**3GPP TSG-RAN WG1 Meeting #104-e R1-210xxxx**

**e-Meeting, Jan 25th – Feb 5th, 2020**

**Agenda Item: 7.2.1**

**Source: Moderator (ZTE)**

**Title: FL summary on the maintenance of 2-step RACH**

**Document for: Discussion**

# Introduction

This document contains the summary of issues related to the maintenance of Rel-16 2-step RACH WI in RAN1#104-e meeting.

# Maintenance issues

The following 3 issues are identified based on the submitted contributions in RAN1#104-e.

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| Issue # | Description | Related TDoc # |
| 1 | Correction on DMRS configuration for MsgA in 38.214 | R1-2100243 |
| 2 | Clarify in the description of the transmission timing adjustment procedure in 38.213 | R1-2101526 |
| 3 | Not support MsgB and unicast PDSCH TDMed multiplexing in a slot per CC | R1-2101573 |
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*FL comments:*

For the above 3 issues, the proponents have clarified clearly the intention for changes in their TDocs. It would be rather straightforward to include them in a single email thread.

# Summary

The following Email discussion is proposed (will be updated based on companies’ feedback, if any).

Proposed Email thread #1:

Corrections of 2-step RACH related issues

* CR in R1-2008785, CR in R1-2101526, and TP in R1-2101573

Any comments?

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| Company | Comment |
| Spreadtrum | Support FL’s proposal.For TP in R1-2101573, we want to provide further elaborations on why we should consider the restriction on MsgB.* The payload size of MsgB could be much larger than Msg2 and/or Msg4 when including RRC payload for multiple UEs. It poses more challenge and difficulty for UE processing for the case when MsgB and unicast PDSCH TDMed multiplexing in a slot than the case for Msg2 and unicast PDSCH TDMed multiplexing in a slot.
* In our understanding, the processing capability requirement for MsgB could be equivalent to one unicast PDSCH. In Rel-15, for msg4, actually there are some restrictions in UE feature session, i.e., when UE not support more than 1 unicast PDSCHs in a slot per CC, UE is not expected to be scheduled with msg4 and unicast PDSCH in a slot per CC.

In our opinion, similar to msg4, UE should be not expected to be scheduled with MsgB and unicast PDSCH in a slot per CC when UE not supporting FG5-11/5-11a/5-11b. Otherwise, it is possibly that the UE could not process MsgB when one MsgB and one unicast PDSCH TDMed multiplexing in a slot. Then, the latency would be increased (always fallback to 4-step RACH) and the benefit of 2-step RACH would loss.Thus, we have the following proposal:**The UE is not expected to be scheduled a PDSCH scheduled with C-RNTI, MCS-C-RNTI, or CS-RNTI, and another PDSCH in the same cell scheduled with MSGB-RNTI in a slot.** |
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# References

1. R1-2100243 Correction on DMRS configuration for MsgA in 38.214 Huawei, HiSilicon
2. R1-2101526 Draft CR to 38.213 on corrections for 2-step RACH Ericsson
3. R1-2101573 Discussion on remaining issues on 2-step RACH Spreadtrum Communications

# Appendix

List of proposals in the submitted contributions.

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| TDoc | Proposals |
| R1-2100243Huawei | **Reason for change:** 1. It is clear that there can be at most 2 ports configured per DM-RS CDM group for single-symbol DM-RS case. Then for MsgA PUSCH transmission, if a UE is not configured with *msgA-PUSCH-NrofPort*, the UE shall assume that it is only for the case of double-symbol DM-RS that 4 ports are configured per DM-RS CDM groups. This is also aligned with the possible DMRS configuration defined in TS 38.211 and TS 38.212.
2. For MsgA PUSCH transmission, only PUSCH DM-RS configuration type 1 is supported, and there is no higher layer parameter “*dmrs-Type*”. The corresponding correct description is already provided in TS 38.211.

-------------------------6.2.2 UE DM-RS transmission procedure\*\*\* Unchanged text is omitted \*\*\*When transmitted PUSCH is scheduled by DCI format 0\_1 with CRC scrambled by C-RNTI, CS-RNTI, SP-CSI-RNTI or MCS-C-RNTI, or corresponding to a configured grant, or being a PUSCH for Type-2 random access procedure,- the UE may be configured with higher layer parameter *dmrs-Type* in *DMRS-UplinkConfig*, and the configured DM-RS configuration type is used for transmitting PUSCH in as defined in Clause 6.4.1.1 of [4, TS 38.211].\*\*\* Unchanged text is omitted \*\*\*For MsgA PUSCH transmission, if the UE is not configured with *msgA-PUSCH-DMRS-CDM-group,* the UEshall assume that 2 DM-RS CDM groups are configured. Otherwise, *msgA-PUSCH-DMRS-CDM-group* indicates which DM-RS CDM group to use from the set of {0,1}. For MsgA PUSCH transmission, if the UE is not configured with *msgA-PUSCH-NrofPort,* the UEshall assume that 4 ports are configured per DM-RS CDM groups for double-symbol DM-RS. Otherwise, *msgA-PUSCH-NrofPort* with value of 0 indicates the first port per DM-RS CDM group, while a value of 1 indicates the first two ports per DM-RS CDM group.\*\*\* Unchanged text is omitted \*\*\* |
| R1-2101526Ericsson | **Reason for change**: A 12-bit absolute TA can be in a DL-SCH with Absolute Timing Advance Command MAC CE which is already specified in 38.321 from 2-step RACH work item in NR R16. But in 38.213, the 12 bits absolute TA is only assumed to be in RAR, and only 6-bit TA is assumed for all other cases.-----------------------------------------4.2 Transmission timing adjustments<omit unchanged text>In case of random access response or Absolute Timing Advance Command MAC CE, a timing advance command [11, TS 38.321], , for a TAG indicates values by index values of  = 0, 1, 2, ..., 3846, where an amount of the time alignment for the TAG with SCS of  kHz is . is defined in [4, TS 38.211] and is relative to the SCS of the first uplink transmission from the UE after the reception of the random access response.In other cases, a timing advance command [11, TS 38.321], , for a TAG indicates adjustment of a current value, , to the new value, , by index values of  = 0, 1, 2,..., 63, where for a SCS of  kHz, . <omit unchanged text> |
| R1-2101573Spreadtrum | Reason for change:The payload size of MsgB is much larger than Msg2 and/or Msg4. The processing capability requirement for MsgB could be equivalent to unicast PDSCH. For UEs not supporting two unicast PDSCHs TDMed in a slot per CC, MsgB could not be treated. The accessing latency would be increased and the benefit of 2-step RACH would loss.Summary of change:Not support MsgB and unicast PDSCH TDMed multiplexing in a slot.Consequences if not approved:The benefit of 2-step RACH would loss, and even 2-step RACH could not be supported for UEs not supporting 2 unicast PDSCHs TDMed in a slot per CC. Clauses affected:TS38.214 g40, section 5.1----------------------Start of Text proposal#1 for TS 38.214----------------------------5.1 UE procedure for receiving the physical downlink shared channel--------------------------------------------------Unchanged text omitted---------------------------------------------The UE is not expected to decode a PDSCH scheduled with C-RNTI, MCS-C-RNTI, or CS-RNTI if another PDSCH in the same cell scheduled with RA-RNTI or MSGB-RNTI partially or fully overlap in time. The UE is not expected to be scheduled a PDSCH scheduled with C-RNTI, MCS-C-RNTI, or CS-RNTI, and another PDSCH in the same cell scheduled with MSGB-RNTI in a slot.-----------------------End of Text proposal#1 for TS 38.214---------------------------- |
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