**3GPP TSG-RAN WG4 Meeting # 108-bis R4-2317249**

**Xiamen, China, October 09 – October 13, 2023**

**Agenda item:** 5.6.5

**Source:** Hisashi Onozawa (Nokia)

**Title:** Topic summary for [108-bis][125] FR2\_enh\_req\_Ph3\_part1

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

This summary is for the thread #125 about FR2\_enha\_req\_Ph3\_part in RAN4#108-bis. The contributions in AI 5.6/5.6.1/5.6.3 are treated, which includes the general aspects of the WI as well as the Beam correspondence requirements for RRC\_INACTIVE and initial access.

# Topic #1: Beam correspondence requirement

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

The main open question is whether the EIRP spherical coverage requirement for beam correspondence in RRC\_INACTIVE or initial access requires consideration of power tolerance or relaxation such that the existing beam correspondence requirement in RRC\_CONNECTE may not simply reused in initial access.

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2315562**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315562.zip) | Sony, Ericsson | **Observation 1: the existing power tolerances in 38.101-2 are not applicable for beam correspondence test in initial access.**  **Observation 2: fewer transmission opportunities in the initial access may affect the UE output power accuracy.**  **Observation 3: the preamble can be configured with a shorter transmission gap and longer transmission durations if needed for improved test accuracy.**  **Observation 4: a special test configuration of PRACH with beam lock may also be introduced if the existing preamble configuration is not sufficient to support UEs performing an accuracy uplink power control in initial access.**  **Proposal 1: RAN4 can investigate the needed RACH transmission periodicity and transmission duration in initial access to ensure the UE can perform accurate uplink power for beam correspondence test in initial access.**  **Proposal 2: It is suggested to define the core requirement for beam correspondence in initial access without any power tolerance but as an optional requirement for Rel-18 and mandate this requirement later if RAN5 can confirm the feasibility to accommodate sufficient transmission opportunities in the conformance test later.**  **Proposal 3: RAN4 can further discuss how to capture the optionality of the beam correspondence in initial access in the specification.** |
| [**R4-2315055**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315055.zip) | Qualcomm Incorporated | **Proposal 1 : In RAN4 it is assumed that the test method provides sufficient RACH occasions to the UE prior to measurement, to allow the UE power to settle.**  **Proposal 2 : UE implementation-specific mechanisms that reduce EIRP in IA compared to connected mode must be overcome by the UE itself and should not be reflected as relaxation to the UE.**  **Proposal 3: In RAN4 it is assumed that the test method provides sufficient wait time so UEs with roving beams can accrue 1 ms worth of complete MSG1 transmissions in the desired direction.**  **Observation 1 : Since it is agreed that the Rel-18 IABC feature cannot apply retroactively, and only applies to Rel-18 + UEs, it is strongly preferred to set the correct design goal for UEs (consistency between MSG1 spherical coverage EIRP and connected mode EIRP).** |
| [**R4-2315196**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315196.zip) | CMCC | **Observation 1: In current CONNECTED state spec, UE is allowed to transmit 0.15ms per 0.625ms periodicity within total 200ms to make sure UE optimize output power accuracy with zero tolerance in BC testing.**  **Observation 2: In current CONNECTED state spec, only 1ms transmission is allowed for UE at target power level during the relative power control testing.**  **Observation 3: if we choose reasonable RO configuration, TDD UL-DL configuration and RAR window, the UL Tx occupancy pattern could be similar as in CONNECTED state.**   * Config 143: for this configuration index, UL RO occupy 12 symbols per 14 symbols(1 slots) with 60kHz SCS assumption, i.e. 0.21ms per 0.25ms, ratio is 0.84 and sum of all RO is 168ms within 200ms   + Note: with ***preambleTransMax*** as 200, the total time for PRACH transmission would be larger than 200ms * Config 142: for this configuration index, UL RO occupy 12 symbols per 28 symbols(2 slots) with 60kHz SCS assumption, i.e. 0.21ms per 0.5ms, ratio is 0.42 and sum of all RO is 84ms within 200ms   + Note: with ***preambleTransMax*** as 200, the total time for PRACH transmission would be larger than 200ms * Config 140: for this configuration index, UL RO occupy 12 symbol/slot \*12 slots within total 40 slots with 60kHz SCS assumption, i.e. 2.57ms per 10ms, ratio is 0.257 and sum of all RO is 51.4ms within 200ms   + Note: with ***preambleTransMax*** as 200, the total time for PRACH transmission would be larger than 200ms * Config 139: for this configuration index, UL RO occupy 12 symbols per 56 symbols(4 slots) with 60kHz SCS assumption, i.e. 0.21ms per 1ms, ratio is 0.21 and sum of all RO is 42ms within 200ms   + Note: with ***preambleTransMax*** as 200, the total time for PRACH transmission would be larger than 200ms * Config 138: for this configuration index, UL RO occupy 12 symbols per 56 symbols(4 slots) with 60kHz SCS assumption, i.e. 0.21ms per 1ms, ratio is 0.21 and sum of all RO is 42ms within 200ms   + Note: with ***preambleTransMax*** as 200, the total time for PRACH transmission would be larger than 200ms   **Proposal 1: The above list includes all the candidate options of PRACH configuration that either have a longer UL transmission occupancy or a similar UL transmission occupancy compared to the BC testing in the CONNECTED state.**  **Proposal 2: TDD UL-DL configuration and RAR window should be configured accordingly based on chosen PRACH config to make sure UE send PREAMBLE on each RO.**   * **The RAR window starts after the previous RO and ends before the next RO.** * **TDD UL-DL configuration to make sure all candidate RO is UL.**   **Proposal 3: there is no need for tolerance requirements of spherical coverage at IA/Inactive state.**  **Proposal 4: it’s suggested that BC requirement is mandatory from Rel-18.** |
| [**R4-2315439**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315439.zip) | Xiaomi | **Proposal 1: The spherical coverage requirement could be relaxed 3dB based on the requirement of connection mode.**  **Proposal 2: The beam correspondence for initial access and RRC INACTIVE STATE applied for Rel-18 onward UE is optional.** |
| [**R4-2315496**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315496.zip) | Apple | **Observation 1: To accommodate different UE implementation it is not feasible to completely reuse the requirement specified for RRC\_CONNECTED state.**  **Observation 2: Based on existing RA procedure, UL transmission opportunities is unpredictable.**  **Observation 3: Compared with CONNECTED STATE, only open loop power control is possible for random access during initial access where UE has much less transmission opportunities and long transmission periodicity.**  **Observation 4: The performance of open loop power control highly depends on the number of transmission opportunities and the periodicity of the transmission.**  **Observation 5: Absolute and relative power tolerance specified in section 6.3.4.2 and 6.3.4.3 in TS38.101-2 are introduced to reflect the output power inaccuracy before it is stabilized. This is primarily due to either long non-contiguous transmission or power step between adjacent transmission.**  **Proposal 1: For initial access and RA/CG-SDT in RRC\_INACTIVE STATE, the power tolerance specified in 6.3.4.2, 6.3.4.3 or 6.3.4.4 should be applied on top of minimum EIRP at 50%-tile CDF. The applicability rules of the power tolerance are defined in 6.3.4.2, 6.3.4.3 and 6.3.4.4, respectively.**  **Proposal 2: Send LS to RAN5 to further check testability aspects for beam correspondence in IA.** |
| [**R4-2315499**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315499.zip) | Apple | TP for TR 38.891: Specification impact |
| [**R4-2315555**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315555.zip) | Samsung | **Observation 1: tolerance/relaxation value based on relative power tolerance (Option 4) and absolute power tolerance (Option 5) should not be considered.**  **Observation 2: The rationale of tolerance/relaxation for msg1 spherical coverage is quite similar as that for aggregated power tolerance of PUSCH in terms of non-contiguous transmissions and TPC=0 condition.**  **Proposal 1: consider non-zero tolerance/relaxation and mandatory applicability as a package to move forward.**  **Proposal 2: the power tolerance for msg1 spherical coverage requirement should be reflected as a requirement relaxation instead of a separate test case.** |
| [**R4-2315560**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315560.zip) | MediaTek (Shenzhen) Inc. | **Proposal 1: For spherical coverage requirement for Msg1, RAN4 to use the same Spherical coverage requirement as RRC\_CONNECTED mode.**  **Proposal 2: There is no need to introduce any additional power tolerance requirement for msg1 spherical coverage.**  **Proposal 3: RAN4 to consider that Rel-18 beam correspondence for Msg1 should be optional.** |
| [**R4-2315628**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315628.zip) | ZTE Corporation | ***Proposal 1: From the mechanism difference perspective, power tolerance may be needed.***  ***Proposal 2: If we can set the power control parameters for PRACH properly, it may compensate for a part of inaccuracy of output power to a certain extent.***  ***Observation 1: Referring to PRACH ON power measurement period according to TS 38.521-2, taking 20 ms period as an example, the average of the needed test time may be 580 ms to obtain an accumulative period of measurement of 1ms, and the least test time is 100 ms, the most is 1500 ms.***  ***Proposal 3: Whether test time can be guaranteed is RAN5 issue, we need to send a LS to RAN5.*** |
| [**R4-2315811**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315811.zip) | vivo | **Observation 1:** RAN4 requirement should defined with the understanding that sufficient transmit opportunities can be guaranteed and power tolerance is minimized.  **Observation 2:** The need of tolerance comes from the concern that test method cannot guaranteed the condition assumed in RAN4 requirement design.  **Proposal 1:** The core requirement keeps unchanged and send LS to RAN5 to inform that if the test method cannot guarantee UE have same power accuracy as close-loop power control, 3.5 dB relaxation is allowed in the test for this feature.  **Proposal 2:** Further clarify that the total time for PRACH power average calculation is the sum of slots with PRACH transmission.  **Proposal 3:** The beam correspondence in initial access is optional and only UEs that support both *beamCorrespondenceWithoutUL-BeamSweeping* and *beamCorrespondenceSSB-based-r16* are considered to support this feature. |
| [**R4-2315862**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315862.zip) | Huawei, HiSilicon | **Observation 1: Absolute power tolerance could be avoided if test method could be designed to require** **UE to transmit PRACH with gap <= 20ms.**  **Observation 2: The impact of power convergence process could be minimized when the UE is expected to transmit at Pcmax.**  **Proposal 1**: Reusing Rel-17 EIRP spherical requirement based on proper working assumption of test condition. RAN4 to decide the specific working assumption of test condition.  **Proposal 2**: The requirement could be revisited if working assumption of test condition can’t be met based on RAN5’s feedback. |
| [**R4-2315966**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315966.zip) | OPPO | **Observation 1: Several factors may impact the IA spherical requirements like power control tolerance, beam type, and test configurations which have been discussed lot but no conclusion.**  **Observation 2: Via proper test settings (shall be guaranteed by RAN5 tests) absolute power control tolerance can be avoided, and relative power control seems irrelevant to the IA tests.**  **Observation 3: Aggregated power control tolerance is eliminated in connected mode in RAN5 tests via TPC commands and beam lock function which lead to the tolerance is 0dB when delta P=0dB.**  **Observation 4: Aggregated power control tolerance (3.5dB worse) will show in IA MOP tests due to no such TPC commands and beam lock function as in connected mode.**  **Observation 5: For the same UE, it may fail in the initial access tests though can reach the MOP requirement in connected mode if aggregated power control tolerance (3.5dB) is not considered.**  **Proposal 1: Aggregated power control tolerance (3.5dB) needs to be considered in the IA beam correspondence requirements.**  **Observation 6: IA beam type UE used is undefined in the spec and it is a UE implementation specific issue. It is difficult to converge on whether and how much tolerance should be considered.**  **Proposal 2: Certain margin can be considered in the final IA beam correspondence requirements to cover the impact of UE beam types.**  **Observation 7: Some important test issues have been identified in the past meetings, however, LS was not sent to RAN5 due to time issue.**  **Proposal 3: IA beam correspondence test related issues can be collected and informed to RAN5 to guide the correct test design like make sure UE is in max transmit power condition and potential beam changes in the tests, etc.**  **Proposal 4: IA beam correspondence can be mandated from Rel-18 in condition that 3.5dB tolerance is specified, otherwise, should be optional in order to not fail current 3GPP conformant UE design.** |
| [**R4-2316623**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316623.zip) | Nokia, Nokia Shanghai Bell | [**Observation 1:** Both spherical coverage and power control are defined separately, and they are different tests. If UE can pass the power control requirement, then the power fluctuation during the test of spherical coverage is allowed in both RRC\_connected mode and initial access mode.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741828)  [**Observation 2:** We acknowledge that for the PRACH, open-loop control is applied, and for the PUSCH, the close-loop control is applied. The duration of the power stabilization procedure may be different and the design of doing PRACH test is needed for RAN5.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741829)  [**Observation 3:** The power transmission mechanism of PRACH and PUSH is the same. The current power tolerance requirement is applicable to both PRACH and PUSCH based on the definition of non-contiguous transmission described in TS 38.101-2 clauses 6.3.4.2 and 6.3.4.4. We can reuse the current power control tolerance for initial access.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741830)  [**Observation 4:** The impact of wait time during the test should not be considered as the power tolerance will cover the uncertainties in UE transmit power.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741831)  [Proposal 1: The spherical coverage requirement should only serve the purpose of checking the UE's output power strength. We should not mix the power control tolerance requirement with the spherical coverage requirement in the initial access tests.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741832)  [**Observation 5:** Appropriate configuration of the parameters used to arrive at the preamble transmission power will ensure that the UE transmits at maximum power from the first msg1 transmission itself.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741833)  [**Observation 6:** Having already transmitted at maximum power from the first msg1 transmission, configuration of ‘preambleTransMax’ and ‘ra-ResponseWindow’ parameters can provide the UE ample opportunities to retransmit the msg1 multiple times within a short period of time by withholding the RAR.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741834)  [**Observation 7:** Given that the UE can transmit at maximum power from the first transmission and has further opportunities to re-transmit the msg1 at regular short intervals by appropriate configuration settings, there seems to be no pressing need for further relaxations on top of the spherical coverage requirements.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741835)  [**Observation 8:** Beam correspondence tests in the IDLE and INACTIVE modes need to be based solely on SSB reference signals. Existing SSB test configurations do not have enough samples to provide meaningful measurements.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741836)  [Proposal 2: Decrease the SSB periodicity and increase the number of SSB beams for SSB based beam correspondence tests in IDLE/INACTIVE modes.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741837)  [Proposal 3: Beam correspondence for IDLE mode should be a mandatory feature from Rel-18 and onwards.](file:///C:\Users\onozawa\AppData\Local\Temp\Temp39952305-d2d7-4f42-a834-703f12bdf0bd_R4-2316623.zip\R4-2316623%20Rel-18%20Beam%20Correspondence%20Requirements.docx#_Toc146741838) |
| [**R4-2316624**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316624.zip) | Nokia, Nokia Shanghai Bell | Text Proposal for TR 38.891 on Implementation impact to UE |

## Open issues summary

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

### Sub-topic 1-1 Beam correspondence requirement

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 1-1: Feasibility of sufficient transmit opportunities and the impact of wait time during the test.**

* Proposals
  + Yes
    - RAN4 can investigate the needed RACH transmission periodicity and transmission duration in initial access to ensure the UE can perform accurate uplink power for beam correspondence test in initial access. (Sony, Ericsson)
    - In RAN4 it is assumed that the test method provides sufficient RACH occasions to the UE prior to measurement, to allow the UE power to settle. In RAN4 it is assumed that the test method provides sufficient wait time so UEs with roving beams can accrue 1 ms worth of complete MSG1 transmissions in the desired direction. (Qualcomm)
    - if we choose reasonable RO configuration, TDD UL-DL configuration and RAR window, the UL Tx occupancy pattern could be similar as in CONNECTED state. (CMCC)
    - Decrease the SSB periodicity and increase the number of SSB beams for SSB based beam correspondence tests in IDLE/INACTIVE modes. The impact of wait time during the test should not be considered as the power tolerance will cover the uncertainties in UE transmit power. (Nokia)
  + No
    - Based on existing RA procedure, UL transmission opportunities is unpredictable. Compared with CONNECTED STATE, only open loop power control is possible for random access during initial access where UE has much less transmission opportunities and long transmission periodicity. (Apple)
  + Need to check with RAN5
    - Whether test time can be guaranteed is RAN5 issue, we need to send a LS to RAN5. (ZTE)
    - The requirement could be revisited if working assumption of test condition can’t be met based on RAN5’s feedback. (Huawei)
* Recommended WF
  + Yes

**OPPO: this issue should be decided by RAN5. We can inform RAN5.**

**Apple: Similar view as OPPO.**

**Sony: we understand positions from companies. We can look at the candidate packages: define the optional requirements without tolerance or mandatory requirements with tolerance.**

**Mediatek: similar view as OPPO and Apple.**

**Samsung: we think Sony proposal is good.**

**CMCC: Support Sony proposal. In our contribution, we analyze uplink pattern. The same beam pattern in RRC connected state are observed. If we could carefully set the configuration, we can achieve the same Rx-Tx pattern for UE to achieve 0 power control.**

**OPPO: the test configuration impacts UE performance. We should inform RAN5 that the factor will impact UE performance results. To Sony proposal, it is for the next issue.**

**Apple: to CMCC, some assumption has not been confirmed by RAN5. How many RAR can be used? Without RAN5 confirmation, it is difficult to conclude. Optionality features is subject to feature list discussion. There is no feature to be defined as mandatory. About the tolerance, I do not think if UE has not enough transmission opportunity the tolerance should be applied. We do not need discuss what condition should be used.**

**R&S: from TE perspective, there is no issue for hold transmission of feedback for PRACH.**

**Apple: We need official feedback from RAN5.**

**Mediatek: in this case, is it possible to perform beam lock in the initial access?**

**Sony: we propose the previous two options. We share the same understanding as CMCC for network to ensure the sufficient transmission and UE can have enough to ramp up the power.**

**Samsung: To R&S, we should not necessarily need feedback from RAN5 for this part. Transmission continuity is different.**

**OPPO: UE should be given enough transmission opportunity to adjust the power.**

**Issue 1-2: Power tolerance/relaxation**

* Proposals
  + Option 1: Power tolerance or relaxation is not needed if it is properly tested.
    - the existing power tolerances in 38.101-2 are not applicable for beam correspondence test in initial access. (Sony, Ericsson)
    - UE implementation-specific mechanisms that reduce EIRP in IA compared to connected mode must be overcome by the UE itself and should not be reflected as relaxation to the UE. (Qualcomm)
    - there is no need for tolerance requirements of spherical coverage at IA/Inactive state. (CMCC)
    - For spherical coverage requirement for Msg1, RAN4 to use the same Spherical coverage requirement as RRC\_CONNECTED mode. (MediaTek)
    - Reusing Rel-17 EIRP spherical requirement based on proper working assumption of test condition. RAN4 to decide the specific working assumption of test condition. (Huawei)
    - We should not mix the power control tolerance requirement with the spherical coverage requirement in the initial access tests. (Nokia)
  + Option 2: Power tolerance is needed
    - For initial access and RA/CG-SDT in RRC\_INACTIVE STATE, the power tolerance specified in 6.3.4.2, 6.3.4.3 or 6.3.4.4 should be applied on top of minimum EIRP at 50%-tile CDF. The applicability rules of the power tolerance are defined in 6.3.4.2, 6.3.4.3 and 6.3.4.4, respectively. (Apple)
    - From the mechanism difference perspective, power tolerance may be needed. (ZTE)
    - Aggregated power control tolerance (3.5dB) needs to be considered in the IA beam correspondence requirements. (OPPO)
  + Option 3: Can be included as relaxation
    - The spherical coverage requirement could be relaxed 3dB based on the requirement of connection mode. (Xiaomi)
    - consider non-zero tolerance/relaxation and mandatory applicability as a package to move forward. (Samsung)
    - the power tolerance for msg1 spherical coverage requirement should be reflected as a requirement relaxation instead of a separate test case. (Samsung)
  + Option 4: Others (depending on RAN5)
    - The core requirement keeps unchanged and send LS to RAN5 to inform that if the test method cannot guarantee UE have same power accuracy as close-loop power control, 3.5 dB relaxation is allowed in the test for this feature. (vivo)
    - The requirement could be revisited if working assumption of test condition can’t be met based on RAN5’s feedback. (Huawei)
* Recommended WF
  + Option 4

*Tentative agreement:*

* **Option 1: Define the optional requirements without tolerance**
* **Option 2: Define mandatory requirements with tolerance.**
  + **3.5dB as tolerance**

*Huawei: we support defining requirements without tolerance. Currently we do not need wait for RAN5. We can have some working assumption. For the previous topic, i.e., whether we have enough time, RAN1 and RAN2 can allow enough transmission opportunities.*

*Qualcomm: support option 1 defining requirements without tolerance. Support the approach to have working assumptions.*

*Apple: I do not think Option 1 is acceptable for us. People just base on the hypothesis for requirements. That is not right procedure. For option 2, it is not our favorable solution. We do not see how to define mandatory feature after Rel-15.*

*Sony: Support Option 1. For Option 2, where 3.5 comes from?*

*Qualcomm: to Apple, you mention that based on hypothesis. There is some issue raised by TE vendor.*

*Samsung: we can accept option 2. We do need the tolerance. For option 1, except for tolerance, we agreed that there is no UE capability already. How to have optional requirement.*

*Apple: We asked for sending LS to RAN5 two meetings ago. There is no ambiguity. The test procedure should be confirmed by RAN5.*

*Sony: Option 1 does not assume what RAN5 should do.*

*Ericsson: we cannot accept 3.5 dB tolerance and have concern on the coverage.*

**Issue 1-3: Requirement applicability**

* Proposals
  + Option 1: Mandatory
    - it’s suggested that BC requirement is mandatory from Rel-18. (CMCC)
    - consider non-zero tolerance/relaxation and mandatory applicability as a package to move forward. (Samsung)
    - Beam correspondence for IDLE mode should be a mandatory feature from Rel-18 and onwards. (Nokia)
  + Option 2: Optional
    - The beam correspondence for initial access and RRC INACTIVE STATE applied for Rel-18 onward UE is optional. (Xiaomi)
    - RAN4 to consider that Rel-18 beam correspondence for Msg1 should be optional. (MediaTek)
    - The beam correspondence in initial access is optional and only UEs that support both beamCorrespondenceWithoutUL-BeamSweeping and beamCorrespondenceSSB-based-r16 are considered to support this feature. (vivo)
  + Option 3: Optional in Rel-18 and Mandatory later
    - It is suggested to define the core requirement for beam correspondence in initial access without any power tolerance but as an optional requirement for Rel-18 and mandate this requirement later if RAN5 can confirm the feasibility to accommodate sufficient transmission opportunities in the conformance test later. (Sony, Ericsson)
  + Option 4: Mandatory/Optional depending tolerance
    - IA beam correspondence can be mandated from Rel-18 in condition that 3.5dB tolerance is specified, otherwise, should be optional in order to not fail current 3GPP conformant UE design. (OPPO)
* Recommended WF
  + Option 3

**Issue 1-4: Text Proposals**

* Proposals
  + R4-2315499 (Apple)
  + R4-2316623 (Nokia)
  + R4-2316624 (Nokia)
* Recommended WF
  + Further update TPs

# Topic #2: Test Issues

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2315497**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315497.zip) | Apple | LS draft |
| [**R4-2315556**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315556.zip) | Samsung | **Observation 1: it is not necessary to ask RAN5 for feedback on power tolerance measurement as power tolerance is core requirement which is different from test tolerance**  **Proposal 1: focus on core requirement in Q4 within RAN4 to conclude this WI without dependence on RAN5 feedback.**  **Observation 2: if an LS is sent to RAN5, RAN4 agreement and RAN4 common observed issues can be shared and invite RAN5 to further investigate, but questions RAN4 waiting for feedback to conclude WI should be avoided.**  **Proposal 2: RAN4 should capture the usage of beamlock function in RAN4 specification following the same practice of UBF for PUSCH MOP requirements.** |
| [**R4-2315863**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315863.zip) | Huawei, HiSilicon | **Proposal 1: Send LS to RAN5 including all the working assumptions below for RAN5 to further evaluate.**  **Working assumption 1: UE keeps in RRC\_IDLE state to ensure at least 1ms EIRP measurement period for PRACH.**  **Working assumption 2: UE locks the beam direction when requested by test equipment.**  **Working assumption 3: UE is required to transmit with the optimal Tx beam.**  **Working assumption 4: UE is required to transmit at Pcmax.**  **Working assumption 5: UE is required to transmit PRACH with gap <=20ms.** |
| [**R4-2315864**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315864.zip) | Huawei, HiSilicon | LS draft |
| [**R4-2316625**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316625.zip) | Nokia, Nokia Shanghai Bell | Text Proposal for TR 38.891 on UE testing impacts |

## Open issues summary

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

### Sub-topic 2-1 Test Issues

*Sub-topic description:*

*Open issues and candidate options before meeting:*

**Issue 2-1: What to capture in RAN4 specs about testability related issues**

* Proposals
  + Option 1: RAN4 should capture the usage of beamlock function in RAN4 specification following the same practice of UBF for PUSCH MOP requirements. (Samsung)
* Recommended WF
  + FFS. Capture it in a draft CR if agreed.

**Sony: technically wise we are OK but we do not think we should capture it in RAN4 spec.**

**OPPO: It can be capture in LS to RAN5.**

**Agreement:**

* **Assume the usage of beamlock function when specifying the requirement and for the tests**
  + **Inform RAN5 to develop the beamlock function.**

**Issue 2-2: LS to RAN5**

* Proposals
  + Option 1: LS not necessary (Samsung)
    - focus on core requirement in Q4 within RAN4 to conclude this WI without dependence on RAN5 feedback.
  + Option 2: LS necessary (Apple, ZTE, OPPO, Huawei)
    - Send LS to RAN5 to further check testability aspects for beam correspondence in IA.
* Recommended WF
  + Further discus the contents of LS to be sent to RAN5 after the core requirement is agreed.

**Samsung: to clarify our position, we do not see that LS is totally necessary. We should not rely on LS to close the item.**

**Sony: Share the view as Samsung.**

**Huawei: we draft LS including working assumption. We do not need reply on RAN5 to define the requirements.**

**Issue 2-3: Contents of LS**

* Proposals
  + R4-2315497 (Apple)
    - Feasibility of UE beam lock function or (UBF)-liked function in initial access.
    - Feasibility to ensure at least 1ms EIRP measurement period for PRACH.
    - Feasibility to attain and maintain MOP in initial access.
    - Feasibility to ensure UE to transmit with the best Tx beam.
    - Feasibility to ensure beam refinement in initial access and the reasonable testing time.
  + R4-2315864 (Huawei)
    - Working assumption 1: UE keeps in RRC\_IDLE state to ensure at least 1ms EIRP measurement period for PRACH.
    - Working assumption 2: UE locks the beam direction when requested by test equipment.
    - Working assumption 3: UE is required to transmit with the optimal Tx beam.
    - Working assumption 4: UE is required to transmit at Pcmax.
    - Working assumption 5: UE is required to transmit PRACH with gap <=20ms.
  + IA beam correspondence test related issues can be collected and informed to RAN5 to guide the correct test design like make sure UE is in max transmit power condition and potential beam changes in the tests, etc (OPPO)
  + Whether test time can be guaranteed (ZTE)
  + if an LS is sent to RAN5, RAN4 agreement and RAN4 common observed issues can be shared and invite RAN5 to further investigate, but questions RAN4 waiting for feedback to conclude WI should be avoided. (Samsung)
* Recommended WF
  + Further discus the contents of LS to be sent to RAN5 after the core requirement is agreed.

**Apple: there are a lot of commonality. The key question is still that do we need sending out LS.**

**Issue 2-4: Text proposal on UE testing impacts**

* Proposals
  + R4-2316625 (Nokia)
* Recommended WF
  + Update the TP including the agreements during the meeting.

# Topic #3: draft CR

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2315498**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2315498.zip) | Apple | Draft CR to 38.101-3 |
| [**R4-2316626**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_108bis/Docs/R4-2316626.zip) | Nokia, Nokia Shanghai Bell | Draft CR to 38.101-1 |

## Open issues summary

Further revise draft CRs including the progress of the previous topics #1 and #2.

# Topic #4: TR 38.891

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2315869 | Xiaomi,Nokia | TR38.891 v 0.7.0 is reserved. |

## Open issues summary

TR will be post meeting approval by including TPs agreed during the meeting.