**3GPP TSG-RAN2 Meeting #113-edraft*\_*R2-2102151**

**Omline, 25th January – 5th February 2021**

**Agenda Item: 4.1**

**Source: Mediatek Inc.**

**Title: offline\_[AT113-e][301][NBIOT R15] Correction on NPRACH resources**

**Document for: Discussion and Decision**

# Introduction

This document is the summary of the offline email discussion “[AT113-e][301][NBIOT R15] Correction on NPRACH resources in SIB2-NB and SIB23-NB (Mediatek)”, as indicated below:

* [AT113-e][301][NBIOT R15] Correction on NPRACH resources in SIB2-NB and SIB23-NB (Mediatek)

**Scope:**

Week 1: Determine whether there is sufficient support in principle, collect initial comments.

      Week 2: Agree the CRs.

**Intended outcome:**

      Week 1: Report in R2-2102151

      Week 2: Agreed CRs / decision.

**Deadline:**

      Week 1: Jan 27 1100 UTC

      Week 2 (if needed): Feb 04 1100 UTC

# Discussion

This document discusses the CRs as below:

[R2-2101822](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101822.zip) Correction on NPRACH resources in SIB2-NB and SIB23-NB MediaTek Inc., ZTE CR Rel-15 36.331 15.12.0 4592 - F NB\_IOTenh2-Core

[R2-2101824](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101824.zip) Correction on NPRACH resources in SIB2-NB and SIB23-NB MediaTek Inc., ZTE CR Rel-16 36.331 16.3.0 4593 - A NB\_IOTenh2-Core

The intention is to check whether there is sufficient support in principle, collect initial comments.

Companies are invited to provide comments in the table below

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree with the intention of the CRs? (Yes or No)** | **Detailed comments** |
| Huawei, HiSilicon | **yes** | We have editorial comments on the coversheet (meeting line, date, FM2, ...).  For the impacted functionality, we think it should refer to the actual features, i.e. EDT and NPRACH enhancements.  For the changes themselves, they are globally fine but it would be better to introduce the changes at the same position in the field description for the different cases. |
| Qualcomm | Yes | The newly added condition conflicts with the existing condition (highlighted below). The NPRACH resource list is not an ordered list i.e. first entry does not necessarily imply it is for coverage level 0. Which entry in the NPRACH list is appilicable to which coverage level is defined in TS 36.321. Infact the existing conditions are conflicting (see yellow highlighted and green hihglighted).  ***nprach-ParametersListFmt2, nprach-ParametersListFmt2EDT***  Configures NPRACH parameters for each NPRACH resource format 2 on one UL carrier. Up to three NPRACH resources can be configured on one carrier. Each NPRACH resource is associated with a different number of NPRACH repetitions.  E-UTRAN includes the same number of entries, and listed in the same order, as in *nprach-ParametersList* in *SystemInformationBlockType2-NB*.  The NPRACH resources in *nprach-ParametersListFmt2EDT* are used to initiateEDT. Each NPRACH resource is associated with a TBS signalled in the corresponding entry of *edt-TBS-InfoList.*  E-UTRAN configures the NPRACH resources format 2 so that they do not overlap in time domain with the NPRACH resources configured in *nprach-ParametersList* and *nprach-ParametersListEDT* on the same UL carrier.  If there is no NPRACH resource in *nprach-ParametersListFmt2* (respectively *nprach-ParametersListFmt2EDT*) on any UL carrier, including the anchor carrier, for one NPRACH repetition level, the UE uses the NPRACH resources in *nprach-ParametersList* (respectively *nprach-ParametersListEDT*) for this NPRACH repetition level. Otherwise, the UE uses only NPRACH resources in *nprach-ParametersListFmt2* (respectively *nprach-ParametersListFmt2EDT*).  If E-UTRAN configures NPRACH resources format 2 in one NPRACH repetition level, the E-UTRAN configures NPRACH resources format 2 in all NPRACH repetition levels upwards.  We think the hihglighted text should be deleted.  Similar comment applies to *NPRACH-ConfigNB-NB*. |
| Ericsson | Yes | We are fine with the CR |
| ZTE | Yes | We are not cystal clear about QC’s comments. Which hihglighted text should be deleted? The highlight yellow text or highlight green text or both? We think both of them cannot be deleted.  We don’t think the new-added text conflicts with the existing condition. The new-added text is related to high level rule. In other word, we also disagree with this understanding “*The NPRACH resource list is not an ordered list i.e. first entry does not necessarily imply it is for coverage level 0. Which entry in the NPRACH list is appilicable to which coverage level is defined in TS 36.321.*”  Per our understanding, the high level rule is:  non-EDT resources on anchor carrier *(nprach-ParametersList-r13* in SIB2) should have “full” structure and generally the other delta configuration would refer to it.  The coverage mapping is based on this non-EDT resources on anchor carrier configuration. For example, if we have 1(2) RSRP thresholds, that means having 2(3) CE levels and therefore there would be 2(3) items in *nprach-ParametersList-r13*. The *numRepetitionsPerPreambleAttempt-r13* in first item gives the meaning of the first CE level and so on (for TDD, it’s *numRepetitionsPerPreambleAttempt-v1550*).  For other resources, e.g., non-EDT resourses on non-anchor carriers, EDT resources on anchor carrier and non-anchor carriers etc, they all use the structure *NPRACH-ParametersList-NB-r14* instead of *NPRACH-ParametersList-NB-r13.* It's possible that for a certain carrier, NPRACH resources may not be configured on one or more CE levels. How this can be achieved? *NPRACH-ParametersList-NB-r14* should still have the configuration framework for all the CELs and list in the same order as that for non-EDT resourses on anchor carrier in SIB2. And, for each entry, e.g., for each *NPRACH-Parameters-NB-r14*, the content IE, e.g., *nprach-Parameters-r14* can be optional and is allowed to be totally skipped. As a result, one or more CE levels may have no (NULL) NPRACH resources configuration. But even this is the case, as the IE with *NPRACH-ParametersList-NB-r14* have same number entries and same order as the non-EDT resourses on anchor carrier, it still can ensure the correct mapping between different resources and CELs, no ambiguity.  The proposed changes are aligned with the above high level rule.  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  The highlight yellow text is for delta configuration for format2 resources (on top of the high level rule).  The highlight green text is a special requirement for network configuration. The main reasons include: all the format2 resources in anchor carrier and non-anchor carriers are optional. It’s allowed that no format2 resources on all the carriers (including anchor carrier) for low CEL as UE can use format0/1 resources on the low CEL. But if format2 resources are configured in some certain carriers for a certain low CEL in a cell, configuration should guarantee there are also format2 resources on the higher CEL in some carriers in this cell. That means as soon as UE in a low CEL selects format2 resources, it can still use format2 resources in higher CEL in this cell. |
| MTK | Yes | Regarding to QC’s comments, we also think there is no conflict between the newly added condition and the highlighted conditions.  The entries in the newly added contion does not necessarily mean a valid configuration, it could be a empty entries which indicate that it does not have a configuration for the corresponding CE level. In the same time, the empty entris as place holder can maintains a correct order of CE level, so that we know which CE level the rest of the entris in the list can refer to.  The highlighted text is all about configuration rather than entry, so there is no conflict. |
| LGE | Yes | We agree with the intention. |
| Qualcomm | Yes | **I take back comments above regarding conflicting change.**  But I still have two concerns, not actually caused by new text but first concern applies to legacy and new text.  **Concern 1:**  What is meant by ‘same order’ in the proposed change? I understand this sentence is copied from description of ***nprach-ParametersList-EDT*** and my concern also applies to this legacy text too.  The entries (1, 2 or 3) in ***nprach-ParametersList*** are not meant to be in any order but TS 36.321 applies each entry to coverage level according to increasing ***numRepetitionsPerPreambleAttempt*** order.  Therefore, it is not clear what ‘same order’ actually means.  Therefore, I think for the description of ***nprach-ParametersList, nprach-ParametersList-EDT*** in SIB-22-NB,  ***nprach-ParametersListFmt2/ nprach-ParametersListFmt2EDT*** in SIB-23-NB the text should read as follows.  E-UTRAN includes the same number of entries, and listed in the same order of coverage level (see TS 36.321 [6]), as in *nprach-ParametersList* in *SystemInformationBlockType2-NB*.  Bascially what the description meant convey is that entry 0 in each list corresponds the coverage level X, entry 1 in each list corresponds to coverage level Y, entry 3 in each list corresponds to coverage level Z, where X, Y Z can be any value 0 – 2 but each coverage level is different from the other two.  **Concern 2:**  What is meant by NPRACH repetition level in the below text?  Considering **Concern 1** above, each entry in ***nprach-ParametersList/ nprach-ParametersList-EDT/nprach-ParametersListFmt2/nprach-ParametersListFmt2EDT*** actually corresponds NPRACH resources for a coverage level.  Therefore, the following change makes it clearer:  “If there is no NPRACH resource in *nprach-ParametersListFmt2* (respectively *nprach-ParametersListFmt2EDT*) on any UL carrier, including the anchor carrier, for one NPRACH repetition level, the UE uses the NPRACH resources in *nprach-ParametersList* (respectively *nprach-ParametersListEDT*) for this coverage level (see TS 36.321 [6]). Otherwise, the UE uses only NPRACH resources in *nprach-ParametersListFmt2* (respectively *nprach-ParametersListFmt2EDT*).  If E-UTRAN configures NPRACH resources format 2 in one coverage level, the E-UTRAN configures NPRACH resources format 2 in all coverage levels upwards.” |

**Summary:**

All 6 companies agree the intention of the CR. One company suggest editorial comments. One company suggest that the newly added text has been conflict with the existing ones, however after discussion the statement has been taken back. There are 2 extra concerns raised by one company, respectively about ambiguous terminology ‘same order’ and ‘NPRACH repetition level’.

**Proposal:**

**Proposal 1: RAN2 to agree on having a CR for a correction on NPRACH resources.**

**Proposal 2: To revise the CR in the following phase of offline discussion.**

**Proposal 3: To discussion if there is any ambiguity for the ‘same order’ and ‘NPRACH repetition level’**

# Conclusion

Based on the discussion, the following proposals are made:

**Proposal 1: RAN2 to agree on having a CR for a correction on NPRACH resources.**

**Proposal 2: To revise the CR in the following phase of offline discussion.**

**Proposal 3: To discussion if there is any ambiguity for the ‘same order’ and ‘NPRACH repetition level’**

Two draft CRs for revising have been uploaded to the draft folder for the next stage.