3GPP TSG-RAN WG3 Meeting #109-e R3-205514

E-meeting, 17 – 27 August, 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#109-e on:

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

**- Topics to discuss:**

 **- RACH conflict detection**

 **- RACH conflict resolution**

 **- Xn, F1 impacts**

 **- Any other topics based on contributions submitted**

**- LS to RAN2?**

**- If there are agreements, can proceed to CRs and LS**

(Nok - moderator)

Companies are kindly requested to provide input to the first stage of this discussion by EOB of Thursday, August 20, so we can take it into account during the online session on Friday.

# 2 For the Chairman’s Notes

[To be completed]

# 3 Discussion

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

The issue is raised in [1]. Company input is requested on: **The PRACH Coordination between LTE cell in upgraded site and newly-built NR site should be considered in Rel-17.** The proposal targets XnAP enhancement as follows: Addition of (E-UTRA) *PRACH Configuration* IE to XnAP *Neighbour Information E-UTRA* IE [2].

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| Company | Comment |
| Huawei | OK. |
| CATT | Agree. |
| China Telecom | Agree☺ |
| ZTE | Agree |
| Nokia | We understand the described deployment to be co-channel LTE capacity booster layer) and NR coverage layer (without DSS). For the LTE capacity booster layer, NR is enabled in some resources based on DSS. For the NR coverage layer no DSS is used. We assume that LTE PRACH and NR PRACH are not intended to use the same frequency/time resources in this deployment, and hence "traditional" RACH optimization, e.g. based on avoidance of RSI conflict, is therefore not the target? We suggest to investigate use of OAM and/or signaling mechanism for DSS in this case, which could also enable protection of other critical LTE resources (not only PRACH), both in UL and DL if needed. |

## 3.2 Issue 2 – Max Number of neighbour cells’ PRACH configuration from CU to DU

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| Company | Comment |
| Huawei | 1024.As we explained in our discussion paper, there is no message oversize issue with 1024 neighbour cells’ PRACH configuration transferring from CU to DU in F1 setup response and gNB-CU configuration update message.As the size of PRACH configuration is much small than the served cell info.And we support 512 of cells on F1AP in F1 SETUP, which means there are 512 served cell info IEs. |
| Nokia | The proposal in 4759 provides a certain number of PRACH configurations for cells selected by the CU based on neighbor relations with cells served by the DU. The DU will not know which of these configurations that will potentially conflict with a given served cell, and anyway PRACH configuration information can just be an indication of potential conflicts. The number 1024 is relatively high in terms of message size, but relatively low from a functional point of view considering that each of the 512 cells served in the DU may have many co-channel neighbours. So we think a different approach is needed. |

## 3.2 Issue 2 - PRACH configuration conflict detection - transmission of NR PRACH configuration info for neighbour cells

Which enhancements are needed in Rel-17 in terms of transmission of NR PRACH configuration info for neighbour cells? Is a signalling procedure from DU to CU needed to trigger/filter PRACH configuration delivery?

(Please focus on NG-RAN including F1. X2 transfer of NR PRACH configuration information is covered under issue 5).

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| Company | Comment |
| Huawei | No, as we explained in our discussion paper, there is no message oversize issue with 1024 neighbour cells’ PRACH configuration transferring from CU to DU in F1 setup response and gNB-CU configuration update message.So, we don’t see the need to have an additional procedure from DU to CU for further PRACH configuration.This will introduce a lot of unnecessary signaling. |
| CATT | No need of any trigger. The gNB-CU can always perform filtering on its own and thus the PRACH list delivered toward the gNB-DU will never be much longer than the one which it receives from this very gNB-DU. Hence this should not be a considerable load to the gNB-DU. |
| China Telecom | No. agree with Huawei |
| ZTE | Not necessary. |
| Nokia | Providing a limited and filtered set of assistance information (e.g. neighbor PRACH configuration) from the gNB-CU seems beneficial to enable RACH configuration conflict resolution at the gNB-DU. But probably the DU should not need to explicitly request such assistance information, but we think for this purpose the CU would need some information from the DU in terms of e.g. the rate of failed RACH attempts. |

## 3.3 Issue 3 - PRACH configuration conflict detection - retrieval of UE RACH Reports

Is a signalling procedure from DU to CU needed to request the CU to fetch UE RACH Reports from the UE (or from several UEs)?

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| Company | Comment |
| Huawei | Yes. We see some benefits to have such procedure, as there are many cases that RACH procedure may occur between the DU and the UE, but the CU are not aware of this. Therefore, without those RACH reports, the RACH channel load estimation, like access probability and access delay may be not accurate, and hence may impact on the optimisation step negatively. |
| ZTE | Yes, CU does not cover all RACH failure /sub-optimal states.  |
| Nokia | No, it would break F1 design principles to make the CU aware of RACH attempts in the DU. |

## 3.4 Issue 4 - PRACH configuration conflict resolution

Can a PRACH configuration conflict be solved locally in the DU that detects the conflict, or is any signalling needed in conflict resolution phase?

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| Company | Comment |
| Huawei | Yes, with a max number of 1024 neighbour cells’ PRACH configurations, we think that the DU has enough information to solve the PRACH configuration conflict issue locally. |
| CATT | Solving it locally in the gNB-DU is the most efficient method. The gNB-DU knows better the radio circumstances anyhow. |
| China Telecom | Yes.  |
| ZTE | Solving the conflict in the gNB-DU locally. |
| Nokia | Local solution of RACH conflict could work in some cases, e.g. in case of conflicting RSI while other parameters (power ramping) are well configured. But a cell will in most cases not be able to detect whether e.g. its power parameters are too aggressive and it therefore acts as an interference aggressor towards other cells. Its own RACH success rate will in this case be good. So we think signaling for the conflict resolution phase is needed. |

## 3.5 Issue 5 - inter-en-gNB RACH coordination

RAN3#108-e agreed to postpone inter-en-gNB RACH coordination to Rel-17:

* + X2AP signalling of PRACH configurations of neighbour cells is postponed to Rel-17

Proposals can be found in [7], [8]. Please provide your company's view.

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| Company | Comment |
| Huawei | Good to have. |
| CATT | This issue should be solved with a similar approach as the issue over F1AP. |
| China Telecom | Agree with the proposals in [7][8]  |
| ZTE | Support to have. |
| Nokia | Good to have. |

## 3.6 Issue 6 - RACH report for SgNBs

The issue is raised in [11], and an LS proposed sent to RAN2 [12]. Please provide your company's view.

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| Company | Comment |
| Huawei | No strong view. |
| CATT | Similar with MRO for SN change failure case, RACH report for SgNB should also be considered. |
| China Telecom | It is beneficial to introduce RACH report for SgNB |
| Nokia | OK to send an LS to RAN2. |

# 4 Conclusion, Recommendations [if needed]

If needed

# 5 References

 [1] R3-204633 Discussion on the PRACH Coordination in Spectrum Shared between LTE and NR, China Telecom, ZTE, Huawei discussion

[2] R3-204634 (TP for [NR\_SON\_MDT] BL CR for TS 38.423) Addition of LTE PRACH Coordination in XnAP China Telecommunications other 38.423

[3] R3-204758 PRACH configuration conflict detection Huawei discussion

[4] R3-204759 PRACH configuration conflict detection Huawei CR 38.473

[5] R3-205011 TP for RACH report availability indication on F1 interface Ericsson discussion

[6] R3-205012 Solution for RACH Conflict Detection and Resolution at gNB-DU Ericsson discussion

[7] R3-205013 PRACH Configuration of neighbouring cells for EN DC scenario Ericsson CR 36.423

[8] R3-205111 Discussion on Rel-16 leftover issues for PRACH coordination CATT discussion

[9] R3-205112 CR on PRACH coordination for F1AP CATT CR 38.473

[10] R3-205113 CR on PRACH coordination for X2AP CATT CR 36.423

[11] R3-205114 Discussion on RACH report for SgNB CATT discussion

[12] R3-205115 LS to RAN2 on RACH report for SgNB CATT LS out

[13] R3-205204 2-step RACH Configuration Exchange Nokia, Nokia Shanghai Bell discussion

[14] R3-205205 RACH Conflict Resolution Nokia, Nokia Shanghai Bell discussion

[15] R3-205206 Enhancement of RACH Conflict Resolution Nokia, Nokia Shanghai Bell CR 38.423

[16] R3-205207 Enhancement of RACH Conflict Resolution Nokia, Nokia Shanghai Bell CR 38.473

[17] R3-205323 Left issue for Rel-16 RACH Optimization ZTE, China Telecom, China Unicom discussion