**3GPP TSG-RAN WG4 Meeting # 109 R4-2318134**

**Chicago, USA, November 13 – November 17, 2023**

**Agenda item:** 8.6.5

**Source:** Hisashi Onozawa (Nokia)

**Title:** Topic summary for [109][128] 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.*

# Topic #1: Beam correspondence requirements for RRC\_INACTIVE and initial access

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2319135 | Xiaomi, Nokia | Reserved for  TR 38.891 v 0.8.0 for NR RF requirements enhancement for frequency range 2 (FR2), Phase 3 |
| [**R4-2318466**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318466.zip) | Huawei, HiSilicon | Draft CR for beam correspondence for IDLE and INACTIVE |
| [**R4-2318483**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318483.zip) | Nokia, Nokia Shanghai Bell | Text Proposal for TR 38.891 on Beam Correspondence Requirements |
| [**R4-2318486**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318486.zip)  Introducing beam correspondence requirement for initial access and RRC\_INACTIVE | Nokia, Nokia Shanghai Bell | Withdrawn |
| [**R4-2318631**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318631.zip) | Apple | Withdrawn |
| **[R4-2318632](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318632.zip)** | Apple | CR to TS 38.101-3  On beam correspondence requirement for EN-DC/NE-DC |
| [**R4-2318633**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318633.zip) | Apple | TP for TR 38.891: Specification impact |
| [**R4-2318878**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318878.zip)  Discussion on beam correspondence requirements for RRC\_INACTIVE and initial access | Xiaomi | **Proposal 1: Introduce the tolerance for spherical coverage requirement for BC in initial access into Spec, as below**  Table 2-1: UE spherical coverage for power class 3   |  |  | | --- | --- | | Operating band | Min EIRP at 50%-tile CDF (dBm) | | n257 | 11.5 | | n258 | 11.5 | | n259 | 5.8 | | n260 | 8 | | n261 | 11.5 | | n262 | 2.9 | | n263 | 2.3 | | NOTE 1: Minimum EIRP at 50 %-tile CDF in RRC\_CONNECTED is defined as the lower limit without tolerance  NOTE 2: Void  NOTE 3: The requirements in this table are verified only under normal temperature conditions as defined in Annex E.2.1.  NOTE 4: Minimum EIRP at 50 %-tile CDF in initial access and RRC INACTIVE shall be reduced the lower tolerance limit by 2 dB. | | |
| [**R4-2318981**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318981.zip)  Further evaluation on the impact of power tolerence | vivo | **Observation: Under the assumed worst case, i.e., ∆P~U (-3.5, 0), the spherical coverage degradation is 1.9 dB.**  **Proposal：Capture following highlighted wording in the spec:**  Table 6.2.1.3-3: UE spherical coverage for power class 3   |  |  | | --- | --- | | Operating band | Min EIRP at 50%-tile CDF (dBm) | | n257 | 11.5 | | n258 | 11.5 | | n259 | 5.8 | | n260 | 8 | | n261 | 11.5 | | n262 | 2.9 | | n263 | 2.3 | | NOTE 1: Minimum EIRP at 50 %-tile CDF is defined as the lower limit without tolerance in RRC\_CONNECTED state.  NOTE 2: Void  NOTE 3: The requirements in this table are verified only under normal temperature conditions as defined in Annex E.2.1.  NOTE 4: The requirements in this table minus 2 dB tolerance apply to PRACH | | |
| **[R4-2318982](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318982.zip)** | vivo | TP for TR 38.891 on impact of power control tolerance |
| [**R4-2319195**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319195.zip) | ZTE Corporation | Draft CR to TS38.101-2 introduction of beam correspondence requirement for RRC\_INACTIVE and initial access |
| [**R4-2319269**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2319269.zip)  Discussion on PRACH requirements handling | Samsung | **Observation 1: existing PRACH requirements covers MPR, time mask, power control and EVM which are required to be verified at beam peak direction, but there is no beam peak search according to previous agreement (no min peak EIRP requirement)**  **Proposal 1: RAN4 to discuss following two options to resolve this issue:**   * **Option 1: remove PRACH requirements for MPR, time mask, power control and EVM in core specification** * **Option 2: send LS to RAN5 to inform RAN4 guidance on test verification perspective** |
| [**R4-2320637**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320637.zip) | Nokia, Nokia Shanghai Bell | Withdrawn |
| [**R4-2320638**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320638.zip) | Nokia, Nokia Shanghai Bell | CR to 38.101-2  Introducing beam correspondence requirement for initial access and RRC\_INACTIVE |
| [**R4-2320969**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2320969.zip) | Apple | CR to 38.101-2  On beam correspondence requirement for EN-DC/NE-DC |
| [**R4-2318484**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318484.zip) | Nokia, Nokia Shanghai Bell | Text Proposal for TR 38.891 on Implementation impact to UE |
| [**R4-2318485**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_109/Docs/R4-2318485.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 1-1 PRACH requirement handling

*Sub-topic description:*

According to R4-2319269, existing PRACH requirements covers MPR, time mask, power control and EVM which are required to be verified at beam peak direction, but there is no beam peak search according to previous agreement (no min peak EIRP requirement). It proposes that RAN4 discuss following two options to resolve this issue.

Moderator note: This proposal may have impacts to legacy releases.

*Open issues and candidate options before meeting:*

**Issue 1-1: PRACH requirements handling**

* Proposals
  + Option 1: remove PRACH requirements for MPR, time mask, power control and EVM in core specification
  + Option 2: send LS to RAN5 to inform RAN4 guidance on test verification perspective
* Recommended WF
  + TBA

Samsung: this special case is for legacy issue. It is identified after Rel-18 work is done. In legacy, we always assume there is peak EIRP for PRACH. It means that in Rel-18 we change the assumption. We hope we can figure out the solution.

Mediatek: this is only for RRC inactive/idle. This seems applicable to RRC connected mode. This WI is just for RRC inactive/idle.

Qualcomm: for beam corresponding requirement, PA is assumed to transmit at Pcmax. It needs some help for emission of MPR applies. PA is operating near Pcmax. That is reason we need it.

Sony: we are proposing BC requirement for initial access. We do not see affect on other requirements in the spec.

Nokia: support Qualcomm. This requirement is for controlling the quality of PRACH. The quality of PRACH needs be maintained. We should discuss in maintenance.

Ericsson: we assume PRACH should transmit according to power class. We do not see why we should remove the requirements. PRACH should meet the power class.

Samsung: to Mediatek, it is not only connected issue. To Qualcomm and Ericsson, we agree that PRACH should meet the max power, but we do not have PRACH peak EIRP requirement as agreed in Rel-18.

Apple: We have sympathy to Samsung proposal. This issue should not be addressed in the WI. Can we agree to have separate vehicle to address this issue?

Sony: Not to test does not mean PRACH does not meet the EIPR requirements.

Samsung: to Sony, companies should have different understanding. In Rel-18 there is no requirements + tests for PRACH EIRP.

Agreement:

* Further discuss the issue in the maintenance agenda in the future meetings.

### Sub-topic 1-2 Power class

*Sub-topic description*

Currently, beam correspondence requirements are specified not only for power class 3 but also power class 5, 6 and 7. Is the agreement so far made for initial access and RRC inactive applicable for all these power classes?

*Open issues and candidate options before meeting:*

**Issue 1-2: Power class**

* Proposals
  + Option 1: Introduce the new beam correspondence requirement not only for power class 3 but also for power class 5, 6 and 7 with 2 dB tolerance in spherical coverage EIRP.
  + Option 2: FFS for power class 5, 6 and 7.
* Recommended WF
  + Option 1

Samsung: for this proposal, we always discuss PC3. We are not ready to consider all the power classes.

Huawei: it is not time to agree all the power classes. The implementation may be different.

Verizon: we need consider all the power classes since in the next release we may not have WIs.

AT&T: I do not think there is application for PC3 only in the WID.

Huawei: we should consider whether 2dB tolerance can be reused for other power classes.

Samsung: we share the similar understanding as Huawei.

Verizon: why should we use 2dB for all the power classes? We should consider PC1 as well.

Sony: for PC5 and PC6, 0dB can be applied. For PC7 we can consider 2dB for further discussion.

Nokia: it is hard to add PC1 since we have no requirement.

Qualcomm: We can keep PC1 and discuss the value.

OPPO: This is not easy testing. If we open to other power class, we are not sure if we can complete the WI.

Ericsson: Why do we have poor performance for fixed device. Regarding test scope, we would like to know BC testing is discussed first in Rel-15 and it is proposed by RAN1 for initial access. It is crucial for FR2. It is important from system perspective to apply it for initial access.

Qualcomm: We can add some note to allow us to continue discussion in the maintenance.

Huawei: for fixed device, the maximum power level is different from PC3. UE may use different PAs. There could be some difference between fixed device and mobile device. PC6 is used for HST. We still have concern to introduce the requirements for all the power classes. For PC1, we echo Nokia comment.

AT&T: we are still not comfortable to FFS on other power classes. We should not change the WID by removing them.

OPPO: we have checked the WID. We do not see anything about the power classes. It is future work to discuss other power classes.

Qualcomm: to OPPO, when WID does not specify something, we should interpret not to preclude it.

Sony: we would like to echo comment from Qualcomm. We still have concern using 2dB tolerance for other power classes.

**Conclusion:** for PC3, keep the previous agreement.

The following bullet was discussed but not agreed during the first round.

* Introduce the new beam correspondence requirement for power class [1], 5, [6 and 7] with power tolerance in spherical coverage EIRP.
  + FFS on power tolerance for each power class
  + The discussion of introducing new BC requirements for PC [1], 5, [6 and 7] won’t impact the completion of WI for FR2 enhancement.

### Sub-topic 1-3 Spec impact to TS 38.101-3

*Sub-topic description*

The current WID does not cover TS 38.101-3. It is for further discussion if the CR is necessary.

*Open issues and candidate options before meeting:*

**Issue 1-3: Spec impact to TS 38.101-3**

* Proposals
  + Option 1: No CR to TS 38.101-3
  + Option 2: Agree R4-2318632 and revise the WID in the next plenary.
* Recommended WF
  + FFS

Agreement: Agree on Option 2.

### Sub-topic 1-4 Text Proposals

*Sub-topic description*

*Open issues and candidate options before meeting:*

**Issue 1-4: Text proposals**

* Proposals
  + R4-2318483 Nokia
  + R4-2318633 Apple
  + R4-2318982 vivo
  + R4-2318484 Nokia
  + R4-2318485 Nokia
* Recommended WF
  + FFS

### Sub-topic 1-5 CR/draftCR

*Sub-topic description*

*Open issues and candidate options before meeting:*

**Issue 1-5: CR/draftCR to 38.101-2**

* Proposals
  + R4-2318466 Huawei
  + R4-2319195 ZTE
  + R4-2320638 Nokia
  + R4-2320969 Apple
* Recommended WF
  + FFS