**3GPP TSG RAN WG1 Meeting #100bis-e R1-200xxxx**

**E-Meeting, April 20 – 30, 2020**

**Agenda Item: 6.2.1.6**

**Source: Moderator (Huawei)**

**Title: Feature lead summary #1 on MPDCCH performance improvement**

**Document for: Discussion and Decision**

# Introduction

Agreements and conclusions in previous meeting for the MPDCCH performance improvement of LTE-MTC are summarized in [1]. In this paper, the inputs from companies submitted to RAN1#100bis-e meeting ([2]-[3]) on remaining issues are summarized.

# Issues

Issue 1: Capturing of the mapping between DMRS for MPDCCH and CRS antenna ports .

* As explained in [1], only the relation between MPDCCH and CRS antenna ports are specified as below, the mapping of DMRS and CRS has not been captured in the spec. As a result, UE may not be use both DMRS and CRS for the demodulation of MPDCCH.
* Proposal: Endorse the following text proposal to TS 36.211

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| Text proposal to 36.211**6.10.3A.2 Mapping to resource elements**<unchanged parts are omitted>For BL/CE UEs, if higher layer parameter *ce-reserved-resource-DL-freq* or *ce-reserved-resource-DL-time* is configured, then in case of MPDCCH transmission associated with C-RNTI or SPS C-RNTI using UE-specific MPDCCH search space,- If all OFDM symbols in a PRB are reserved, the demodulation reference signal transmission in that PRB is dropped.For BL/CE UEs, if *mpdcch-crs-idle-config* or *mpdcch-crs-config* is configured by higher layers, in a physical resource block  assigned for the MPDCCH, the relation between the DMRS and CRS antenna ports follows the relation between the MPDCCH and CRS antenna ports specified in subcluase 6.8B.5. |

Issue 2: Use of MPDCCH performance improvement for PUR procedure

* As explained in [2], applying MPDCCH performance improvement to PUR can improve the detection performance of DCI for UL grant without additional UE complexity. For the UE with these two capabilities, MPDCCH performance improvement by using CRS can be used in PUR procedure.
* To enable the use of MPDCCH performance improvement for PUR, the following are proposed:

***MPDCCH performance improvement by using CRS can be used in PUR procedure.***

***Predefined mapping between DMRS and CRS ports should be used when MPDCCH performance improvement is configured for PUR.***

***UE-specific parameter powerratio is added in PUR configurations if MPDCCH performance improvement is configured for PUR.***

# Summary

FL’s view on the issues that are prioritized for discussion in this e-meeting:

* Issue 1: Capturing of the mapping between DMRS for MPDCCH and CRS antenna ports .
* Issue 2: Use of MPDCCH performance improvement for PUR procedure

# References

1. R1-1913594, “RAN1 agreements for Rel-16 Additional MTC Enhancements for LTE”, Ericsson, Reno, USA, November 2019.
2. R1-2001574 Corrections on MPDCCH performance improvement Huawei, HiSilicon
3. R1-2001854 Clarification on MPDCCH performance improvement ZTE