**3GPP TSG RAN WG1 #118 R1-240xxxx**

**Maastricht, NL, August 19th – 23rd, 2024**

**Source: Moderator (ZTE)**

**Title: FL summary of PDSCH scrambling for MBS in RRC\_INACTIVE**

**Agenda item: 8.1**

**Document for:** **Discussion and Decision**

# Introduction

This document provides the summary of PDSCH scrambling for MBS in RRC\_INACTIVE proposed by [1].

R1-2406114 Draft CR on PDSCH scrambling for MBS in RRC\_INACTIVE ZTE Corporation, Sanechips

# Discussion

For multicast reception in RRC\_INACTIVE, the gNB can configure the scrambling ID of DMRS for PDSCH for MTCH and MCCH by higher layer parameter *pdsch-ConfigMTCH* and *pdsch-ConfigMCCH* instead of *DMRS-DownlinkConfig*. The current specification is not correct. In addition, the scrambling ID of DMRS for PDSCH is configured separately for unicast and multicast. The scrambling ID for PDSCH is provided by different higher parameters for unicast, multicast reception in RRC\_INACTIVE including MTCH and MCCH. This is not captured in TS 38.211 clearly.

The draft CR is provided as below.

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| 7.3.1.1 Scrambling Up to two codewords  can be transmitted. In case of single-codeword transmission, .  For each codeword , the UE shall assume the block of bits , where is the number of bits in codeword  transmitted on the physical channel, are scrambled prior to modulation, resulting in a block of scrambled bits according to    where the scrambling sequence is given by clause 5.2.1. The scrambling sequence generator shall be initialized with  where  -  equals the higher-layer parameter *dataScramblingIdentityPDSCH* in *pdsch-Config* if configured and the RNTI equals the C-RNTI, MCS-C-RNTI, or CS-RNTI, and the transmission is not scheduled using DCI format 1\_0 in a common search space;  - equals the higher-layer parameter *dataScramblingIdentityPDSCH* in *pdsch-ConfigMulticast* if configured in a common MBS frequency resource and the RNTI equals the G-RNTI, G-CS-RNTI, or MCCH-RNTI, and the transmission is scheduled using DCI format 4\_1/4\_2 in a common search space configured in the common MBS frequency resource;  - equals the higher-layer parameter *dataScramblingIdentityPDSCH* given by *pdsch-ConfigMCCH* if configured in a common MBS frequency resource and the RNTI equals to the multicast MCCH-RNTI and the transmission is scheduled using DCI format 4\_0 in a common search space configured in the common MBS frequency resource;  - equals the higher-layer parameter *dataScramblingIdentityPDSCH* given by *pdsch-ConfigMTCH* if configured in a common MBS frequency resource and the RNTI equals to the G-RNTI and the transmission is scheduled using DCI format 4\_0/4\_1 in a common search space configured in the common MBS frequency resource;  - equals  - the higher-layer parameter *dataScramblingIdentityPDSCH* if the codeword is scheduled using a CORESET with *CORESETPoolIndex* equal to 0;  - the higher-layer parameter *dataScramblingIdentityPDSCH2* if the codeword is scheduled using a CORESET with *CORESETPoolIndex* equal to 1;  if the higher-layer parameters *dataScramblingIdentityPDSCH* and *dataScramblingIdentityPDSCH2* are configured together with the higher-layer parameter *CORESETPoolIndex* containing two different values, and the RNTI equals the C-RNTI, MCS-C-RNTI, or CS-RNTI, and the transmission is not scheduled using DCI format 1\_0 in a common search space;  - otherwise  and where  corresponds to the RNTI associated with the PDSCH transmission as described in clause 5.1 of [6, TS 38.214].  **<Unchanged parts are omitted>** 7.4.1.1.1 Sequence generation The UE shall assume the sequence is defined by  .  where the pseudo-random sequence is defined in clause 5.2.1. The pseudo-random sequence generator shall be initialized with  where is the OFDM symbol number within the slot, is the slot number within a frame, and  - are given by the higher-layer parameters *scramblingID0* and *scramblingID1*, respectively, in the *DMRS-DownlinkConfig* IE in *pdsch-Config* if provided and the PDSCH is scheduled by PDCCH using DCI format 1\_1, 1\_2, or 1\_3 with the CRC scrambled by C-RNTI, MCS-C-RNTI, or CS-RNTI;  - is given by the higher-layer parameter *scramblingID0* in the *DMRS-DownlinkConfig* IE in *pdsch-Config* if provided and the PDSCH is scheduled by PDCCH using DCI format 1\_0 with the CRC scrambled by C-RNTI, MCS-C-RNTI, or CS-RNTI;  - are given by the higher-layer parameters *scramblingID0* and *scramblingID1*, respectively, in the *DMRS-DownlinkConfig* IE in *pdsch-ConfigMulticast* if provided in a common MBS frequency resource for multicast and the PDSCH is scheduled by PDCCH using DCI format 4\_2 with the CRC scrambled by G-RNTI or G-CS-RNTI;  - is given by the higher-layer parameter *scramblingID0* in the *DMRS-DownlinkConfig* IE in *pdsch-ConfigMulticast* if provided in a common MBS frequency resource and the PDSCH is scheduled by PDCCH with the CRC scrambled by G-RNTI, G-CS-RNTI, MCCH-RNTI;  - is given by the higher-layer parameter *dmrs-ScramblingID0* given by *pdsch-ConfigMCCH* if provided in a common MBS frequency resource and the PDSCH is scheduled by PDCCH using DCI format 4\_0 with the CRC scrambled by multicast-MCCH-RNTI;  - is given by the higher-layer parameter *dmrs-ScramblingID0* given by *pdsch-ConfigMTCH* if provided in a common MBS frequency resource and the PDSCH is scheduled by PDCCH using DCI format 4\_0/4\_1 for multicast in RRC\_INACTIVE with the CRC scrambled by G-RNTI;  - otherwise;  - given by  - if the higher-layer parameter *dmrs-Downlink* in the *DMRS-DownlinkConfig* IE is provided  where λ is the CDM group defined in clause 7.4.1.1.2.  - otherwise by  The quantity is given by the DM-RS sequence initialization field, if present, in the DCI associated with the PDSCH transmission if DCI format 1\_1, 1\_2, 1\_3, or 4\_2 in [4, TS 38.212] is used, otherwise . |

**Question 1:**

Companies are invited to provide their views on the proposed CR in the following table.

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| **Company** | **Comments** |
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# Conclusion

# References

1. R1-2406114 Draft CR on PDSCH scrambling for MBS in RRC\_INACTIVE