1 are not included on the test case list.   *Recommendations for 2nd round:*  Tentative agreement is agreed. Continue discussion on the remaining options also based on new issue 2-1-0. |
| **Sub-topic 2-2: Test case details for cell re-selection** | ***General recommendation for the 2nd round for Sub-topics 2-2 – 2-16:***  Since the moderator suggestion was to de-prioritize the issues under these sub-topics on the 1st round, suggestion for the 2nd round is to give companies an opportunity to continue commenting based on the original issues and proposals.   * For the issues where **3 or more** **companies** (including the proponent company) have shown their support already on the 1st round without objection, a tentative agreement is proposed. For these issues, companies are encouraged to indicate on the 2nd round if they object the tentative agreement i.e. agreement will be proposed only after the 2nd round. * For the issues with **less than 3** companies showing their support even without objection, moderator proposal is to continue discussion based on the original issue on the 2nd round.   **Issue 2-2-1: Test configurations for cell re-selection**  *2 companies support Proposal 1. No objection.*  **Issue 2-2-2: Cell specific test parameters for cell re-selection**  *2 companies support Proposal 1, 1 company wanted to check further.*  **Issue 2-2-3: Test requirements for cell re-selection**  *No comments from other companies than the proponent company.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-3: Test case details for handover** | **Issue 2-3-1: Test configurations for handover test cases**  *3 companies support Proposal 1, out of which one proposes to add test configurations also for E-UTRAN – NR-U handover.*  *Tentative agreements:*   * Handover test case configurations are aligned with the configurations used in IDLE mode cell reselection test cases.  |  |  | | --- | --- | | 1 | With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |   Table 1 Configuration for cell change from NR-U to NR-U   |  |  |  | | --- | --- | --- | | 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 2 Configuration for cell change from NR-U to NR   |  |  |  | | --- | --- | --- | | Configuration | Description of a cell without CCA | Description of a cell with CCA | | 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 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 Configuration for cell change from NR to NR-U  *Candidate options:*  Option 1 (new): (Nokia) In addition to test configurations listed under the tentative agreement, introduce the following test configurations for E-UTRAN – NR-U handover.   |  |  |  | | --- | --- | --- | | Configuration | Description of E-UTRAN cell | Description of a cell with CCA | | 1 | Rel-15 LTE FDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | | 2 | Rel-15 LTE TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |   Table 4 Configuration for cell change from E-UTRAN to NR-U  *Recommendations for 2nd round:*  Companies to comment if they object the tentative agreement and if they are ok with the proposed addition (Option 1).  **Issue 2-3-2: Cell specific test parameters for handover test cases**  *In addition to the support from the proponent company, there was one clarifying question about DBT window, which was clarified in the comments.*  *Recommendations for 2nd round:*  Continue the discussion based on the original issue on the 2nd round.  **Issue 2-3-3: Test requirements for handover**  *3 companies support Proposal 1, with one of them indicating that L3 parameter depends on whether UL LBT failures are to be tested in the test case. No objection.*  *Tentative agreements:*  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.   * Note: Parameter L3 depends on whether UL LBT failures are to be tested in these test cases.   *Recommendations for 2nd round:*  Can the tentative agreement be approved with the clarification added (Note)? |
| **Sub-topic 2-4: Test case details for RRC re-establishment** | **Issue 2-4-1: Test cases to be introduced for RRC re-establishment**  *2 companies support Proposal 1.*  **Issue 2-4-2: Test configurations for RRC re-establishment test cases**  *2 companies support Proposal 1.*  **Issue 2-4-3: LBT (CCA) model for RRC re-establishment test cases**  *1 company supports the proposals and 2 companies comment that the issue depends on the agreements on CCA model.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-5: Test case details for RRC connection release with re-direction** | **Issue 2-5-1: Test cases to be introduced for RRC connection release with re-direction**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-5-2: Test configurations for RRC connection release with re-direction test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-5-3: LBT (CCA) model for RRC connection release with re-direction test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-6: Test case details for timing** | **Issue 2-6-1: Test configurations for UE transmit timing test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-6-2: LBT (CCA) model for UE transmit timing test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-6-3: Test configurations for UE timing advance adjustment accuracy test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-6-4: LBT (CCA) model for UE timing advance adjustment accuracy test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-7: Test case details for BWP switching** | **Issue 2-7-1: Test configurations for BWP switching test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-7-2: LBT (CCA) model for BWP switching test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-8: Test case details for TCI state switching delay** | **Issue 2-8-1: Test cases to be introduced for TCI state switching**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round:*  Continue the discussion based on the original issue on the 2nd round. |
| **Sub-topic 2-9: Test case details for Interruptions** | **Issue 2-9-1: Deactivated SCell measurement cycle for interruption test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-9-2: LBT (CCA) model for interruption test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-9-3: Phases of interruption test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-10: Test case details for SCell activation/deactivation** | **Issue 2-10-1: Measurement cycles for SCell (de)activation test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-10-2: LBT (CCA) model for SCell (de)activation test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-11: Test case details for RLM** | **Issue 2-11-1: Test case sections to be introduced for RLM**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round:*  Continue the discussion based on the original issue on the 2nd round.  **Issue 2-11-2: SNR combinations for RLM tests**  *Only the proponent company showed their support on the 1st round. 1 company asked for clarification of the expected outcome as OOS is not triggered.*  **Issue 2-11-3: Test configurations for RLM tests**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-11-4: LBT (CCA) model for RLM tests**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-11-5: Testing for UE with different capabilities and under different channel occupancy**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-11-6: Test cases for 4RX UEs**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-12: Test case details for link recovery** | **Issue 2-12-1: Test case sections to be introduced for BFD and link recovery**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-12-2: Tests to be introduced for BFD and link recovery and test details**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-12-3: LBT (CCA) model for BFD and link recovery and test details**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-12-4: Test case sections to be introduced for L1-RSRP reporting**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-12-5: Reporting requirements for L1-RSRP measurement procedure test cases**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-12-6: LBT (CCA) model for L1-RSRP measurement reporting tests**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-13: Test case details for RRM measurements: Intra-frequency, inter-frequency and inter-RAT** | **Issue 2-13-1: Test case sections to be introduced for intra-frequency measurements**  *2 companies supported Proposal 1 on the first round. 1 company supported Proposal 2 and 1 company said it depends on the agreements in sub-topic 2-1.*  **Issue 2-13-2: Test configurations for RRM measurements**  *Only the proponent company showed their support on the 1st round. 1 company commented to refer to the agreements under issue 1-1-5.*  **Issue 2-13-3: LBT (CCA) configuration for RRM measurement test cases**  *Only the proponent company showed their support on the 1st round. One company commented that GTW agreements for the LBT model should be reflected to this proposal.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-14: Test case details for RSSI and CO measurements** | **Issue 2-14-1: Test case sections to be introduced for RSSI and CO measurements**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-14-2: LBT (CCA) model for RSSI and CO measurements**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-14-3: Number of cells for RSSI and CO measurements**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-14-4: Test coverage for RSSI and CO measurements**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-15: Test case details for SFTD measurements** | **Issue 2-15-1: Test configurations for SFTD measurements**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-15-2: Reporting in SFTD measurements**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-15-3: LBT (CCA) model for SFTD measurements**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |
| **Sub-topic 2-16: Test case details for SFTD measurement accuracy** | **Issue 2-16-1: Test configurations for inter-RAT SFTD measurement accuracy**  *Only the proponent company showed their support on the 1st round. No other comments.*  **Issue 2-16-2: LBT (CCA) model for inter-RAT SFTD measurement accuracy**  *Only the proponent company showed their support on the 1st round. No other comments.*  *Recommendations for 2nd round for the issues under this sub-topic:*  Continue the discussion based on the original issues on the 2nd round. |

*Recommendations on WF/LS assignment*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **WF/LS t-doc Title** |  | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on test configurations for NR-U RRM performance requirements |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2102524 | *“to be revised”* |
| R4-2100774 | *Return to* |
| R4-2100775 | *Return to* |
| R4-2100776 | *Return to* |
| R4-2101015 | *Return to* |
| R4-2101135 | *Return to* |
| R4-2101136 | *Return to* |
| R4-2101137 | *Return to* |
| R4-2101433 | *to be revised* |
| R4-2101649 | *Return to* |
| R4-2101650 | *Return to* |
| R4-2101651 | *Return to* |
| R4-2101652 | *Return to* |
| R4-2101653 | *Return to* |
| R4-2102369 | *to be revised* |
| R4-2102372 | *to be revised* |
| R4-2102530 | *to be revised* |
| R4-2102532 | *to be revised* |
| R4-2102650 | *to be revised* |
| R4-2102652 | *to be revised* |
| R4-2102243 | *to be revised* |

## Discussion on 2nd round (if applicable)

Please continue discussion in open issues summary, after the 2nd week/round delimiter.  
Please also continue the TP/CR discussions above.

### Sub-topic 2-1: Test case list

Moderator: Please prioritize the discussion for Issue 2-1-0 for this Sub-topic on the second round. Any additional comments not directly related to Issue 2-1-0 can be done under other issues.

Ericsson: easier to discuss directly together with the revised tdoc on updated test case list.

**Issue 2-1-0 (NEW): General discussion on whether a test case should be included on NR-U test case list or not**

Background:

*On the 1st round discussion, for multiple proposed test cases, objecting companies repeated similar comments such as:*

* *Same requirement/behaviour is already tested in some other test case.*
* *Requirements for NR-U are the same as the requirements for NR so no need to test twice.*
* *A corresponding test case does not exist for FR1 NR and is thus not needed for NR-U either.*
* *Related to measurement procedure test cases: Since Rel-15 test cases are based on RSRP, why include also <RSRQ for NR-U?*

*Moderator would like to concentrate the discussion related to these comments on the 2nd round under this single issue, aiming to reach high level opinions and agreements on the criteria under which a certain test case should/should not be added on the test case list.*

Questions:

Companies are asked to answer the following questions (issues where the related comments were given on the 1st round are listed below each question, comment might have also been for a subset of the issue):

**Q1:** If NR requirements apply for NR-U i.e. no new requirement for NR-U is introduced, should a related test case be added for NR-U?

Discussed related to these issues on the 1st round:

* + Issue 2-1-10: Test cases for interruptions
  + Issue 2-1-15: Test cases for accuracy for NR-U inter-frequency measurements

**Q2:** If an NR test case corresponding to a proposed NR-U test case does not exist, but the requirement exists for both, should a test case be added for NR-U?

Discussed related to these issues on the 1st round:

* + Issue 2-1-9: Test cases on active TCI state switching delay

**Q3:** Under which criteria can it be concluded that the requirement/behaviour proposed to be tested for NR-U is already tested in another (NR or NR-U) test case?

Discussed related to these issues on the 1st round:

* + Issue 2-1-1: Test cases on RRC\_IDLE, cell re-selection
  + Issue 2-1-2: Test cases on handover delay and interruptions
  + Issue 2-1-3: Test cases on RRC re-establishment
  + Issue 2-1-5: Test cases on RRC connection release with re-direction
  + Issue 2-1-7: Test cases on BWP switching and interruption
  + Issue 2-1-11: Test cases for intra-frequency measurement procedure
  + Issue 2-1-13b: Test cases for inter-RAT measurement procedure: RSSI and CO
  + Issue 2-1-14a: Test cases for accuracy for NR-U intra-frequency measurements – SS-RSRQ/SS-SINR
  + Issue 2-1-14b: Test cases for accuracy for NR-U intra-frequency measurements – NR-U SCC with NR-U PCC, and N-RU SCC with NR-U PSCC and E-UTRAN PCC
  + Issue 2-1-16b: Test cases for accuracy for NR-U inter-RAT measurements: RSSI and CO

**Q4:** For measurement procedure test cases, why include also RSRQ metric in addition to RSRP for NR-U in the test cases although this was not done for NR?

Discussed related to these issues on the 1st round:

* + Issue 2-1-12: Test cases for inter-frequency measurement procedure
  + Issue 2-1-13a: Test cases for inter-RAT measurement procedure
  + Issue 2-1-16a: Test cases for accuracy for NR-U inter-RAT measurements

Recommended WF

When possible, reflect possible agreements on this issue directly to the related issues in Sub-Topic 2-1 and the test case list. Otherwise, the comments and agreements can be used as a guideline for further discussion.

Issue 2-1-0 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Q1: …  Q2: …  Q3: …  Q4: …  Additional comment: … |
| Nokia | Q1: If the UE supports both NR and NR-U and has passed the test for NR, it does not seem needed to repeat the test for NR-U, in case the same requirements apply. However, our understanding based on the discussions in the last RAN4 meeting was that these test cases would be introduced in case there would be UEs that are NR-U only. In this case, requirements that are common for NR and NR-U need to be tested also for such UEs. If it would be possible to just define a common NR-U cell configuration that would be used instead of the NR configuration in the already existing NR test cases, this would save us from some duplication of test cases in the spec, but not sure if this way is feasible in practice when drafting the spec.  Q2: This depends on the reason why the test case was not introduced for NR, but in general this does not seem necessary.  Q3: Without commenting any specific test case or requirement, we think that a general guideline could be that if some requirement is tested with certain cell configuration for NR, then the same configurations should be tested for NR-U as well, assuming that (either the same or NR-U specific) requirement applies for NR-U. Here taking into account also our response to Q1. |
| Huawei | Q1: The issues could be further divided into whether to introduce the test cases in the spec in NR-U specific section (A.9-A.12) and whether UE needed to be tested. For the latter question, we believe the UE needs to be tested. For example, for a UE supporting scenarios A, the UE could possibly work on carrier without CCA. Then the corresponding requirements shall also be met just like legacy UE. So the question is whether there is need to add all these test in section A.9-A.12 or these kind of UE also needs to pass the test cases in legacy sections. We think maybe for these test cases, some applicability rules in general may work. The applicability rule shall also figure out the mapping between the test cases and the scenarios. For example, for UE supporting scenarios A, does it mean it only need to pass the test cases in clause A.9?  Q2: We think there no need to have test cases for such cases.  Q4: Similar views as Q2, there no need to introduce addition testing for NR-U compared with NR. |
| Qualcomm | Q1: As discussed during earlier meetings, a UE that supports both NR and NR-U and passes the tests for certain requirement in NR, then the same requirement should not be tested for NR-U. Only new NR-U specific requirements should be tested. For a UE that supports stand-alone NR-U, applicable legacy NR requirements should also be tested.  Q2: We should de-prioritize such test cases and should be discussed during maintenance.  Q3: Focus should be on testing the specified NR-U requirement.  For example, in cell-reselection cases we have the following requirements defined for NR-U:   1. Measurement and evaluation when subject to CCA on the serving cell 2. Measurements of intra-frequency NR cells when subject to CCA on the serving cell and target cell 3. Measurements of inter-frequency NR cells when subject to CCA on the target cell   These requirements can be verified with two test cases:   1. NR-U -> NR-U -- Intra frequency 2. NR-U -> NR-U -- Inter frequency   Then, there is no need to define the following test cases:   1. NR(FR1) -> NR-U 2. NR-U -> NR(FR1)   No new NR-U specific requirement is being tested in these-cases, it's just a matter of different possible scenarios.  Q4: We should de-prioritize such test cases and should be discussed during maintenance. |
| MediaTek | Q1: For NR-U only UE, this can be tested. But for the UE is capable of both NR-U and normal UR, these test are not needed.  Q2: We should de-prioritize such test cases  Q3: similar comments as Qualcomm’s. If UE has been tested for NR-U -> NR-U, than X -> NR-U, NR-U -> X is not needed.  Q4: noting that in R15, the measurement procedures are based on RSRP. We could select some tests to test SS-RSRQ/SS-SINR. Duplicating test cases with only changes on SS-RSRQ/SS-SINR will create too many tests, comparing to R15. |
| Ericsson | Q1 and Q3: We could agree in general on:   * Test cases for the Rel-15 requirements for which the applicability was specified also for NR-U   + In general, NR-U feature is a new feature, so even if the same requirements apply for Rel-15 and NR-U, this shall not prevent RAN4 from specifying test cases for such requirements   + The need for such test cases shall be discussed on the case-by-case basis, similar to the new NR-U requirements * Legacy test cases for NR-U UE (e.g., at least for UEs supporting NR-U SA but not NR SA)   + By default, all legacy test cases would be needed     - Observation 1: RAN4 already agreed to specify test cases for such UEs.     - Observation 2: just reusing them directly is generally not possible due to at least some differences in the configuration   + RAN4 will further discuss:     - Compact way to introduce such test cases     - Applicability rules to avoid unnecessary multiple testing (e.g., UE capability should be taken into account)     - Whether/which of the legacy test cases may be not needed for NR-U UE * Test cases for NR (without CCA) measurements in deployments with NR-U SpCell:   + Before defining such measurement procedure test cases, discuss and agree on the applicable requirements   + Before defining such measurement accuracy test cases, discuss and agree on the applicable requirements * Test cases for cell reselection scenarios which are FFS in [1]:   + Option 1: define separate test cases for each such cell reselection scenario   + Option 2: define combined test cases:     - Use the same test case to verify cell reselection for E-UTRAN (FDD,TDD)->NR-U (agreed in RAN4#97-e) and NR-U -> E-UTRAN (FDD,TDD)     - Use the same test case to verify cell reselection for NR(FR1) -> NR-U and NR-U -> NR(FR1).   + Option 3: Do not define such test cases   Q2: We can further discuss this. Disagree in general, not having a test case in Rel-15 is not the deciding reason.  Q4: We think we have to discuss the opposite – why should SS-RSRQ/SS-SINR should be excluded? Especially given we have already agreed to have to intra-frequency and inter-RAT.  So, our view is summarized below:   * Test cases for SS-RSRQ/SS-SINR:   + Observation: the following related test cases have been already agreed in RAN4#97-e:     - intra-frequency SS-RSRQ/SS-SINR measurement requirements     - E-UTRA-NR-U SS-RSRQ/SS-SINR measurement requirements     - E-UTRA-NR-U SS-RSRQ/SS-SINR measurement accuracy requirements   + Define test cases for:     - Intra-frequency measurement accuracy requirements     - Inter-frequency measurement procedure     - Inter-frequency measurement accuracy requirements |

**Issue 2-1-1: Test cases on RRC\_IDLE, cell re-selection**

Should the test cases left FFS for RRC IDLE mode cell re-selection be included in the NR-U test case list?

* + Option 1: Add the following test cases on the test case list for NR-U:
    - RRC\_IDLE, cell re-selection
      1. NR (FR1) -> NR-U
      2. NR-U -> NR (FR1)
      3. NR-U - > E-UTRAN (FDD,TDD)
  + Option 2: The test cases listed in Option 1 for NR-U are *not* necessary:
    - 1) and 2) in case test case for “Cell reselection to FR1 inter-frequency NR when CCA is used on the serving and target cell” has been passed.
    - 3) in case test case for “Cell reselection to FR1 intra-/inter-frequency NR when CCA is used on the serving and target cell” has been passed
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-1 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Support option 1. |
| Ericsson | Option 1 |

**Issue 2-1-2: Test cases on handover delay and interruptions**

Should the test cases left FFS for handover be included in the NR-U test case list?

* + Option 1: Add the following test cases on the test case list for NR-U:
    - Handover

1) NR-U -> NR-U, Inter-frequency, known

2a) NR (FR1) -> NR-U, known

2b) NR (FR1) -> NR-U, unknown

3a) NR-U -> NR (FR1), known

3b) NR-U -> NR (FR1), known

4) NR-U - > E-UTRAN (FDD,TDD)

* + Option 2: The test cases listed in Option 1 for NR-U are *not* necessary:
    - 1), 2a) and 2b) in case the UE has passed test cases for NR-U to NR-U handovers.
    - 3a), 3b) and 4) in case the UE has passed R-15 tests.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-2 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Option 1 |

**Issue 2-1-3: Test cases on RRC re-establishment**

* Proposal 1: Add the following test case on the test case list for NR-U:
  + RRC re-establishment
    - NR (FR1) -> NR-U
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-3 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-4: Test cases on Random access:** Agreed based on the 1st round discussion.

**Issue 2-1-5: Test cases on RRC release with re-direction**

* Option 1: Add the following test case on the test case list for NR-U:
  + RRC connection release with re-direction
    - NR (FR1) -> NR-U
* Option 2: The test case listed in Option 1 for NR-U is *not* necessary if the UE has passed test case for “Redirection from NR in FR1 **with CCA** to NR in FR1 with CCA” **(NR-U -> NR-U)**.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.
  + Could the companies supporting Option 2 indicate if the **correction** suggested by Qualcomm compared to the first round text is ok?

Issue 2-1-5 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-6: Test cases on timing:** Agreed based on the 1st round discussion.

**Issue 2-1-7: Test cases on BWP switching and interruption**

Should the test cases left FFS for BWP switching be included in the NR-U test case list?

* Option 1: Add the following test cases on the test case list for NR-U:
  + BWP switching delay and interruption
    - NR PCC (PCC)
    - NR-U PCC
    - NR-U PSCC and E-UTRAN PCC (FDD, TDD)
* Option 2: Legacy DCI/timer/RRC-based BWP switching tests on NR-U cell are *not* necessary while UE has passed the corresponding R15 tests.
* Option 3: The DCI/timer/RRC-based BWP switching can be tested only by UEs supporting NR-U SA mode. The other test cases can be de-prioritized.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-7 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-8: Test cases on PSCell addition/release delay:** Agreed based on the 1st round discussion.

**Issue 2-1-9: Test cases on active TCI state switching delay**

Which test cases on TCI state switching delay should be included on the NR-U test case list?

* Proposal 1:
  + Option 1.1: Add the following test cases on the test case list for NR-U:
    - TCI state switching delay
      * NR-U PCC
      * NR-U SCC, with NR PCC (FR1)
      * NR-U PSCC, with E-UTRAN PCC (FDD, TDD)
  + Option 1.2 (new, based on 1st round comment): TCI state switching delay test cases have low priority.
  + Option 1.3 (new, based on 1st round comment): TCI state switching delay test cases are not included on the test case list.
* Proposal 2: It shall be investigated whether some of the test cases for active TCI state switching are redundant for UE supporting both EN-DC and NR SA scenarios for NR-U.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-9 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | What was the reason not to introduce this test case for FR1 NR? |

**Issue 2-1-10: Test cases for interruptions**

Should the test cases left FFS for interruptions be included in the NR-U test case list?

* Option 1: Add the following test cases on the test case list for NR-U:
  + Interruptions
    - 1a. Due to NR-U SCell addition/release, with:
      * NR PCC (FR1)
      * NR-U PCC
      * NR-U PSCC and E-UTRAN PCC (FDD,TDD)
    - 1b. During measurements no deactivated NR-U SCell, with:
      * NR PCC (FR1)
      * NR-U PCC
      * NR-U PSCC and E-UTRAN PCC (FDD,TDD)
* Option 2: Test cases for the interruption as the legacy requirement are not necessary, while UE has passed the legacy tests.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-10 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-11: Test cases for intra-frequency measurement procedure**

Should the test cases agreed in RAN4#97e for intra-frequency measurement procedure with the cell setup discussed in the proposals below be included on the test case list for NR-U?

* Proposal 1
  + Option 1.1: For Intra-frequency measurement procedure test cases, test configuration of “NR-U SCC, with NR-U PCC” is not needed while it can be replaced by “NR-U SCC, with NR PCC (FR1)” and “NR-U PCC”.
  + Option 1.2: Keep the agreed test cases for intra-frequency measurement procedure.
* Proposal 2
  + Option 2.1: For Intra-frequency measurement procedure test cases, test configuration of “NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)” is not needed while it can be replaced by “NR-U PSCC, with E-UTRAN PCC (FDD,TDD)”.
  + Option 2.2: Keep the agreed test cases for intra-frequency measurement procedure.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-11 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-12: Test cases for inter-frequency measurement procedure**

Should the test cases left FFS for SS-RSRQ and SS-SINR inter-frequency measurements be included in the NR-U test case list?

* Proposal 1: Add the following test cases on the test case list for NR-U:
  + Inter-frequency SS-RSRQ, SS-SINR measurements on:
    - NR-U inter-frequency, with NR PCC (FR1)
    - NR-U inter-frequency, with NR-U PCC
    - NR-U inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)
    - NR (FR1) inter-frequency, with NR-U PCC
    - NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-12 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Support Proposal 1. Since SS-RSRQ and SS-SINR test cases were agreed to be introduced also for intra-frequency measurement procedure test cases, we think it would make sense to introduce them also for the corresponding inter-frequency test cases. |

**Issue 2-1-13a: Test cases for inter-RAT measurement procedure**

Should the test cases left FFS for inter-RAT RSRP/RSRQ measurements be included on the NR-U test case list?

* Option 1: Include the following test cases on the test case list for NR-U:
  + Inter-RAT measurement procedure
    - NR-U-E-UTRA **RSRP/RSRQ** (needed for HO):
      * On E-UTRA (FDD,TDD), with NR-U PCC
      * On E-UTRA (FDD,TDD), with NR-U PSCC
* Option 2 (new): Include the following test cases on the test case list for NR-U:
  + Inter-RAT measurement procedure
    - NR-U-E-UTRA **RSRP** (needed for HO):
      * On E-UTRA (FDD,TDD), with NR-U PCC
      * On E-UTRA (FDD,TDD), with NR-U PSCC
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-13a Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-13b: Test cases for inter-RAT measurement procedure: RSSI and CO**

**In addition to test cases for RSSI and CO On NR-U neighbour, with E-UTRA (FDD,TDD) PCC** (tentative agreement on the 1st round), should the following test cases for inter-RAT RSSI and CO measurements be included on the NR-U test case list?

* Option 1: Add the following test cases on the test case list for NR-U:
  + Inter-RAT measurement procedure
    - E-UTRA-NR-U RSSI measurements requirements:
      * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC
    - E-UTRA-NR-U CO measurements requirements:
      * On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC
* Option 2: Low priority for test cases listed in Option 1.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-13b Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-14a: Test cases for accuracy for NR-U intra-frequency measurements – SS-RSRQ/SS-SINR**

Should the test cases left FFS for intra-frequency SS-RSRQ and SS-SINR measurement accuracy be included in the NR-U test case list?

* Proposal 1
  + Option 1.1: Add the following test cases on the test case list for NR-U:
    - Accuracy for NR-U intra-frequency measurements
      * 1a. Intra-frequency absolute accuracies for SS-RSRQ on:
        + 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)
      * 1b. Intra-frequency absolute accuracies for SS-SINR on:
        + 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)
  + Option 1.2: Test cases for SS-RSRQ/SS-SINR measurement accuracy under CCA are not necessary.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-14a Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-14b: Test cases for accuracy for NR-U intra-frequency measurements – NR-U SCC with NR-U PCC, and N-RU SCC with NR-U PSCC and E-UTRAN PCC**

Should the test cases agreed in RAN4#97e for intra-frequency measurement accuracy with the cell setup discussed in the proposals below be included on the test case list for NR-U?

* Proposal 1
  + Option 1.1: For Intra-frequency measurement accuracy test cases, test configuration of “NR-U SCC, with NR-U PCC” is not needed while it can be replaced by “NR-U SCC, with NR PCC (FR1)” and “NR-U PCC”.
  + Option 1.2: Keep the agreed test cases for intra-frequency measurement accuracy.
* Proposal 2
  + Option 2.1: For Intra-frequency measurement accuracy test cases, test configuration of “NR-U SCC, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)” is not needed while it can be replaced by “NR-U PSCC, with E-UTRAN PCC (FDD,TDD)”.
  + Option 2.2: Keep the agreed test cases for intra-frequency measurement accuracy.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-14b Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-15: Test cases for accuracy for NR-U inter-frequency measurements**

Should the test cases left FFS for inter-frequency SS-RSRQ and SS-SINR measurement accuracy be included in the NR-U test case list?

* Option 1: Add the following test cases on the test case list for NR-U:
  + Accuracy for NR-U inter-frequency measurements
    - 1a. Inter-frequency absolute and relative accuracies for SS-RSRQ on:
      * NR-U neighbor, with NR PCC (FR1)
      * NR-U neighbor, with NR-U PCC
      * NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD)
    - 1b. Inter-frequency absolute and relative accuracies for SS-SINR on:
      * NR-U neighbor, with NR PCC (FR1)
      * NR-U neighbor, with NR-U PCC
      * NR-U neighbor, with NR-U PSCC, with E-UTRAN PCC (FDD,TDD)
      * NR (FR1) inter-frequency, with NR-U PCC
      * NR (FR1) inter-frequency, with NR-U PSCC and E-UTRAN PCC (FDD,TDD)
* Option 2: Test cases for SS-RSRQ/SS-SINR measurement accuracy under CCA are not necessary.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-15 Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-16a: Test cases for accuracy for NR-U inter-RAT measurements**

Should the test cases left FFS for inter-RAT E-UTRA RSRP/RSRQ measurement accuracy be included in the NR-U test case list?

* Option 1: Add the following test cases on the test case list for NR-U:
  + Accuracy for NR-U inter-RAT measurements
    - 1a. NR-U – E-UTRA **RSRP/RSRQ** (needed for HO) with:
      * NR-U PCC
      * NR-U PSCC
* Option 2 (new): Add the following test cases on the test case list for NR-U:
  + Accuracy for NR-U inter-RAT measurements
    - 1a. NR-U – E-UTRA **RSRP** (needed for HO) with:
      * NR-U PCC
      * NR-U PSCC
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-16a Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

**Issue 2-1-16b: Test cases for accuracy for NR-U inter-RAT measurements: RSSI and CO**

**In addition to test cases for RSSI and CO On NR-U neighbour, with E-UTRA (FDD,TDD) PCC** (tentative agreement on the 1st round), should the test cases for E-UTRA-NR-U RSSI and CO measurement accuracy listed below be included in the NR-U test case list?

* Option 1: Add the following test cases on the test case list for NR-U:
  + 1b. E-UTRA-NR-U RSSI measurement accuracy requirements:
    - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC
  + 1c. E-UTRA-NR-U CO measurement accuracy requirements:
    - On NR-U neighbor, with E-UTRA (FDD,TDD) PCC and NR-U PSCC
* Option 2: Test cases listed in Option 1 are not included on the test case list.
* Recommended WF
  + Companies are encouraged to give general comments for Issue 2-1-0 instead of repeating their 1st round comments on those specific issues here. Any discussion directly related to these test cases including the support/objection of the listed options/proposals can continue under this topic.

Issue 2-1-16b Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  |  |

### Sub-topic 2-2: Test case details for cell re-selection

Moderator: Since the discussion for sub-topics 2-2 - 2-16 was de-prioritized on the 1st round, companies are encouraged to further add their comments on the 2nd round. For convenience, 1st round comments are still included under each issue to avoid the need to repeat the same comments on the 2nd round for the issues that remained the same. 1st round comments can be updated by the corresponding companies if needed.

Some tentative agreements are proposed based on the 1st round discussions for issues that had 3 or more supporting companies without objection. Moderator would like companies to confirm if they object the proposed tentative agreements. If no objection, tentative agreements will be agreed after the 2nd round.

**Issue 2-2-1: Test configurations for cell re-selection**

*The listed proposals are discussed in R4-2102244 (Ericsson)*

Which test configurations are to be included for cell re-selection test cases?

* Proposal 1 (Ericsson): The standalone cell reselection test cases are defined based on the test configurations shown in Table 1, Table 2 and Table 3.

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

Table 1 Configuration for cell change from NR-U to NR-U

|  |  |  |
| --- | --- | --- |
| 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 2 Configuration for cell change from NR-U to NR

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell without CCA | Description of a cell with CCA |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 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 Configuration for cell change from NR to NR-U

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-2-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Agreeable in our view. |
| Ericsson | Support Proposal 1. |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |

**Issue 2-2-2: Cell specific test parameters for cell re-selection**

*The listed proposals are discussed in R4-2102244 (Ericsson)*

Which cell specific test parameters should be included in cell re-selection test cases to account for LBT impact?

* Proposal 1 (Ericsson): 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
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-2-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Can further check. The “DBT window” means LBT window right? |
| Huawei | Depends on the CCA model. |
| Ericsson | Support Proposal 1. |

**Issue 2-2-3: Test requirements for cell re-selection**

*The listed proposals are discussed in R4-2102244 (Ericsson)*

How to define test requirements for cell re-selection?

* Proposal 1 (Ericsson): Reselection test shall verify that maximum allowed CCA failures for Md, Mm and Me.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-2-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1 |

### Sub-topic 2-3: Test case details for handover

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

*The listed proposals are discussed in R4-2102242 (Ericsson)*

Which test configurations are to be included in handover test cases?

* Tentative agreement:
  + Handover test case configurations are aligned with the configurations used in IDLE mode cell reselection test cases.
* For cell change from NR-U to NR-U:

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

Table 1 Configuration for cell change from NR-U to NR-U

|  |  |  |
| --- | --- | --- |
| 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 2 Configuration for cell change from NR-U to NR

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell without CCA | Description of a cell with CCA |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 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 Configuration for cell change from NR to NR-U

* Proposal 2 (new, based on 1st round comments): (Nokia)
  + Option 1 (Nokia): In addition to test configurations listed under the tentative agreement, introduce the following test configurations for E-UTRAN – NR-U handover.

|  |  |  |
| --- | --- | --- |
| Configuration | Description of E-UTRAN cell | Description of a cell with CCA |
| 1 | Rel-15 LTE FDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Rel-15 LTE TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

Table 4 Configuration for cell change from E-UTRAN to NR-U

* Recommended WF
  + Can Proposal 1 (tentative agreement based on 1st round comments) be agreed? Collect views for new Proposal 2.

Issue 2-3-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Tentative agreement is ok. Support proposal 2. |

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

*The listed proposals are discussed in R4-2102242 (Ericsson)*

Which cell specific test parameters should be included in handover test cases to account for LBT impact?

* Proposal 1 (Ericsson): 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
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-3-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | DBT window means LBT window? A typo? |
| Ericsson | Support Proposal 1.  To ZTE: DBT window is the RAN1 terminology. |

**Issue 2-3-3: Test requirements for handover**

*The listed proposals are discussed in R4-2102242 (Ericsson)*

How to define test requirements for handover test cases?

* Proposal 1: (Ericsson): 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.
* Tentative agreement:
  + 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.
    - Note: Parameter L3 depends on whether UL LBT failures are to be tested in these test cases.
* Recommended WF
  + With the note added to Proposal 1, can the tentative agreement be agreed?

Issue 2-3-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Tentative agreement is ok. |

### Sub-topic 2-4: Test case details for RRC re-establishment

**Issue 2-4-1: Test cases to be introduced for RRC re-establishment**

*The listed proposals are discussed in R4-2102647 (Ericsson)*

Which test cases are to be included for RRC re-establishment?

* Proposal 1 (Ericsson): 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:
  + TC1: Intra-frequency RRC Re-establishment in FR1 with known target cell subject to CCA
  + TC2: Inter-frequency RRC Re-establishment in FR1 with unknown target cell subject to CCA
  + TC3: Intra-frequency RRC Re-establishment in FR1 with unknown target cell subject to CCA
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-4-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |
| Nokia | Ok with Proposal 1. We have included these test cases in our draft CR for RRC re-establishment. |

**Issue 2-4-2: Test configurations for RRC re-establishment test cases**

*The listed proposals are discussed in R4-2102647 (Ericsson)*

Which test configurations are to be included for RRC re-establishment test cases?

* Proposal 1: (Ericsson): 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 |

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-4-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1 |
| Nokia | After the agreement for Issue 1-1-4, Proposal 1 is ok. |

**Issue 2-4-3: LBT (CCA) model for RRC re-establishment test cases**

*The listed proposals are discussed in R4-2102647 (Ericsson)*

How to define the details of LBT (CCA) model for RRC re-establishment test cases?

* Proposal 1 (Ericsson): NR-U to NR-U RRC re-establishment tests are defined for the following LBT configuration/setting:
  + - 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
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-4-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | The P value depends on the CCA model. |
| Ericsson | Support Proposal 1, it’s now also aligned with the GTW agreements. |
| Nokia | This depends on the agreements under Topic #1. LBT success probability for this test case can be discussed after agreement about default value and the other possible values is made. We would prefer to agree on the test case specific probabilities in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

### Sub-topic 2-5: Test case details for RRC connection release with re-direction

**Issue 2-5-1: Test cases to be introduced for RRC connection release with re-direction**

*The listed proposals are discussed in R4-2102648 (Ericsson)*

Which test cases are to be introduced for RRC connection release with re-direction?

* Proposal 1: (Ericsson): At least the following NR-U 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:
  + - TC1: Redirection from NR with CCA in FR1 to NR in CCA in FR1
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-5-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

**Issue 2-5-2: Test configurations for RRC connection release with re-direction test cases**

*The listed proposals are discussed in R4-2102648 (Ericsson)*

Which test configurations are to be included in test cases for RRC connection release with re-direction?

* Proposal 1 (Ericsson): NR-U 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 | Description |
| 1 | With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-5-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. But this is related to similar issue in general configurations under topic #1. |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-4, so ok for us. |

**Issue 2-5-3: LBT (CCA) model for RRC connection release with re-direction test cases**

*The listed proposals are discussed in R4-2102648 (Ericsson)*

How to define the details of LBT (CCA) model for test cases for RRC connection release with re-direction?

* Proposal 1 (Ericsson): NR-U to NR-U RRC connection release with redirection test is defined for the following LBT configuration/setting:
  + - Serving cell: PCCA\_UL=1 and PCCA\_DL=1 in all test times
    - Target cell: PCCA\_UL=1 and PCCA\_DL< 1 (e.g. 0.75) in all test times
* Proposal 2 (Ericsson): In NR-U 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
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-5-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1 and 2. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

### Sub-topic 2-6: Test case details for timing

**Issue 2-6-1: Test configurations for UE transmit timing test cases**

*The listed proposals are discussed in R4-2102649 (Ericsson)*

Which test configurations to include for UE transmit timing test cases?

* Proposal 1 (Ericsson): The UE transmit timing tests are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:

**Table 1: Configuration related to SSB SCS and BW in UE transmit timing tests in 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 |
| Note 1: The UE is only required to be tested in one of the supported test configurations. | |

**Table 2: Configuration related to SSB SCS and BW in UE transmit timing tests in SA**

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

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-6-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. Bu this is related to general test configuration discussion in Topic #1. |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |
| MediaTek | Support Proposal 1 and it is inline with GTW agreement. |

**Issue 2-6-2: LBT (CCA) model for UE transmit timing test cases**

*The listed proposals are discussed in R4-2102649 (Ericsson)*

How to define the details of LBT (CCA) model for UE transmit timing test cases?

* Proposal 1 (Ericsson): UE transmit timing tests are defined for the following LBT configuration/setting in SpCell:
  + - PCCA\_UL=1 and PCCA\_DL < 1 depending on SSB periodicity (e.g. 0.5% for TSSB=20 ms) in all test times
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-6-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

**Issue 2-6-3: Test configurations for UE timing advance adjustment accuracy test cases**

*The listed proposals are discussed in R4-2102649 (Ericsson)*

Which test configurations to include for UE timing advance adjustment accuracy test cases?

* Proposal 1 (Ericsson): The timing advance adjustment accuracy tests are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:

**Table 1: Configuration related to SSB SCS and BW in UE timing advance tests in 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 |
| Note 1: The UE is only required to be tested in one of the supported test configurations. | |

**Table 2: Configuration related to SSB SCS and BW in UE advance timing tests in SA**

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

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-6-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1, but it’s related to the general configuration discussion in Topic #1. |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |

**Issue 2-6-4: LBT (CCA) model for UE timing advance adjustment accuracy test cases**

*The listed proposals are discussed in R4-2102649 (Ericsson)*

How to define the details for LBT model for UE timing advance adjustment accuracy test cases?

* Proposal 1 (Ericsson): UE timing advance adjustment accuracy tests are defined for the following LBT configuration/setting in SpCell:
  + - PCCA\_UL=1 and PCCA\_DL =1 in all test times
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-6-4 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

#### Sub-topic 2-7: Test case details for BWP switching

**Issue 2-7-1: Test configurations for BWP switching test cases**

*The listed proposals are discussed in R4-2102651 (Ericsson)*

Which test configurations to include for BWP switching delay test cases?

* Proposal 1 (Ericsson): The tests for BWP switching under consistent UL failure are defined for the following configuration related to SSB SCS and BW in EN-DC and SA:

**Table 1: Configuration related to SSB SCS and BW in 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 |
| Note 1: The UE is only required to be tested in one of the supported test configurations. | |

**Table 2: Configuration related to SSB SCS and BW iin SA**

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

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-7-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1, but it’s related to the more general configuration discussion in Topic #1. |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |

**Issue 2-7-2: LBT (CCA) model for BWP switching test cases**

*The listed proposals are discussed in R4-2102651 (Ericsson)*

How to define the details of LBT (CCA) model for BWP switching test cases?

* Proposal 1 (Ericsson): The tests on BWP switching under consistent UL failure are defined for the following LBT configuration/setting in SpCell:

**Table 3: LBT settings in UL and DL BWPs in SpCell**

|  |  |  |
| --- | --- | --- |
| 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 |

* Proposal 2 (Ericsson): Periodic SRS is configured in the SpCell to enable the UE to detect consistent UL LBT failure in the SpCell.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-7-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1 and 2. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

### Sub-topic 2-8: Test case details for TCI state switching delay

**Issue 2-8-1: Test cases to be introduced for TCI state switching**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

Which test cases to introduce for TCI state switching delay?

* Proposal 1 (Ericsson): In Rel-16 NR-U, test cases for active TCI state switching are introduced for the following cases:
  + EN-DC, NR PSCell under CCA, known TCI state, MAC-based triggering
  + EN-DC, NR PSCell under CCA, known TCI state, RRC-based triggering
  + NR SA, PCell under CCA, known TCI state, MAC-based triggering
  + NR SA, PCell under CCA, known TCI state, RRC-based triggering
  + NR SA, SCell under CCA, known TCI state, MAC-based triggering
  + NR SA, SCell under CCA, known TCI state, RRC-based triggering
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-8-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. We can also define a rule to avoid multiple unnecessary testing. |
| Nokia | Need to agree first if TCI state switching delay test case will be introduced for NR-U. |
| MediaTek | Depending on Q2 in issue 2-1-0. |

### Sub-topic 2-9: Test case details for Interruptions

**Issue 2-9-1: Deactivated SCell measurement cycle for interruption test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

What should be the measurement cycle for deactivated SCell in interruption test cases?

* Proposal 1 (Ericsson): During interruption tests, a deactivated SCell measurement cycle of 160ms is used.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-9-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

**Issue 2-9-2: LBT (CCA) model for interruption test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

How to define the details of LBT model for interruption test cases?

* Proposal 1 (Ericsson): LBT model is configured in interruption tests, with a channel access success probability P=[0.75]
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-9-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

**Issue 2-9-3: Phases of interruption test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

How to define the different phases of interruption test cases?

* Proposal 1 (Ericsson): The interruption requirements are verified in tests with the following phases
  + - T1 : UE is configured with PCell and PScell if applicable, and measures/reports candidate Scell such that it will be known in T2
    - T2 : Scell is added, interruption requirement verified
    - T3 : Scell is activated, interruption requirement verified
    - T4 : Scell is deactivated, interruption requirement verified
    - T5 : Deactivated Scell measurement interruption requirement is verified
    - T6 : Scell is released, interruption requirement verified
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-9-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

### Sub-topic 2-10: Test case details for SCell activation/deactivation

**Issue 2-10-1: Measurement cycles for SCell (de)activation test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

How to take into account different measurement cycles for SCell (de)activation in the test cases?

* Proposal 1 (Ericsson): Define test cases for SCell (de)activation of known SCell in NR-U for both measurement cycles 160 and 320ms.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-10-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1. |

**Issue 2-10-2: LBT (CCA) model for SCell (de)activation test cases**

*The listed proposals are discussed in R4-2102368 (Ericsson)*

How to model LBT (CCA) in SCell (de)activation test cases?

* Proposal 1 (Ericsson): Test cases for SCell (de)activation testing with NR PCC in FR1 with SCC under CCA are modeled with only DL CCA in SCell.
* Proposal 2 (Ericsson): Test cases for SCell (de)activation testing with NR PCC under CCA with SCC under CCA are modeled with DL CCA in SCell and UL CCA in PCell.
* Proposal 3 (Ericsson): Test cases for SCell (de)activation testing with NR PSCC under CCA with SCC under CCA are modeled with DL CCA in SCell and UL CCA in PSCell.
* Proposal 4 (Ericsson): For UL CCA model in SCell (de)activation testing, PCCA\_UL = [0.75] is used for all time intervals.
* Proposal 5 (Ericsson): For DL CCA model in SCell (de)activation testing, PCCA\_DL = [0.75] is used for all time intervals.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-10-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1-5. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

### Sub-topic 2-11: Test case details for RLM

**Issue 2-11-1: Test case sections to be introduced for RLM**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

Which test cases are to be introduced for RLM?

* Proposal 1(Ericsson):
  + The following sections for NR-U RLM are added:
    - For PSCell in Scenario B:
      * A.10.3.1.2 Radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode
      * A.10.3.1.3 Radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode
      * A.10.3.1.4 Radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode
      * A.10.3.1.5 Radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode
    - For PCell in Scenario C:
      * A.11.4.1.2 Radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in non-DRX mode
      * A.11.4.1.3 Radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in non-DRX mode
      * A.11.4.1.4 Radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in DRX mode
      * A.11.4.1.5 Radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in DRX mode
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-11-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

**Issue 2-11-2: SNR combinations for RLM tests**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

Which SNR combinations are to be tested for each RLM test?

* Proposal 1 (Ericsson): For RLM out-of-sync, Test 1 and Test 2 (with different SNR combinations) are developed for testing both requirements (RLM-RS SSB Es/Iot ≥-7 dB and for RLM-RS SSB Es/Iot <-7 dB).
  + 1a. For RLM out-of-sync, Test 1 SNRs: (1 dB, [-7 dB], [-15 dB]).
  + 1b. For RLM out-of-sync, Test 2 SNRs: (1 dB, [-3 dB], [-7 dB]).
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-11-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | Some question to the second bullet of proposal 1. What is the expected outcome of the test as OOS will not be triggered. |
| Ericsson | Support proposal 1.  To Huawei: whether it is triggered or not depends on NW-configured parameters. The requirement is different for the two cases, and both needs to be tested. |
| Nokia | Agree to have separate tests for different SSB Es/Iot ranges. |
| MediaTek | More discussion is needed. Unclear about 1b and the relation to NW-configured parameters, as mentioned by Ericsson.  Fine to FFS the SNR ranges for RLM-RS SSB Es/Iot ≥-7 dB and for RLM-RS SSB Es/Iot <-7 dB. |

**Issue 2-11-3: Test configurations for RLM tests**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

Which test configurations are to be included in the RLM tests?

* Proposal 1 (Ericsson): Test configurations for NR PCell (Scenario C) and NR PSCell (Scenario B) in all NR-U RLM test cases:
  + <TDD, SSB SCS 30 kHz, data SCS 30 kHz, bandwidth 40 MHz>
  + Note: in Scenario B, the above configuration is further combined with LTE FDD and LTE TDD, resulting in two configurations in test cases for Scenario B.

EN-DC:

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR: TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| 2 | LTE TDD; NR: TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| NOTE: The UE is only required to pass in one of the supported test configurations above. | |

SA:

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | TDD, SSB SCS 30 kHz, data SCS 30 kHz, bandwidth 40 MHz |

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-11-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1, related to the general configuration in Topic #1. |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |

**Issue 2-11-4: LBT (CCA) model for RLM tests**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

Details of LBT (CCA) model for RLM tests?

* Proposal 1 (Ericsson): DL CCA model for RLM in-sync:
  + T1: DL PCCA=1.0,
  + T2-T5: DL PCCA=TBD.
* Proposal 2 (Ericsson): UL CCA model for RLM in-sync: UL PCCA=1.0 in T1-T5.
* Proposal 3: (Ericsson): DL CCA model for RLM out-of-sync:
  + T1: DL PCCA=1.0,
  + T2, T3: DL PCCA=TBD.
* Proposal 4 (Ericsson): UL CCA model for RLM out-of-sync: UL PCCA=1.0 in T1-T3.

Recommended WF

* + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-11-4 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1-4. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

**Issue 2-11-5: Testing for UE with different capabilities and under different channel occupancy**

*The listed proposals are discussed in R4-2102529 (Ericsson)*

How to test RLM for a UE with different capabilities?

* Proposal 1 (Ericsson): Use PCCA=0.75 and PCCA=0.5 in RLM out-of-sync test cases.
* Proposal 2 (Ericsson): Use PCCA=0.6 in RLM in-sync test cases.

Recommended WF

* + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-11-5 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposals 1 and 2. |
| Nokia | Also related to LBT model details, so we would prefer to agree on these details in the next meeting after agreeing on LBT model on general level in this meeting. |

**Issue 2-11-6: Test cases for 4RX UEs**

* Proposal 1 (Ericsson): For NR-U, all relevant test cases (e.g., RLM test cases) have to also cover 4 RX UEs (similar to legacy Rel-16 NR).

Recommended WF

* + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-11-6 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. It’s supported by RF, so should not be controvercial. |

### Sub-topic 2-12: Test case details for link recovery

**Issue 2-12-1: Test case sections to be introduced for BFD and link recovery**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

Which test cases are to be included for BFD and link recovery?

* Proposal 1 (Ericsson):
  + Define the following BFD and LR test cases for NR-U:
    - A.10.3.4.1 EN-DC Beam Failure Detection and Link Recovery Test for FR1 PSCell configured with SSB-based BFD and LR in non-DRX mode
    - A.10.3.4.2 EN-DC Beam Failure Detection and Link Recovery Test for FR1 PSCell configured with SSB-based BFD and LR in DRX mode
    - A.11.4.4.1 Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in non-DRX mode
    - A.11.4.4.2 Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in DRX mode
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-12-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

**Issue 2-12-2: Tests to be introduced for BFD and link recovery and test details**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

How to define BFD and link recovery tests for different evaluation period depending on different BFD-RS SSB ES/Iot?

* Proposal 1 (Ericsson): To verify the different evaluation period (for BFD-RS SSB Es/Iot ≥ -7 dB and (BFD-RS SSB Es/Iot < -7 dB) in Table 8.5A.2.2-1, define the test cases with
  + 1) BFD-RS SSB Es/Iot ≥ -7 dB and
  + 2) BFD-RS SSB Es/Iot < -7 dB to verify the different evaluation period.
* Proposal 2 (Ericsson): For the case with BFD-RS SSB Es/Iot < -7 dB, set SSB Es/Iot = -3dB in T2 and set SSB Es/Iot = -12dB in T3/T4/T5, by reusing the test cases defined in Rel-15.
* Proposal 3 (Ericsson): For the case with BFD-RS SSB Es/Iot ≥ -7 dB, set SSB Es/Iot = [-1]dB in T2 and set SSB Es/Iot = [-7]dB in T3/T4/T5.
* Proposal 4 (Ericsson): SNR test points for BFD and LR tests with CCA should be adjusted for UEs capable of 4Rx, i.e., set lower SNR test point than the tests for 2Rx UEs.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-12-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1-4. |

**Issue 2-12-3: LBT (CCA) model for BFD and link recovery and test details**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

How to define LBT (CCA) model details for BFD and link recovery tests?

* Proposal 1 (Ericsson): BFD and LR tests specify the DL/UL CCA success rate given by PCCA\_DL and PCCA\_UL.
* Proposal 2 (Ericsson): BFD and LR tests set different PCCA according to the assumed channel access mode, i.e., LBE and FBE. Set higher DL CCA success rate (e.g. 0.75) for FBE and lower DL CCA success rate (e.g. 0.5) for LBE during the tests.
* Proposal 3 (Ericsson): Assume no UL CCA failure during the BFD and LR tests, that is, PCCA\_UL=1.0.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-12-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1-3. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

**Issue 2-12-4: Test case sections to be introduced for L1-RSRP reporting**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

Which test cases are to be defined for L1-RSRP measurement procedure?

* Proposal 1 (Ericsson): Define the following L1-RSRP measurement procedure test cases for NR-U:
  + A.9.3.3.1 SSB based L1-RSRP measurement when DRX is not used (SA SCell with NR PCell)
  + A.9.3.3.2 SSB based L1-RSRP measurement when DRX is used (SA SCell with NR PCell)
  + A.10.4.3.1 SSB based L1-RSRP measurement on PSCC when DRX is not used (EN-DC PSCell)
  + A.10.4.3.2 SSB based L1-RSRP measurement on PSCC when DRX is used (EN-DC PSCell)
  + A.10.4.3.3 SSB based L1-RSRP measurement on SCC when DRX is not used (EN-DC SCell with LTE PCell and NR-U PSCell)
  + A.10.4.3.4 SSB based L1-RSRP measurement on SCC when DRX is used (EN-DC SCell with LTE PCell and NR-U PSCell)
  + A.11.5.4.1 SSB based L1-RSRP measurement when DRX is not used (SA PCell)
  + A.11.5.4.2 SSB based L1-RSRP measurement when DRX is used (SA PCell)
  + A.11.5.4.3 SSB based L1-RSRP measurement on SCC when DRX is not used (SA SCell with NR-U PCell)
  + A.11.5.4.4 SSB based L1-RSRP measurement on SCC when DRX is used (SA SCell with NR-U PCell)
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-12-4 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

**Issue 2-12-5: Reporting requirements for L1-RSRP measurement procedure test cases**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

Es/Ioc to be used in L1-RSRP measurement procedure tests with CCA?

* Proposal 1 (Ericsson): For L1-RSRP measurement procedure tests with CCA, reuse the same Es/Ioc as Rel-15 tests.

How to define reporting requirements for L1-RSRP measurement procedure test cases?

* Proposal 2 (Ericsson): For NR-U L1-RSRP measurement procedure tests with DRX and non-DRX cases, RAN4 sets the same T1/T2 and reporting timing requirements as Rel-15 test, that is,
  + T1=5s, T2=1s.
  + TReport=80 slots (Periodic L1-RSRP reporting with PUCCH)
  + The UE shall send L1-RSRP report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the absolute accuracy requirement.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-12-5 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1 and 2. |

**Issue 2-12-6: LBT (CCA) model for L1-RSRP measurement reporting tests**

*The listed proposals are discussed in R4-2101432 (Ericsson)*

How to define the details of LBT (CCA) model for L1-RSRP measurement procedure tests?

* Proposal 1 (Ericsson): L1-RSRP measurement procedure tests specify the DL/UL CCA success rate given by PCCA\_DL and PCCA\_UL.
* Proposal 2 (Ericsson): L1-RSRP measurement procedure tests set PCCA\_DL < 1 (e.g., 0.75). Set the common PCCA\_DL applicable for both FBE and LBE.
* Proposal 3 (Ericsson): RAN4 discuss whether L1-RSRP measurement procedure tests consider UL CCA failure or not during the tests. If not considered, set PCCA\_UL=1.0 in the test cases.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-12-6 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1-3. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

### Sub-topic 2-13: Test case details for RRM measurements: Intra-frequency, inter-frequency and inter-RAT

**Issue 2-13-1: Test case sections to be introduced for intra-frequency measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which test cases are to be defined for intra-frequency measurements?

* Proposal 1 (Ericsson): The following test cases are defined for NR-U intra-frequency RRM measurements for PCC, SCC, and PSCC:
  + SA event triggered reporting test without gaps under non-DRX,
  + SA event triggered reporting test without gaps under DRX,
  + SA event triggered reporting test with per-UE gaps under non-DRX,
  + SA event triggered reporting test with per-UE gaps under DRX.
* Proposal 2 (Ericsson): Each test case is conducted for three A3 measurement quantities: SS-RSRP, SS-RSRQ, SS-SINR.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-13-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |
| Nokia | Proposal 1 is ok, Proposal 2 depends on agreements in Sub-topic 2-1. |

**Issue 2-13-2: Test configurations for RRM measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which test configurations are to be added for RRM measurements?

* Proposal 1 (Ericsson): Test configurations to be introduced for RRM measurements:

Scenario A:

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| NOTE: The UE is only required to be tested in one of the supported test configurations. | |

Scenario B:

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

Scenario C:

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

Inter-RAT E-UTRAN-NR-U:

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

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-13-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support the proposal. Also related to the general configuration discussion in Topic #1. |
| Nokia | Refer to agreement for issue 1-1-5.  After first round, proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |

**Issue 2-13-3: LBT (CCA) configuration for RRM measurement test cases**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define the details of LBT (CCA) model for RRM measurement test cases?

* Proposal 1 (Ericsson): UL CCA model: PCCA\_UL=1.0 in all time intervals (T1 and T2).
* Proposal 2: (Ericsson): DL CCA model: PCCA\_DL=[0.75] in all time intervals (T1 and T2).
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-13-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |
| Nokia | The proposal should be aligned with the agreements made in GTW session for the LBT model. Probabilities can be discussed after the default probability and the set of alternative probabilities are agreed. We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

### Sub-topic 2-14: Test case details for RSSI and CO measurements

**Issue 2-14-1: Test configurations to be introduced for RSSI and CO measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which test configurations are to be included for RSSI and CO measurements?

* Proposal 1 (Ericsson): In RSSI and CO test cases, the test configurations are the same as for RRM measurement:

Scenario A:

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| NOTE: The UE is only required to be tested in one of the supported test configurations. | |

Scenario B:

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

Scenario C:

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

Inter-RAT E-UTRAN-NR-U:

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

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-14-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support the proposal, related to the general configuration discussion in Topic #1. |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |

**Issue 2-14-2: LBT (CCA) model for RSSI and CO measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define LBT (CCA) model details for RSSI and CO measurement test cases?

* Proposal 1 (Ericsson): UL CCA model: PCCA\_UL=1.0
* Proposal 2 (Ericsson): DL CCA model: PCCA\_DL=1.0
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-14-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

**Issue 2-14-3: Number of cells for RSSI and CO measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define the number of cells for RSSI and CO measurement test cases?

* Proposal 1 (Ericsson): Number of cells for RSSI and CO measurements:
  + Scenario A:
    - Intra-frequency RSSI/CO: 2 cells (PCell, SCell)
    - Inter-frequency RSSI/CO: 2 cells (PCell, SCell) and 1 inter-frequency for RSSI/CO
  + Scenario B:
    - Intra-frequency RSSI/CO: 2 cells (E-UTRAN PCell, NR PSCell)
    - Inter-frequency RSSI/CO: 2 cells (E-UTRAN PCell, NR PSCell) and 1 inter-frequency for RSSI/CO
  + Scenario C:
    - Intra-frequency RSSI/CO: 1 cell (PCell)
    - Inter-frequency RSSI/CO: 1 cell (PCell) and 1 inter-frequency for RSSI/CO
  + Standalone Inter-RAT E-UTRAN-NR-U:
    - Inter-RAT RSSI/CO: 1 cell (E-UTRAN PCell) and 1 inter-RAT frequency for RSSI/CO
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-14-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1 |

**Issue 2-14-4: Test coverage for RSSI and CO measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define the test coverage for intra- and inter-frequency RSSI and CO measurement test cases?

* Proposal 1 (Ericsson): The following test coverage is proposed for *intra-frequency* RSSI and CO:
  + RSSI:
    - Test 1: Non-DRX, SMTC and RMTC are overlapping
    - Test 2: DRX, SMTC and RMTC are not overlapping
  + CO:
    - Test 1: DRX, SMTC and RMTC are overlapping
    - Test 2: Non-DRX, SMTC and RMTC are not overlapping
* Proposal 2 (Ericsson): The following test coverage is proposed for *inter-frequency* RSSI and CO:
  + - RSSI:
      * Non-DRX
    - CO:
      * DRX
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-14-4 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |
| MediaTek | upport proposals 1 and 2. |

### Sub-topic 2-15: Test case details for SFTD measurements

**Issue 2-15-1: Test configurations for SFTD measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which test configurations are to be included in SFTD measurement test cases?

* Proposal 1 (Ericsson): The following test configurations are used for inter-RAT SFTD reporting delay test with NR target under CCA

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

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-15-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support Proposal 1, related to the general configuration discussion in topic #1. |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |

**Issue 2-15-2: Reporting in SFTD measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

Which reporting types are inter-RAT reporting delay test cases to be based on?

* Proposal 1 (Ericsson): Inter-RAT reporting delay test cases are based on SFTD reporting only, i.e. no additional SS-RSRP reporting.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-15-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |

**Issue 2-15-3: LBT (CCA) model for SFTD measurements**

*The listed proposals are discussed in R4-2102531 (Ericsson)*

How to define the details of LBT (CCA) model for SFTD measurement test cases?

* Proposal 1 (Ericsson): Test case for inter-RAT SFTD reporting delay for SFTD between EUTRA PCell and NR neighbour cell on NR carrier under CCA is modelled with DL CCA on the NR carrier.
* Proposal 2 (Ericsson): For DL CCA model in inter-RAT SFTD reporting delay test, PCCA\_DL = [0.75] is used as initial assumption.
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-15-3 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposals 1 and 2. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

### Sub-topic 2-16: Test case details for SFTD measurement accuracy

**Issue 2-16-1: Test configurations for inter-RAT SFTD measurement accuracy**

*The listed proposals are discussed in R4-2102371 (Ericsson)*

Which test configurations are to be included in inter-RAT SFTD measurement accuracy test cases?

* Proposal 1 (Ericsson): The following test configurations for NR-U Inter-RAT SFTD accuracy testing are to be supported:

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

* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-16-1 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1, related to the general discussion in Topic #1 (aligned with the current discussion). |
| Nokia | Proposal seems to be in line with the agreement for issue 1-1-5, so ok for us. |

**Issue 2-16-2: LBT (CCA) model for inter-RAT SFTD measurement accuracy**

*The listed proposals are discussed in R4-2102371 (Ericsson)*

How to define the details of LBT (CCA) model for inter-RAT SFTD measurement accuracy test cases?

* Proposal 1 (Ericsson): In test cases for NR-U Inter-RAT SFTD measurement accuracy, as initial assumption the NR target cell is modelled with DL CCA PCCA\_DL = [0.75].
* Recommended WF
  + Continue discussion/commenting on the 2nd round. Comments from the 1st round are included in the comments and can be updated by the corresponding companies on the 2nd round if needed.

Issue 2-16-2 Companies’ comments 1st/2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Ericsson | Support proposal 1. |
| Nokia | We would prefer to agree on the test case specific probabilities and other LBT model details in the next meeting and concentrate on agreeing on the LBT model on general level in this meeting. |

### 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** |
| **General comments:** | Huawei: General comments to. It is better to come back next meeting before we have concrete test cases list, general configurations including LBT models, and general rules on how to define the test requirements with L,max.  Ericsson: At least one test case in each area (including the CRs below) can be discussed in the 2nd round, if revised and aligned with the agreements in this meeting.  Nokia: In general, we think that no test case draft CR in this table should be approved in this meeting without updating the content with the latest agreements on test configurations. Revised CRs to be checked one by one and to be discussed in separate email threads. The rest of the CRs can be updated for the next meeting.  Huawei: We can focus on the general issues and may consider the CR related to common configurations or structures. With so many pending issues, it does not make sense to check all these CRs one by one in details during the meeting, which will cause lots of efforts for the time being. It is suggested to come back next meeting for these particular test cases after we have clear pictures of the framework.  **Ericsson**: For issues under discussion we have kept TBDs. We think it’s fine to endorse CRs in this meeting, as long as they do not contradict the agreements and aligned with the on-going discussions (alternatively, have TBDs for the open issues). Most parts of the test cases are the same as in legacy, so it’s helpful to agree at least on basic test cases (e.g., non-DRX, etc.) for the requirements, if possible, since this will be a good starting point for the next meeting and actually will allow the other companies to better check until the next meeting and address the issues if found in the next meeting. This is a better approach than getting a bunch of completely new CRs again in the next meeting, since the situation will not get better in the next meeting.  Note: the endorsed CRs will not go into the spec but into the big CR which will be further checked and updated if needed in the next meeting. |
| AI 7.1.6.1, General | |
| AI 7.1.6.3.2, RRC IDLE, cell re-selection | |
| [**R4-2102243**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102243.zip)  revised to  R4-210xxx  Ericsson  CR | Introduction of NR-U cell reselection tests |
|  |
| AI 7.1.6.3.3, HO delay and interruptions | |
| [**R4-2101135**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101135.zip)  Nokia  draftCR | Draft TC E-UTRAN - NR-U Handover |
|  |
| [**R4-2101649**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101649.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for HO delay and interruption for NR-U |
|  |
| AI 7.1.6.3.4, RRC re-establishment | |
| [**R4-2101136**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101136.zip)  Nokia  draftCR | Draft TC RRC re-establishment with CCA |
|  |
| AI 7.1.6.3.5, RRC connection release with re-direction | |
| [**R4-2101650**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101650.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for RRC release with redirection for NR-U |
|  |
| AI 7.1.6.3.6, Timing | |
| [**R4-2100774**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100774.zip)  MediaTek inc.  draftCR | Introduction of test cases for UE transmit timing requirements with CCA |
|  |
| [**R4-2102650**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102650.zip)  revised to  R4-210xxx  Ericsson  draftCR | UE timing tests for NR-U |
|  |
| AI 7.1.6.3.7, BWP switching delay and interruptions | |
| [**R4-2102652**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102652.zip)  revised to  R4-210xxx  Ericsson  draftCR | Test cases on BWP switching with consistent UL LBT failures |
|  |
| AI 7.1.6.3.8, PSCell addition/release | |
| [**R4-2101651**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101651.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for PSCell addition and release for NR-U |
| Ericsson: For Table A.10.3.X.1.1-3, OCNG shall only be present when there are bursts on downlink. |
| AI 7.1.6.3.9, Interruptions | |
| [**R4-2102369**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102369.zip)  revised to  R4-210xxx  Ericsson  draftCR | DraftCR Introduction of NR-U SCell interruption and SCell (de)activation tests |
|  |
| AI 7.1.6.3.10, RLM | |
| [**R4-2102530**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102530.zip)  revised to  R4-210xxx  Ericsson  draftCR | RLM test cases |
|  |
| AI 7.1.6.3.11, Beam management | |
| [**R4-2101433**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101433.zip)  revised to  R4-210xxx  Ericsson  draftCR | Draft CR: test cases for beam management in NR-U |
|  |
| AI 7.1.6.3.12, Intra-frequency, inter-frequency and inter-RAT measurement requirements | |
| [**R4-2101137**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101137.zip)  Nokia  draftCR | Draft TC NR-U inter-frequency measurements |
|  |
| [**R4-2101652**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101652.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for inter-RAT measurement for NR-U |
| Ericsson: We provided comments directly in the CR. We prefer to discuss a bit more the TCs for the EN-DC case, so we removed them. For LTE standalone case, we need to include CCA model, CCA probability, DBT window. |
| [**R4-2102532**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102532.zip)  revised to  R4-210xxx  Ericsson  draftCR | NR-U RRM, SFTD, RSSI, and CO measurements test cases |
|  |
| AI 7.1.6.3.13, Accuracy requirements for NR-U intra-frequency, inter-frequency and inter-RAT measurements | |
| [**R4-2101015**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101015.zip)  Apple  draftCR | TCs for RSSI and CO measurement accuracy in NR-U R16 |
|  |
| [**R4-2101653**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101653.zip)  Huawei, HiSilicon  draftCR | Draft CR of test cases for intra-frequency measurement accuracy for NR-U |
| Ericsson: We provided comments directly in the CR. We need to include the CCA model, CCA probabilities. In Scenario A (section 9), all cells cannot be on the same frequency, since there is SCell. |
| [**R4-2102372**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102372.zip)  revised to  R4-210xxx  Ericsson  draftCR | DraftCR 38.133 NR-U Inter-RAT SFTD accuracy TC |
|  |
| [**R4-2100775**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100775.zip)  MediaTek inc.  draftCR | Introduction of test cases for Accuracy for NR-U inter-frequency SS-RSRP measurements |
|  |
| [**R4-2100776**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100776.zip)  MediaTek inc.  draftCR | Introduction of test cases for L1-RSRP measurement accuracy with CCA serving cell |
|  |

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #3: Spec structure and applicability rules

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

## Companies’ contributions summary

The companies contributions on this topic are combined in papers in the other topics, and can be found in Section 1.1 and 2.1.

## Open issues summary and view’s collection for the 1st round

### Sub-topic 3-1: Differentiation between UEs supporting LBE, FBE or both

**Issue 3-1-1: Applicability rules for UEs supporting both LBE and FBE**

* Option 1 (ZTE): If a UE claims to support both modes then the UE shall pass tests for both modes. De-prioritize the discussion if needed since this shall be seen as a corner case.
* Option 2 (Qualcomm): A UE that signals both FBE and LBE capability need to test only LBE test cases

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | First of all in our view it should be rare for UE to support both modes. But if a UE claims so then it has to pass both tests or else it doesn’t make sense. We don’t think a UE passing LBE test cases automatically means that it can pass FBE TCs. |
| Huawei | Similar views as ZTE. |
| MediaTek | Fine with Option 2. |
| Ericsson | Needs more discussion, depends perhaps also on specific test cases. |
| Nokia | More discussion is needed. Would be good to clarify the core reason why a UE supporting LBE and FBE might have difficulty passing a test with FBE, if it can pass the same test with LBE. |

**Issue 3-1-2: Applicability rules for UEs supporting LBE**

* Option 1 (Qualcomm): Only FBE based test cases apply to a UE that signals FBE only capability.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Makes sense to us. |
| MediaTek | Fine with Option 1. |
| Ericsson | We agreed in GTW to not have separate test cases for FBE and LBE. We need rules, more generic ones, propose to further discuss the testing for UE with different capabilities in general in the next meeting. |
| Nokia | Option 1 is ok. |

**Issue 3-1-3: Applicability rules for UEs supporting FBE**

* Option 1 (Qualcomm): Only LBE based test cases apply to a UE that signals LBE only capability.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Makes sense to us. |
| MediaTek | Can UE signal both LBE and FBE? |
| Ericsson | Same comment as on 3-1-2 |
| Nokia | Option 1 is ok. |

### Sub-topic 3-2: Specification structure for test cases

*Sub-topic description: Discussion about specification structure based on proposals in discussion papers.*

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

**Issue 3-2-1: Test cases with PCell in FR1 and no SCell under CCA**

*The listed proposals are discussed in R4-2100773 (MediaTek)*

In which section to include test cases with PCell in FR1 and no SCell under CCA?

* Proposal 1 (MediaTek): A.9 is also used for the test cases for when Pcell is in FR1 and no SCell under CCA has been configured, e.g. inter-frequency measurement under CCA.

Recommended WF

* Discuss the proposal in the comment section.

Companies’ comments 1st week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | We raise the question for inter-frequency measurement under CCA but PCell is in licensed band. A.9 was defined only for the case with SCell under CCA. |
| Ericsson | We will have inter-frequency requirements in all of A.9, A.10, and A.11.  The scenario brought up can be in A.9, but we then need introduction and also revise the title or it can be in a new A.13, because this may not necessarily relate to scenario A but also to a HO, so perhaps we could keep 2 options for further discussion:   * A.9 * A.13. |

### CRs/TPs comments collection

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

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2102523**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102523.zip)  Ericsson  draftCR | **Draft Big CR: Introduction of Rel-16 NR-U RRM performance requirements** |
| ZTE: suggest to focus on technical discussions during the first round and come back at all CRs later. |
| **Ericsson: some CRs can be discussed earlier, e.g., for general configurations or for test case structure, etc. While for test cases, can be difficult to revise all test cases, but perhaps in the 2nd round at least one TC in each area could be revised to give a general idea.** |
|  |
| [**R4-2102525**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102525.zip)  Ericsson  draftCR | **NR-U test cases structure** |
| **Nokia:** There are no detailed agreements yet on UL LBT model, but would the purpose be to add both DL and UL LBT/CCA model under section A.3.20? Also small editorial comment: The styles of titles A.3.19 and A.3.20 are not matching, although they are same level headers. |
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## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic 3-1: Differentiation between UEs supporting LBE, FBE or both** | Issue 3-1-1: Applicability rules for UEs supporting both LBE and FBE  In this issue the opinions of the companies are split, and many request more clarification.  *Tentative agreements:*  None.  *Candidate options:*  In order to address the possible issues of increased number of tests, consider also Option 3 in addition to the options provided originally in the issue:   * Option 1: If a UE claims to support both modes then the UE shall pass tests for both modes. De-prioritize the discussion if needed since this shall be seen as a corner case. * Option 2: A UE that signals both FBE and LBE capability need to test only LBE test cases * Option 3 (new): A UE that signals both FBE and LBE capability need to test LBE on half of the test cases and FBE on the other half. Each half of the test cases is randomly selected.   *Recommendations for 2nd round:*  Continue discussion and consider if the new option addresses the concerns expressed in the 1st round.  Issue 3-1-2: Applicability rules for UEs supporting LBE  Most companies agreed with the proposed option. One company expressed concerns on the wording of the proposal considering that we agreed not to specify different test cases for FBE and LBE.  *Candidate options:*  To address the concerns expressed in the 1st round, can we consider the following options:   * Option 1 (original wording): Only FBE based test cases apply to a UE that signals FBE only capability. * Option 2 (new wording): A UE that signals FBE only capability is subject to tests only with FBE configuration.   *Recommendations for 2nd round:*  Companies are encouraged to consider if Option 2 is agreeable, or please suggest new wording for the issue if necessary.  Issue 3-1-3: Applicability rules for UEs supporting FBE  Some companies agreed with the proposed option. One company expressed concerns on the wording of the proposal considering that we agreed not to specify different test cases for FBE and LBE. Another company questioned if a UE may support both LBE and FBE.  *Candidate options:*  To address the concerns expressed in the 1st round, can we consider the following options:   * Option 1 (original wording): Only LBE based test cases apply to a UE that signals LBE only capability. * Option 2 (new wording): A UE that signals LBE only capability is subject to tests only with LBE configuration.   *Recommendations for 2nd round:*  Companies are encouraged to consider if Option 2 is agreeable, or please suggest new wording for the issue if necessary. |
| **Sub-topic 3-2: Specification structure for test cases** | Issue 3-2-1: Test cases with PCell in FR1 and no SCell under CCA  *Tentative agreements:*  None  *Candidate options:*   * Option 1: Consider to include test cases with PCell in FR1 and no SCell under CCA in clause A.9 * Option 2: Consider to include test cases with PCell in FR1 and no SCell under CCA in clause A.13   *Recommendations for 2nd round:*  Discuss the candidate options above. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on test configurations for NR-U RRM performance requirements |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2102523 | *“to be revised”* |
| R4-2102525 | *“to be revised”* |

## Discussion on 2nd round (if applicable)

Please continue discussion in open issues summary, after the 2nd week/round delimiter.  
Please also continue the TP/CR discussions above.

### Sub-topic 3-1: Differentiation between UEs supporting LBE, FBE or both

**Issue 3-1-1: Applicability rules for UEs supporting both LBE and FBE**

In order to address the possible issues of increased number of tests, consider also Option 3 in addition to the options provided originally in the issue:

* Option 1: If a UE claims to support both modes then the UE shall pass tests for both modes. De-prioritize the discussion if needed since this shall be seen as a corner case.
* Option 2: A UE that signals both FBE and LBE capability need to test only LBE test cases
* Option 3 (new): A UE that signals both FBE and LBE capability need to test LBE on half of the test cases and FBE on the other half. Each half of the test cases is randomly selected.

Recommended WF

* Continue discussion and consider if the new Option 3 addresses the concerns expressed in the 1st round.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Our preference if Option 3.  We can accept Option 1 and 2 if that is a clear preference from other companies in order to advance the work. |
| Huawei | Prefer option 2. Option 3 is a little bit strange and complicated. Is it possible that some requirements are not tested due to the random selection? |
| Qualcomm | Support option 2. |
| MediaTek | Prefer to Option 2. |
| Nokia (moderator) | Since most companies are fine with Option 2, may we agree with that?  A UE that signals both FBE and LBE capability need to test only LBE test cases |
| Ericsson | We prefer to further discuss this issue in the next meeting. |

**Issue 3-1-2: Applicability rules for UEs supporting LBE**

To address the concerns expressed in the 1st round, given that we don’t have separate tests for FBE and LBE but different configurations, can we consider the following options:

* Option 1 (original wording): Only FBE based test cases apply to a UE that signals FBE only capability.
* Option 2 (new wording): A UE that signals FBE only capability is subject to tests only with FBE configuration.

Recommended WF::

* Companies are encouraged to consider if Option 2 is agreeable, or please suggest new wording for the issue if necessary.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We support Option 2, the new wording expresses our agreements on Issue 1-2-1. |
| Qualcomm | We are fine with the new wording in Option 2. |
| MediaTek | Fine with Option 2. |
| Nokia (moderator) | Since all the companies answering to this issue support Option 2, may we agree to that?   * A UE that signals FBE only capability is subject to tests only with FBE configuration. |
| Ericsson | Agree on:   * The test configuration for dynamic channel access mode applies at least when: * UE is capable of only dynamic channel access mode, and * NW indicates dynamic channel occupancy. * The test configuration for semi-static access mode applies at least when: * UE is capable of only semi-static channel access mode, and * NW indicates semi-static channel occupancy. |

**Issue 3-1-3: Applicability rules for UEs supporting FBE**

To address the concerns expressed in the 1st round, given that we don’t have separate tests for FBE and LBE but different configurations, can we consider the following options:

* Option 1 (original wording): Only LBE based test cases apply to a UE that signals LBE only capability.
* Option 2 (new wording): A UE that signals LBE only capability is subject to tests only with LBE configuration.

Recommended WF:

* Companies are encouraged to consider if Option 2 is agreeable, or please suggest new wording for the issue if necessary.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We support Option 2, the new wording expresses our agreements on Issue 1-2-1. |
| Qualcomm | We are fine with the new wording in Option 2. |
| MediaTek | Fine with Option 2. |
| Nokia (moderator) | Since all the companies answering to this issue support option 2, can we agree with that?   * A UE that signals LBE only capability is subject to tests only with LBE configuration. |
| Ericsson | Agree on:   * The test configuration for dynamic channel access mode applies at least when: * UE is capable of only dynamic channel access mode, and * NW indicates dynamic channel occupancy. * The test configuration for semi-static access mode applies at least when: * UE is capable of only semi-static channel access mode, and * NW indicates semi-static channel occupancy. |

### Sub-topic 3-2: Specification structure for test cases

*Sub-topic description: Discussion about specification structure based on proposals in discussion papers.*

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

**Issue 3-2-1: Test cases with PCell in FR1 and no SCell under CCA**

In which section to include test cases with PCell in FR1 and no SCell under CCA?

* Option 1: Consider to include test cases with PCell in FR1 and no SCell under CCA in clause A.9
* Option 2: Consider to include test cases with PCell in FR1 and no SCell under CCA in clause A.13

Recommended WF

* Discuss the proposal in the comment section.

Companies’ comments 2nd week:

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Fine with Option 2. |
| Nokia (moderator) | Can we agree with Option 2?  Consider to include test cases with PCell in FR1 and no SCell under CCA in clause A.13 |
| Ericsson | We do not agree. We realized that there are no inter-frequency requirements for PCell under CCA and other cells without CCA. We need to resolve the requirements issue first. |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2102523**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102523.zip)  Ericsson  draftCR | **Draft Big CR: Introduction of Rel-16 NR-U RRM performance requirements** |
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| [**R4-2102525**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102525.zip)  Ericsson  draftCR | **NR-U test cases structure** |
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## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |