**3GPP TSG-RAN WG2 Meeting #132 R2-250xxxx**

**Dallas, USA, Nov. 17th-21st, 2025**

**Agenda item: 8.12.1**

**Source: Samsung**

**Title: Report of Rel-19 MIMO MAC open issues**

**WID/SID: NR\_MIMO\_Ph5**

**Document for: Discussion and Decision**

# Introduction

This offline discussion aims to collect any additional Rel-19 MIMO MAC open issues for correction.

* [Post131bis][215][MIMOevo] CR for TS 38.321 (Samsung)

Intended outcome: Update the CR and identify any additional other open issues

Deadline: Long (Oct. 31)

# Discussion

Besides the two remaining issues from RAN2#131bis listed below, please provide the description of any additional issues, proposals for potential solutions, and the corresponding TP. Other companies please provide comments/views on the issues/proposals/TPs.

It is encouraged to list any additional issues as early as possible (by Oct. 28) so that there will be some time for other companies to review and comment.

Please also indicate non-controversial issues (e.g., editorial issues) if any. Such issues will be directly handled in the MAC rapporteur CR to be submitted to RAN2#132.

Please use the template below and fill in each block for one issue.

# [Issue-1]

**[Issue description]**:

As cross-CC UEI CSI reporting is supported, i.e., PUCCH for UEIRI and PUSCH for the actual report can be on different cells. For mode-B UEI reporting, PUCCH and Type1 CG PUSCH can be configured on different cells, thus, associated with different TAGs. If the TAT (associated with a sTAG) for Type1 CG PUSCH is expired while the TAT for PUCCH is running, UE behaviour is not clear.

**[Discussion]**:

In RAN2#131bis, more companies prefer that UE releases the PUCCH resource. There is a concern that releasing the PUCCH resource will cause interruption to other UCIs (e.g., P/SP CSI on PUCCH, HARQ for SPS, SR) that is configured with the same PUCCH resource id. To address the concern, the condition is added, that is, if the configured PUCCH resource id is only associated to this type-1 CG PUSCH (i.e., not associated with any other UCI). However, this may only address the concern for PUCCH resource id of other UCIs that is configured by RRC.

A further concern is that releasing PUCCH resource will generally impact the UCI transmission on PUCCH. For instance, to transmit HARQ-ACK/NACK for dynamic DL scheduling, UE selects a PUCCH resource set based on the bit length of UCI, and within the selected PUCCH resource set the PUCCH resource id is dynamically indicated in DCI. Once the UE releases the PUCCH resource, it cannot be used to transmit HARQ-ACK/NACK flexibility for dynamic DL scheduling, or transmit HARQ-ACK/NACK multiplexing with other UCIs. Further offline checking with RAN1 is encouraged.

Another complication for PUCCH resource release is that in RRC the PUCCH resource is currently released per cell based on MAC layer indication of the cell. In this case, it should be released per PUCCH resource ID configured on a specific BWP ID of a specific cell.

**[Proposed Solution]**:

For mode-B UEI reporting, PUCCH and Type1 CG PUSCH can be associated with different TAGs. If the TAT (associated with a sTAG) for Type1 CG PUSCH is expired while the TAT for PUCCH is running,

Option 1 (baseline from RAN2#131bis): UE releases the PUCCH if the configured PUCCH resource id is only associated to this type-1 CG PUSCH (i.e., not associated with any other UCI).

Option 2 (to avoid any impact to other UCI transmission): UE does not release the PUCCH, UE does not transmit UEIRI on the PUCCH if UEI CSI report is triggered.

**Please feel free to comment here or further discuss in contributions.**

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| **Company** | **Comments** |
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# [Issue-2]

**[Issue Description]**:

When DRX is configured, the Active Time for Serving Cells in a DRX group includes the time between transmsision of a UEIRI and receiving a PDCCH scheduling PUSCH for mode-A UEI CSI report:

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- a PDCCH scheduling a mode-A UE-initiated CSI report on PUSCH has not been received after transmitting UE Initiated Report Indication on PUCCH (as specified in TS 38.214 [7]).

If PDCCH for CSI report is never received (either the PDCCH is not scheduled by NW after the NW receives the UEIRI or the NW fails to receive the UEIRI on PUCCH), the UE will have to keep staying in DRX active time due to the condition being always met, causing unnecessary power consumption.

**[Proposed Solution]**:

For DRX, after transmitting UEIRI on PUCCH:

Option 1: UE stays in active time until receiving PDCCH scheduling. Keep the current MAC spec.

Option 2: UE stays in active time until the next PUCCH resource occasion. Update MAC spec.

**[Discussion]**:

In RAN2#131bis, the concern for Option 1 is that UE will be stuck in DRX active time if fallback mechanism (e.g., BFD/BFR/RLF) is not triggered. For instance, the current beam may recover quickly after UEIRI transmission which will not trigger BFD/BFR/RLF, but it can be rare to miss UEIRI in this case since the UEI event configuration should ensure there is no issue to use the current beam to transmit/receive UEIRI regardless of DRX. As mentioned in another example, UE cannot transmit UEIRI again for a new triggered report if PUCCH is released due to TAT expired, but this will not prevent BFD/BFR/RLF, and this is not a specific concern for UEI CSI reporting in DRX.

The concern for Option 2 is that if the PUCCH periodicity is configured to be small, there may not be enough time for NW to transmit PDCCH or UE to receive PDCCH before the next PUCCH occasion, which makes UE enter DRX inactive time without transmitting the report on PUSCH.

One discussion point in RAN2#131bis is that according to the current TS 38.214,

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| 5.2.1.5.4.1 UE Initiated CSI reporting  For a UE configured with a *CSI-ReportConfig* with *eventType* for periodic reference signals with the same periodicity configured by the *newBeamResourceSet*, without *eventDetectionTimeWindowLength,* and with *dl-OrJointTCI-StateList*, when an event instance is determined (as described in the following clauses),  - for a reference signal configured by the *newBeamResourceSet*, if *eventType* is set to ‘event2’ or ‘event7’, or  - for the reference signal in the indicated TCI state or the SS/PBCH block which is QCLed with the reference signal in the indicated TCI state, if *eventType* is set to ‘event1’,  the UE transmits UEIRI on a PUCCH format 0 or format 1 in the PUCCH resource (in the CC provided by *pucchCell,* if configured, in the *CSI-ReportConfig*) configured by *PUCCHResource* in the *CSI-ReportConfig*.  For a UE configured with a *CSI-ReportConfig* with *eventType* for periodic reference signals with the same periodicity configured by the *newBeamResourceSet*, with *eventDetectionTimeWindowLength*, and with *dl-OrJointTCI-StateList,* when an event instance is determined (as described in the following clauses),  - for a reference signal configured by the *newBeamResourceSet*, if *eventType* is set to ‘event2’ or ‘event7’, or  - for the reference signal in the indicated TCI state or the SS/PBCH block which is QCLed with the reference signal in the indicated TCI state, if *eventType* is set to ‘event1’,  the UE  - starts a timer for such reference signal from the initial value equal to the time window length provided by *eventDetectionTimeWindowLength* and sets the counter to 1,if the timer for such reference signal is not running; or  - increments the counter for such reference signal by 1, if the timer for such reference signal is running.  If the number of event instances determined by the counter for such reference signal is greater than or equal to *eventInstanceCount*, the UE transmits UEIRI on a PUCCH format 0 or format 1 in the PUCCH resource (in the CC provided by *pucchCell,* if configured, in the *CSI-ReportConfig*) configured by *PUCCHResource* in the *CSI-ReportConfig*.  … |

for a triggered UEI report, it is not clear whether UE transmits only one UEIRI on a PUCCH occasion or transmits multiple UEIRIs on multiple PUCCH occasions (continuously or not). One interpretation is up to UE implementation. Further offline checking with RAN1 on the exact UE behavior is encouraged.

If UE transmits UEIRI only once or transmits multiple UEIRIs on non-consecutive PUCCH occasions for a triggered report, the short time to the next PUCCH occasion may prevent UE receiving PDCCH, so that UE may go to inactive time for power saving without transmitting the PUSCH, which can work from UE power saving perspective, while the NW may still monitor the scheduled DG to receive mode-A report. From NW perspective, to avoid such an issue, NW can configure a proper PUCCH periodicity (e.g., based on TA, processing time, etc).

If UE continuously transmits UEIRIs on PUCCH occasions for a triggered report, after each UEIRI transmission, the DRX active time will be prolonged to the next PUCCH occasion until UE receives the PDCCH, thus, no issue for Option 2. For this case, there should be no need to change the current specification, which is actually more precise on the active time ending point.

**Please feel free to comment here or further discuss in contributions.**

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| **Company** | **Comments** |
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# [Issue-3] [Company]

**[Issue description]**:

**[Proposal and TP]**:

**[Discussion]**:

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| **Company** | **Comments** |
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# Conclusions

The following open issues are listed with proposals.

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# References

1. R2-2507702 Report from session on Rel-18 MIMO, Rel-19 MIMO, LPWUS, SBFD, NR Others RAN2 Vice Chairman (CATT)
2. R2-2507734 [AT131bis][203][MIMOevo] Remaining MAC issues Samsung