3GPP TSG-RAN WG3 Meeting #110-e R3-206883

E-meeting, 2 – 12 November, 2020

**Agenda item: 10.2.1.7**

**Source: Nokia (moderator)**

**Title: CB: # 1007\_SONMDT\_RACH - Summary of email discussion**

**Document for: Approval**

# 1 Introduction

This paper provides summary of discussions at RAN#110-e on:

**CB: # 1007\_SONMDT\_RACH**

**- Topics to discuss:**

 **- max number of neighbor cells for PRACH configuration transfer from CU to DU**

 **-** **assistance information from gNB-DU to gNB-CU**

 **- gNB-DU/en-gNB report of “potential PRACH conflict”**

 **- gNB-DU resolves PRACH configuration conflicts?**

 **- RACH Failure Rate calculation and signaling**

 **- DU indicates to CU the occurrence of RACH for cases when RACH procedure is not known to gNB-CU?**

 **- PRACH Coordination between LTE and NR in shared spectrum**

 **- Details of Xn and F1 signaling**

 **- May also discuss other topics based on contributions**

**- Propose to have the discussion in two phases; if there are agreements in the first phase, can proceed to discuss TPs in the second phase**

(Nok - moderator)

We have kept the discussion structure and issues from the second round of the discussion at RAN3#109-e, and tried to map the submitted proposals on that structure.

Companies are kindly requested to provide input to the first stage of this discussion by 8:00 UTC on Thursday, November 5, so that we can take it into account during the online session the same day.

# 2 For the Chairman’s Notes

[To be completed]

# 3 Discussion

## 3.1 Issue 1 - PRACH Coordination in Spectrum Shared between LTE and NR

Options under discussion are:

1. (Xn signalling): Addition of (E-UTRA) *PRACH Configuration* IE to XnAP *Neighbour Information E-UTRA* IE

2. (Xn signalling): Rel-15 signalling for DSS (E-UTRA - NR cell level resource coordination)

**Related proposals in submitted papers:**

6372: Both Alternatives 1 and 2 raise questions of non collocated co-channel deployment of NR and LTE cells which would require analysis of RAN1 and RAN4 if pursued in Rel-17.

6554 proposes:

* Proposal 1: PRACH Coordination between LTE cell in upgraded site and newly-built NR site should be considered in Rel-17.
* Proposal 2: PRACH Configuration IE defined in TS36.423 should be added to the Neighbour Information E-UTRA IE in XnAP (TP in 6555).
* Proposal 3: For cell configuration information of each E-UTRA cell in Neighbour Information E-UTRA IE, ECGI of the paired NR cell shall be contained.

**Please provide your view on the above proposals. Could an LS to RAN1/RAN4 be beneficial?**

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## 3.2 Issue 2 and 3 – PRACH configuration conflict detection: transmission of NR PRACH configuration info for neighbour cells

**Main options under discussion are:**

1. "High" number (512, 1024) of configurations sent from CU to DU, and no assistance information from DU to CU

2. "Low" number (e.g. 16) of configurations sent from CU to DU, with assistance information from DU to CU

**Related proposals in submitted papers:**

6104 proposes

* for F1 a flat list of 512 (or 1024) neighbour PRACH configurations to be included in the GNB-CU CONFIGURATION UPDATE message, not associated to any particular served cell in the gNB-DU, and no assistance information from DU to CU.

6134 proposes

* for F1 a flat list of 512 neighbour PRACH configurations to be included in the following messages: F1 SETUP RESPONSE, GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE and GNB-CU CONFIGURATION UPDATE. Each PRACH configuration is associated to a cell (NR CGI) (served cell in the DU? neighbour cell?). No assistance information from DU to CU.
* for X2: add an optional *NR Cell PRACH Configuration* IE into the *NR Neighbour Information* IE, as well as some necessary IEs to deliver the location and bandwidth of carriers, the TDD pattern and the number of SSB.

6513 proposes for F1

* a flat list of 16 neighbour PRACH configurations to be included in the F1 SETUP RESPONSE message, not associated to any particular served cell in the gNB-DU;
* and a structured list of 512 \* 16 neighbour PRACH configurations to be included in a new gNB-DU triggered class 1 procedure providing assistance information from the DU to the CU. Each sub-list of 16 PRACH configurations is associated to a served cell in the gNB-DU.

6372 proposes

* for F1, a low number of neighbour PRACH configurations sent from gNB-CU to gNB-DU. Filtering is therefore needed in the gNB-CU, e.g. according to the cells that have the highest RACH Failure Rate;
* for Xn, assistance information (RACH failure rate) exchanged between neighbour nodes, which can also help the CU to filter the PRACH configurations to be sent on F1.

In summary, the number of transferred neighbour PRACH configurations are similar in all proposals. Companies are divided in two camps with regards to the need for assistance information.

**Please provide your further views on the need for assistance information, and on which interface(s).**

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## 3.3 Issue 4 - PRACH configuration conflict detection - retrieval of UE RACH Reports

Options under discussion are:

1. DU requests the CU to upload UE RACH Report

2. CU autonomously uploads UE RACH Reports

**Related proposals in submitted papers:**

6372 proposes that the CU uploads UE RACH Reports from the UE without being triggered by the DU, considering that the DU has not full view of RACH failures experienced by the DU and that the CU may be guided for example by RLF Report availability information.

6513 proposes that the DU requests the CU to upload UE RACH Report each time the occurrence of the RACH procedure is not known to the gNB-CU.

6695 proposes that the DU requests the CU to upload one or more UE RACH Report (by providing a list of UE IDs), based on detection of sub-optimal RACH configuration by the DU. It is not necessary to always retrieve RACH report from all UEs.

**Please provide your further views on option 2 vs option 1, and in case of option 1, whether it is needed to always retrieve RACH report from all UEs.**

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## 3.4 Issue 5 - PRACH configuration conflict resolution

Options under discussion are:

1. DU resolves PRACH configuration conflicts locally

2. DU resolves PRACH configuration conflicts locally, but may flag the presence of a conflict to the gNB-CU so that gNB-CU can send assistance information

3. DU resolves PRACH configuration locally whenever possible, and informs about RACH failure rate for mitigation of interference scenarios.

**Related proposals in submitted papers:**

6104 and 6134: option 1, with neighbour RACH configuration information filtered autonomously by the CU (and eNB for 6134).

6372: option 3, with assistance information proposed on F1 and Xn.

6513: option 2, with assistance information proposed on F1.

**Please provide your further views on options 1/2/3, e.g. the capability of each option to solve PRACH configuration conflicts.**

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# 4 Conclusion, Recommendations [if needed]

If needed

# 5 References

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| [R3-206104](Docs/R3-206104.zip) | (TP for SON BL CR for TS 38.473): PRACH configuration conflict (Huawei) | other |
| [R3-206134](Docs/R3-206134.zip) | Discussion on Rel-16 leftover issues for PRACH coordination (CATT) | discussion |
| [R3-206135](Docs/R3-206135.zip) | (TP on SON for 38.473)TP on PRACH coordination for F1AP (CATT) | other |
| [R3-206136](Docs/R3-206136.zip) | (TP on SON for 38.423)TP on PRACH coordination for X2AP (CATT) | other |
| [R3-206372](Docs/R3-206372.zip) | RACH Remaining Aspects (Nokia, Nokia Shanghai Bell) | discussion |
| [R3-206373](Docs/R3-206373.zip) | (TP for SON BL CR to TS 38.423) Enhancement of RACH Conflict Resolution (Nokia, Nokia Shanghai Bell) | other |
| [R3-206374](Docs/R3-206374.zip) | (TP for SON BL CR to TS 38.473) Enhancement of RACH Conflict Resolution (Nokia, Nokia Shanghai Bell) | other |
| [R3-206513](Docs/R3-206513.zip) | (TP for SON BL CR for TS38.473): RACH conflict resolution and RACH report (Ericsson) | other |
| [R3-206554](Docs/R3-206554.zip) | Discussion on the PRACH Coordination between LTE and NR (China Telecom, ZTE, Huawei) | discussion |
| [R3-206555](Docs/R3-206555.zip) | (TP for [NR\_SON\_MDT] BL CR for TS 38.423) Addition of LTE PRACH Coordination in XnAP (China Telecommunications) | other |
| [R3-206695](Docs/R3-206695.zip) | Left issue for Rel-16 RACH Optimization (ZTE) | discussion |