**3GPP TSG-RAN WG2 Meeting #126 Draft R2-2405733**

**Fukuoka, Japan, 20 – 24 May 2024**

**Source: Samsung**

**Title: Report of [AT126][201][MIMOevo] remaining MAC issues (Samsung)**

**Agenda item:** **7.7.3**

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

# Introduction

This document records inputs and outcome for the following offline discussion.

* [AT126][201][MIMOevo] Offline discussion on the remaining MAC issues (Samsung)

Scope: Discuss the remaining critical MAC issues that need to be handled in this meeting

 Intended outcome: Summary and agreeable proposals in R2-2405733

 Deadline: before CB session

# Discussion

## Issue 1

R2-2404487 Correction on multi-TRP STx2P PHR MAC CE Nokia discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

STx2P is not applicable to E-UTRA, no report of the 2nd type 2 PH.

**Proposal 1: Remove the PH 2 for Type 2 PH reporting from the figures of the Enhanced Multiple Entry PHR for multiple TRP STx2P MAC CE.**

**Q1: agree P1?**

ZTE supports, LG also supports

* **P1 is agreeable**

## Issue 2

R2-2405171 Corrections on PHR Samsung discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 3-1: Reporting one type 1 PH or one type 3 PH is not applicable if the serving cell is configured with multi-panel scheme and the associated MAC entity is configured with twoPHRmode.*

*Proposal 3-2: For proposal 3-1, adopt the TP in Appendix 5.3 for TS 38.321 clause 5.4.6.*

* OPPO think it should be ‘if the active BWP is configured with….’ Samsung agrees.
* LG E think we need new procedural texts for multi panel case.

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4> else (i.e. this MAC entity is not configured with *twoPHRMode*):

5> if this Serving Cell is configured with multiple TRP PUSCH repetition or *multipanelSchemeSDM* or *multipanelSchemeSFN* and if the MAC entity this Serving Cell belongs to is configured with *twoPHRMode*:

6> if there is at least one real PUSCH transmission at the slot where the PHR MAC CE is transmitted:

7> obtain the value of the Type 1 power headroom of the first real transmission of the corresponding uplink carrier as specified in clause 7.7 of TS 38.213[6] for NR Serving Cell.

6> else if there is no real PUSCH transmission at the slot where the PHR MAC CE is transmitted:

7> obtain the value of the type 1 power headroom of the reference PUSCH transmission associated with the *SRS-ResourceSet* with a lower *SRS-resourceSetID* or the value of the type 3 power headroom for the corresponding uplink carrier as specified in clause 7.7 of TS 38.213[6] for NR Serving Cell.

5> else:

6> obtain the value of the Type 1 or Type 3 power headroom for the corresponding uplink carrier as specified in clause 7.7 of TS 38.213 [6] for NR Serving Cell and clause 5.1.1.2 of TS 36.213 [17] for E-UTRA Serving Cell.

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**Q2: when the MAC entity transmitting the PHR is not configured with twoPHRmode, for Rel-18 multi-panel**

**Option 1: apply current Rel-17 procedure that report one type 1 PH, meaning keeping “***multipanelSchemeSDM* or *multipanelSchemeSFN***” and possible other the wording changes in the current steps (e.g., clarify first transmission)**

**Option 2: report 2 type 1 PHs, meaning to remove “***multipanelSchemeSDM* or *multipanelSchemeSFN***” and add new steps**

CATT, ZTE, oppo: option 1, similar to r17, as it has been discussed in R17,

LG: option 1 needs to clarify first transmission,

* **Option 1 is agreeable**

**Q3: do we change “**if this Serving Cell is configured with *multipanelSchemeSDM/ multipanelSchemeSFN/* multiple TRP PUSCH repetition**” to “if the active BWP of the serving cell is configured with …”**

Oppo: prefer to change all places in PHR section

ZTE, Ericsson: not only for rel18, also impact r17, postpone, not critical

* **Postpone, wait and see Rel17 correction progress**

## Issue 3

Proposal 4-1: In PHR procedure, for STx2P multi-entry PHR, move the steps of obtaining PCMAX,f,c,k and MPEk under the following conditions:

if this MAC entity has UL resources allocated for transmission on this Serving Cell; or

if the other MAC entity, if configured, has UL resources allocated for transmission on this Serving Cell and phr-ModeOtherCG is set to real by upper layers

Proposal 4-2: For multi-entry PHR, restructure the procedural text for obtaining Pcmax and MPE, by using the structure of single-entry PHR MAC CEs.

Proposal 4-3: For Proposal 4-1 and 4-2, adopt the TP in Appendix 5.4 for TS 38.321 clause 5.4.6.

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4> if this MAC entity is configured with *phr-AssumedPUSCH-Reporting*:

5> if this MAC entity has UL resources allocated for transmission on this Serving Cell; or

5> if the other MAC entity, if configured, has UL resources allocated for transmission on this Serving Cell and *phr-ModeOtherCG* is set to *real* by upper layers:

6> if *dynamicTransformPrecoderFieldPresenceDCI-0-1-r18* or *dynamicTransformPrecoderFieldPresenceDCI-0-2-r18* is set to *enabled* in the active BWP of this Serving Cell:

7> obtain the value for the corresponding PCMAX,f,c field for assumed PUSCH from the physical layer if available, as specified in clause 7.7 of TS 38.213 [6].

6> obtain the value for the corresponding PCMAX,f,c field from the physical layer.

4> else (i.e. if this MAC entity is not configured with *phr-AssumedPUSCH-Reporting*):

5> if this MAC entity is configured with *twoPHRMode* and if this Serving Cell is configured with *multipanelSchemeSDM* or *multipanelSchemeSFN*:

6> obtain two values for the corresponding PCMAX,f,c,k fields from the physical layer.

6> if *mpe-Reporting-FR2* is configured and this Serving Cell operates on FR2 and this Serving Cell is associated to this MAC entity:

7> obtain two values for the corresponding MPEk fields from the physical layer.

5> else:

6> if this MAC entity has UL resources allocated for transmission on this Serving Cell; or

6> if the other MAC entity, if configured, has UL resources allocated for transmission on this Serving Cell and *phr-ModeOtherCG* is set to *real* by upper layers:

7> obtain the value for the corresponding PCMAX,f,c field from the physical layer.

7> if *mpe-Reporting-FR2* is configured and this Serving Cell operates on FR2 and this Serving Cell is associated to this MAC entity:

8> obtain the value for the corresponding MPE field from the physical layer.

7> if *mpe-Reporting-FR2-r17* is configured and this Serving Cell operates on FR2 and this Serving Cell is associated to this MAC entity:

8> obtain the value for the corresponding MPEi field from the physical layer;

8> obtain the value for the corresponding Resourcei field from the physical layer.

7> if *dpc-Reporting-FR1* is configured and ΔPPowerClass /ΔPPowerClass, CA/ΔPPowerClass, EN-DC/ΔPPowerClass, NR-DC reporting is triggered and this Serving Cell operates on FR1 and this Serving Cell is associated to this MAC entity:

8> obtain the value for the corresponding DPC field(s) from the physical layer.

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RAN1 agrees regardless of real or virtual PUSCH transmission, report two type 1 PHs and two Pcmax values.

**Q4: are the following conditions applied to the obtaining of Rel-18 multi-panel Pcmax and MPE.**

5> if this MAC entity has UL resources allocated for transmission on this Serving Cell; or

5> if the other MAC entity, if configured, has UL resources allocated for transmission on this Serving Cell and *phr-ModeOtherCG* is set to *real* by upper layers:

Zte, Oppo, LG, CATT: the current step is correct, no change

LG: another issue is whether UE report only one Pcmax for a serving cell configured with multi-panel if the MAC entity transmitting the PHR is not configured with twoPHRmode

* **No change is needed for now**

## Issue 4

*Proposal 5: For STx2P multi-entry MAC CE with 8 serving cells and with 32 serving cell, two bitmaps are added:*

*• one with each bit indicating whether the octet containing the second PH value is present or not for a reported serving cell*

*• the second one with each bit indicating whether the octet containing the second Pcmax is present or not for a reported serving cell.*

* ZTE think only one bitmap is needed, and do not want to change the current behaviour.
* CATT think there is no need to change, if we rely on inter node msg. LG E, OPPO, QC, Ericsson agree.

**Q5: For STx2P multi-entry PHR MAC CE:**

**Option 1: Reuse R17 inter-node msg to indicate per serving cell configuration, add a new parameter for Rel-18 multipanel scheme, and rely on NW implementation, no change on MAC CE format not bitmap**

**Option 2: one bitmap indicate** **indicating whether the octet containing the second Pcmax is present or not for a reported serving cell.**

**Option 3: Option 2 + one more bitmap indicating whether the octet containing the second PH value is present or not for a reported serving cell**

Ericssion: what’s the point of second bitmap of second PH? Rapp: in case of BWP switch, inter-node msg may not work well

ZTE: the issue is dynamic BWP switch. Way1: confirm bitmap is necessary. Way2: notify RAN3 bwp switch may trigger inter-node msg exchange

Xiaomi: there could be an issue as zte mentioned, but it’s legacy issue of R17,

OPPO: inter-node msg is sufficient

HW: inter-node msg may not be perfect, but NW can make sure the current signalling and MAC CE work, samsung, catt, LG agree, we can rely on NW implementation.

ZTE: we need to capture something in RRC spec to make it work, concern how NW implement

Nokia: no force to NW implementation, can capture in chairman note

* **Capture in chair note it’s up to NW implementation to make sure the current PHR MAC CE format can work (e.g., for dynamic BWP switch)**

LG: do we need new parameter in inter-node msg for Rel-18 multipanel?

ZTE: new parameter

Catt: reuse

R2-2404374 Discussion on PHR-Related Issues for STx2P CATT discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

**Proposal 2: Reuse the field *twoSRS-PUSCH-Repetition* in the inter-node RRC message to indicate each serving cell of other MAC entity is configured with multiple panel simultaneous uplink transmission schemes including multipanelSchemeSDM and multipanelSchemeSFN. The TP in Annex 1 should be adopted.**

* **We assume the inter-node msg can be used to make sure the current Rel-18 multi-entry PHR MAC CE for STx2P can work for DC, i.e., need RRC changes (e.g, by new parameter in inte-node msg)**

**e.g., introduce twoSRS-MultipanelScheme, (similar to twoSRS-PUSCH-Repetition-r17), that indicates whether the indicated serving cell is configured with multiple panel simultaneous uplink transmission schemes of multipanelSchemeSDM or multipanelSchemeSFN corresponding to two SRS resource sets configured in either srs-ResourceSetToAddModList or srs-ResourceSetToAddModListDCI-0-2 with usage 'codebook' or 'noncodebook'. The new parameter and twoSRS-PUSCH-Repetition-r17 are not configured together for a serving cell.**

## Issue 5

R2-2404555 Remaining issues on STx2P PHR LG Electronics Inc. discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

**Proposal 3. Simplify the field description for R18 STx2P MAC CE by referring RAN1 specification, as follows.**

* **Power Headroom k (PH k): This field indicates the power headroom level for k = 1, 2, where PH 1 is associated with the first Type 1 power headroom report and PH 2 is associated with the second Type 1 power headroom report, as specified in TS 38.213 clause 7.7.1 [6].**

**Q6: keep current wording or simplify as in P3?**

LG: we don’t need to discuss this.

Rapp: we keep the PH field description changes from last meeting for now

## Issue 6

R2-2404375 [C520] [C521] [C522] [C523] [C524] Discussion on RRC Corrections for MIMO CATT discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

**Proposal 1a: RIL [C520] is agreed. Clarify the SDT CG resource are associated with the TAG ID 0, in the case of the PCell where the RRCRelease has been received is configured with 2TA.**

**Proposal 1b: Revisit the agreement made last meeting on the field description of cg-SDT-timeAlignmentTimer. Remove “This field is associated with PTAG indicated by tag-Id” from the field description of cg-SDT-timeAlignmentTimer.**

**Proposal 1c: The TP in Annex 1 is adopted.**

**Q7: Whether we need to clarify that UE applies the N\_TA of the PTAG indicated by tag-Id if CG-SDT is configured?**

ZTE: we can keep the change introduced in the late meeting, no issue for that, already imply the TA of PTAG is used, prefer no more change, can accept majority view

CATT: we need this clarification on top of the change introduced in the last meeting

LG, Xiaomi: need this clarify

Ericsson: not sure we do need this in RRC, if we need we add in MAC

**Q8: If the clarification is needed, where do we clarify it? MAC (clause 5.2 before the start of cg-sdt TAT) or RRC (e.g., cg-sdt resource configuration FD)?**

CATT: we can have it in MAC

QC: no need in MAC

Rapp: no convergence whether/how to change

* **No more changes introduce for now, keep the changes in last meeting**

R2-2405489 RAN4 impacts of 2TA for SDT Xiaomi discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

**Q9: any RAN4 impact?**

Xiaomi: inform RAN4 our conclusion on cg-sdt, formal LS

Ericsson: not a topic in offline, cannot decide here

ZTE: there could be some RAN4 impact,

LG: this is not needed, legacy TAG is used any way, no RAN4 impact. Samsung shares same view.

Rapp: different views on whether there is RAN4 impact, can inform RAN4 offline if needed

## Issue 7

R2-2405426 Discussion on introducing 8Tx in MAC specification ASUSTeK discussion Rel-18 38.321 NR\_MIMO\_evo\_DL\_UL-Core

Observation: 8Tx which supports up to two TBs for a PUSCH has been introduced in PHY, RRC and stage 2 specifications but no corresponding changes have been made in MAC specification.

**Q10: Similar to DL HARQ, for UL HARQ, each HARQ process supports one or two TBs. add one sentence in MAC 5.4.2.1 HARQ Entity**

AsusTek: 8Tx already in RRC and stage-2, MAC changes are missing

LG: agree some changes are needed, TP regarding two UL grant is not needed, we only need “Each HARQ process supports one or two TBs.”, ZTE, OPPO agrees

AsusTek: ok for one UL grant, but the note may be needed

OPPO , ZTE, LG: the note is assuming 2 UL grants, so not needed either

Ericsson, Nokia: the note can be postponed

* **Keep the change “Each HARQ process supports one or two TBs.”**

# Conclusions

**Proposal 1: Remove the PH 2 for Type 2 PH reporting from the figures of the Enhanced Multiple Entry PHR for multiple TRP STx2P MAC CE.**

**Proposal 2: when the MAC entity transmitting the PHR is not configured with twoPHRmode, for Rel-18 multi-panel PHR, apply current Rel-17 procedure that report one type 1 PH with possible wording changes in the current steps (e.g., clarify/modify “first transmission”, etc)**

**Proposal 3: Capture in chair’s note it’s up to NW implementation to make sure the current Rel-18 multi-entry PHR MAC CE format for STx2P can work (e.g., for dynamic BWP switch).**

**Proposal 4: RAN2 assumes the inter-node msg can be used to make sure the current Rel-18 multi-entry PHR MAC CE format for STx2P can work for DC, i.e., need RRC changes (e.g, by new parameter in inte-node msg)**

**Proposal 4-1: Introduce a new parameter in inter-node msg, e.g., twoSRS-MultipanelScheme, (similar to twoSRS-PUSCH-Repetition-r17), that indicates whether the indicated serving cell is configured with multiple panel simultaneous uplink transmission schemes of multipanelSchemeSDM or multipanelSchemeSFN corresponding to two SRS resource sets configured in either srs-ResourceSetToAddModList or srs-ResourceSetToAddModListDCI-0-2 with usage 'codebook' or 'noncodebook'. The new parameter and twoSRS-PUSCH-Repetition-r17 are not configured together for a serving cell.**

**Proposal 5: Capture in MAC for UL HARQ “Each HARQ process supports one or two TBs.”**

Proposal 6: For RIL 520, due to different views on whether/how to further clarify anything, no more changes for now and keep the changes in last meeting.