3GPP TSG RAN WG1 Meeting #106-e R1-210xxxx

**e-Meeting, August 16th – 27th, 2021**

Source: Moderator (ZTE)

Title: Summary of [106-e-NR-eMIMO-05] MT.1 (candidate PDSCH for mDCI)

Agenda Item: 7.2.6

**Document for: Discussion and Decision**

# Introduction

The document provides a summary for the email discussion thread [106-e-NR-eMIMO-05] MT.1 (candidate PDSCH for mDCI).

[106-e-NR-eMIMO-05] MT.1 (candidate PDSCH for mDCI) by August 20 – Chuangxin (ZTE)

Please provide your comments before August 19, then we can try to get consensus before the official deadline.

# Discussion

In the contribution R1-2106539 [1], it clarifies that multi-DCI based MTRP is introduced where two PDSCHs from two TRPs corresponding two *coresetPoolIndex* values are scheduled independently, and can be multiplexed at the same time in Rel-16. However, in the current 38.213, it is described that UE does not expect to actually receive more than one PDSCH in a same DL slot regardless of STRP or MTRP.

The suggested text proposal for **38.213 section 9.1.2.1** is as follows [1]:

**<Unchanged parts are omitted>**

If the UE indicates a capability to receive more than one PDSCH per slot, for occasions of candidate PDSCH receptions corresponding to rows of $R$ associated with a same value of , where , the UE does not expect to receive more than one PDSCH in a same DL slot if the UE is not provided with *coresetPoolIndex*, otherwise,the UE does not expect to receive more than one PDSCH in a same DL slot associated with a same *coresetPoolIndex* value.

**<Unchanged parts are omitted>**

Please companies share your comments

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| **Company** | **Comment** |
| NEC | Generally fine with the proposal. While we think it’s better to clearly describe CORESETs and coresetPoolIndex, e.g. if UE is not provided coresetPoolIndex for some CORESETs, these CORESETs are regarded as first CORESETs as defined in 38.213, same with CORESETs configured with coresetPoolIndex = 0.

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| If a UE- is not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with a value of 0 for first CORESETs on active DL BWPs of serving cells, and- is provided *coresetPoolIndex* with a value of 1 for second CORESETs on active DL BWPs of the serving cells, and |

And in TS 38.213, it seems there is description for the case.

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| If a UE can support- a first set of $N\_{cells,0}^{DL}$ serving cells where the UE is either not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with a single value for all CORESETs on all DL BWPs of each scheduling cell from the first set of serving cells, and- a second set of $N\_{cells,1}^{DL}$ serving cells where the UE is not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with a value 0 for a first CORESET, and with a value 1 for a second CORESET on any DL BWP of each scheduling cell from the second set of serving cells |

So we think the description can be reused to simplify the change:If the UE indicates a capability to receive more than one PDSCH per slot, for occasions of candidate PDSCH receptions corresponding to rows of $R$ associated with a same value of , where , the UE does not expect to receive more than one PDSCH in a same DL slot if the UE is either not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with a single value for all CORESETs ~~is not provided with~~ *~~coresetPoolIndex~~*~~, otherwise,~~~~the UE does not expect to receive more than one PDSCH in a same DL slot associated with a same~~ *~~coresetPoolIndex~~* ~~value~~. |
| Apple | We think the change from ZTE and NEC can be merged. The sentence “otherwise,…” is still needed on top of the version from NEC. |
| QC | It seems to us that the change may not be needed. This is because based on the existing text above the pseudo-code, this should be already clear as the condition is separately applied to S0 and S1:“…the UE generates a Type-1 HARQ-ACK codebook for the set $S\_{0}$ and the set $S\_{1}$ of serving cells separately by setting $N\_{cells}^{DL}=N\_{cells}^{DL,0}$ and $N\_{cells}^{DL}=N\_{cells}^{DL,1}$ in the following pseudo-code.” |
| OPPO | We are fine with the CR to make the spec clearer. Regarding the wording, we agree with Apple.  |
| ZTE | @Apple, OPPO, NEC We think the original text proposal is OK without NEC’s change. That is because, if only single *coresetPoolIndex* value is configured, UE still follow this condition, i.e. ‘otherwise,the UE does not expect to receive more than one PDSCH in a same DL slot associated with a same *coresetPoolIndex* value’. After discuss with NEC offline, they are OK with the original text now. @QC We think it is better to make spec clearer as people may not think the revised paragraph in our text change belongs to pseudo-code.  |
| Samsung | We are fine the original proposal to make the spec. more clearer. |
| Nokia/NSB | We have a similar reading as QC and pseudo code is not fully relevant. Also, if we relate this text to m-TRP, the reception of more than one PDSCH (we name them PDSCH transmission occasions) in a slot is also possible with TDM scheme and FDM scheme ? |
| vivo | We are fine with the original version from ZTE.@Nokia: we think PDSCH transmission occasions of TDM scheme or FDM scheme is actually one PDSCH because the same TB is transmission among the transmission occasions. |
| LG | We have the same understanding with QC. In pseudo-code, the condition is separately applied to S0 and S1. There is no ambiguous in the current specification from our understanding.  |
| CATT | Support the CR in principle. The following revision to the text proposal is suggested for simplification.**<Unchanged parts are omitted>**If the UE indicates a capability to receive more than one PDSCH per slot, for occasions of candidate PDSCH receptions corresponding to rows of $R$ associated with a same value of , where , the UE does not expect to receive more than one PDSCH in a same DL slot if the UE is not provided with two different values of *coresetPoolIndex*.**<Unchanged parts are omitted>** |
| ZTE2 | Thanks for all the inputs. @CATT, if we go with your revision, it will not be clear what is UE behavior if UE is configured coresetPoolIndex. In such case, we think UE still does not expect to receive more than one PDSCH in a same DL slot per TRP. @LG, QC and Nokia, Hopefully you are OK with the text change as it is unclear whether the revised paragraph belongs to pseudo-code (there is not any pseudo-code in that paragraph at all). At least, the text change makes spec clearer and not harmful.  |
| Huawei | Generally we are open to make specification clearer to clarify the restriction of receiving more than one PDSCH in a same DL slot. The pseudo-code itself may not be sufficiently to ensure applicability of that restriction. However original changes of “otherwise” seems to be misleading since it refers to “If the UE indicates a capability to receive more than one PDSCH per slot”. So “otherwise” means “If the UE does not indicates a capability to receive more than one PDSCH per slot”. Therefore, we prefer something simpler as following: If the UE indicates a capability to receive more than one PDSCH per slot, for occasions of candidate PDSCH receptions corresponding to rows of $R$ associated with a same value of , where , the UE does not expect to receive more than one PDSCH in a same DL slot *associated with a same coresetPoolIndex value if provided, or if coresetPoolIndex is not provided.* |
| ZTE3 | Thanks all for the reply. Huawei version looks good. I suggest to go for Huawei’s revision. Please companies provide your views if you still have strong concern. Thanks! |

# 2nd round Discussion

In the first round discussion, we have the following comments and inputs:

* NEC, Samsung Apple, OPPO, vivo, ZTE, CATT and Huawei agree the proposal in principle. But there are a bit diverse for the exact text change.
* QC, Nokia and LG think the current spec clear.

Based on the comments from companies, my understanding is that all companies have the same understanding, i.e. UE does not expect to receive more than one PDSCH in a same DL slot associated with a same coresetPoolIndex value. The controversial part is whether the revised paragraph in the proposal belong to pseudo-code or not.

To make spec clearer and without any ambiguity, I would like to propose to adopt Huawei’s revision which was not raised any concern for a while.

**Proposal: Adopt the following TP for 38.213:**

**<Unchanged parts are omitted>**

If the UE indicates a capability to receive more than one PDSCH per slot, for occasions of candidate PDSCH receptions corresponding to rows of $R$ associated with a same value of , where , the UE does not expect to receive more than one PDSCH in a same DL slot associated with a same *coresetPoolIndex* value if provided, or if *coresetPoolIndex* is not provided.

**<Unchanged parts are omitted>**

Please provide your comments on this TP in the table below:

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| **Company** | **comments** |
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# Outcome of email discussion

# List of contributions

1. R1-2106539 Draft CR on number of received PDSCHs for multi-TRP transmission ZTE