3GPP TSG-RAN WG2 Meeting #124 draft R2-2313562

Chicago, USA, Nov. 13th – 17th, 2023

Source: RAN2 Vice Chairman (CATT)

Title: Report from session on NR MIMO evolution and Multi-SIM

## Status of At-Meeting Email Discussions

This subclause is not an Agenda Item. It contains a running summary of the email discussions assigned to take place during the meeting weeks.

* [AT124][200] Organizational – NR MIMO evolution and Multi-SIM (RAN2 VC)

**Scope**:

* + - Share plans and list of ongoing email discussions for the related sessions
		- Share meetings notes and agreements for review and endorsement

## 7.17 Dual Transmission Reception (Tx Rx) Multi-SIM for NR

(NR\_DualTxRx\_MUSIM-Core; leading WG: RAN2; REL-18; WID: [RP-231461](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_100/Docs/RP-231461.zip))

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 7.17.1 Organizational

Rapporteur input (e.g., work plan, remaining open issue list), incoming LS etc.

Latest version running CRs submitted by the spec editors.

R2-2311844 Running RRC CR for NR MUSIM enhancements vivo draftCR Rel-18 38.331 17.6.0 NR\_DualTxRx\_MUSIM-Core Withdrawn

R2-2311933 Running RRC CR for NR MUSIM enhancements vivo CR Rel-18 38.331 17.6.0 4399 - B NR\_DualTxRx\_MUSIM-Core Withdrawn

CRs

R2-2311936 Introduction of NR MUSIM enhancements vivo CR Rel-18 38.331 17.6.0 4401 - B NR\_DualTxRx\_MUSIM-Core

R2-2312077 Introduction of R18 MUSIM UE Capabilities Huawei, HiSilicon CR Rel-18 38.331 17.6.0 4408 - B NR\_DualTxRx\_MUSIM-Core

R2-2312081 Introduction of R18 MUSIM UE Capabilities Huawei, HiSilicon CR Rel-18 38.306 17.6.0 0976 - B NR\_DualTxRx\_MUSIM-Core

R2-2313240 38.300 Running CR for NR MUSIM enhancements China Telecom Corporation Ltd. CR Rel-18 38.300 17.6.0 0741 - B NR\_DualTxRx\_MUSIM-Core

R2-2313330 37.340 running CR for introduction of DualTxRx\_MUSIM ZTE Corporation, Sanechips CR Rel-18 37.340 17.6.0 0373 - B NR\_DualTxRx\_MUSIM-Core

* The above CRs are endorsed. Will be updated and reviewed in post meeting email discussion.

Post meeting email discussions

* [Post124][202][MUSIM] CR for TS 38.300 (China Telecom)

**Scope**: Update and review the CR for TS 38.300.

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][203][MUSIM] CR for TS 38.331 (vivo)

**Scope**: Update and review the CR for TS 38.331.

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][204][MUSIM] CR for TS 37.340 (ZTE)

**Scope**: Update and review the CR for TS 37.340.

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][205][MUSIM] CR for UE capability (Huawei)

**Scope**: Update and review the UE capability CRs for TS 38.331 and 38.306

**Intended outcome**: Endorsed CRs

**Deadline**: Nov. 23rd

Completion of the WI

* NR\_DualTxRx\_MUSIM WI is considered complete from RAN2 point of view.

### 7.17.2 Procedures and signalling for MUSIM temporary capability restriction

Remaining aspects for the “proactive” and “reactive” procedures

Remaining signaling design details for the temporary capability restrictions.

Including email report of long email discussion [205].

Contributions on open issues addressed explicitly by the email discussion [205], should be avioded

Email discussion report

R2-2311845 [Post123bis][205][MUSIM] RRC Running CR and further discussions (vivo) vivo other Rel-18 NR\_DualTxRx\_MUSIM-Core

*MN-SN coordination*

*Proposal 1: [5/5The MN can indicate the forbidden band entries (for the MUSIM purpose) info to the SN. Detailed signaling FFS.*

*Proposal 3: [4/4] For the affected bands with restricted capabilities, the MN can also indicate the SN about the capability restriction info if the corresponding band is allowed for the SN.*

*Bandwidth restriction*

*Proposal 4: [6/7] To solve MUSIM band conflict issue, the UE can indicate the temporary supported channel bandwidth restriction.*

*Proposal 4a: [6/6] Following above ASN.1 coding as baseline for the temporary supported channel bandwidth restriction indication:*

*SCG/SCell release using SRB3*

*Proposal 5: [6/7] UE temporary capability restrictions indication of SCG/SCell release via SRB3 for MUSIM purpose is not supported in this release.*

*Gap priority “keep” solution configuration*

*Proposal 6: [6/7] After UE indicates its preference for gap priority “keep” solution option, NW can configure UE to use “keep” solution option or not.*

Discussions:

P1, P3

* For P1, xiaomi wonders can we just reuse the legacy signaling and then remove the FFS.
* For P3, Samsung asks whether we could do some filtering? ZTE clarifies that the intention is that the restriction info corresponds to the list of affected bands so it is clear. Vivo understands it is the inter node msg, and it is up to MN implementation how to indicate this.
* Samsung suggests to remove the ‘if’ part in the end of P3. ZTE is fine with that and wants to discuss stage 3 details further.
* The MN can indicate the forbidden band entries (for the MUSIM purpose) info to the SN. Detailed signaling FFS.
* For the affected bands with restricted capabilities, the MN can also indicate the SN about the capability restriction info.

P4, P4a

* OPPO supports P4 and 4a, but want to make it clear which is the granularity of such signaling.
* To solve MUSIM band conflict issue, the UE can indicate the temporary supported channel bandwidth restriction.
* We use the ASN.1 coding in P4a in R2-2311845 as baseline for the temporary supported channel bandwidth restriction indication

P5

* ZTE asks if the other info such as MIMO layer also follows this proposal?
* UE temporary capability restrictions indication via SRB3 for MUSIM purpose is not supported in this release.

P6

- Xiaomi asks whether we have UE capability for priority based solution. HW thinks this issue is being discussed in R4.

* After UE indicates its preference for gap priority “keep” solution option, NW can configure UE to use “keep” solution option or not.

Early capability restriction indication

R2-2312154 Discussion on WA and Capturing Early indication for ResumeReq Intel Corporation discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal #1: It is proposed to not agree the working assumption. Instead agree to provide the early indication for Resume procedure in msg 3.*

*Proposal #2: If proposal 1 is not agreed and the current working assumption is to be agreed instead, it is proposed to capture the UE behaviour with a NOTE as follows:*

*NOTE: If the UE is experiencing capability restriction due to MUSIM, UE may temporarily use a configuration different from the received configuration until receipt of the next message with new configuration. UE still considers the received configuration as the current configuration as the baseline for delta configuration for future reconfigurations.*

R2-2313350 Discussion on temporary capability restriction Samsung discussion Rel-18

*Proposal 6: A UE supporting R18 MUSIM temporary capability restriction does NOT go to RRC\_IDLE if it is temporary unable to apply (part of) the configuration included in the RRCResume message. It is up to UE implementation how to apply the configuration included in the RRCResume message.*

*Proposal 7: Add the following NOTE in clause of 5.3.13.11 of TS 38.331:*

*- NOTE: The UE supporting MUSIM temporary capability restriction does not apply above failure handling in case it does not apply any part of the configuration for MUSIM purpose. It is up to UE implementation how to apply it.*

Discussions based on the two papers:

* QC do not want to repeat the previous discussions and suggest to confirm the WA. QC agree with SS proposal and also OK with Intel P2. HW share this view, and thinks the part in Intel proposal regarding the delta config can be added to the note.
* Nokia think if we agree the working assumption, then the UE behaviour is go to IDLE. Vivo think some UE implementation does not just go to IDLE.
* Mediatek think having a Note is sufficient.

Discussions in CB session

- Nokia suggest to clarify that note is valid when UE and NW supports early indication via msg5. Ericsson agree and think we should be careful about the exact wording here.

* Early capability restriction indication is provided in Msg5
* Add the following NOTE in clause of 5.3.13.11 of TS 38.331 (exact wording can be improved during the RRC CR review):

-NOTE: If configured by the NW to send early indication (i.e., via SIB1), and if the UE support MUSIM temporary capability restriction, the UE does not apply above failure handling in case it does not apply any part of the configuration for MUSIM purpose. It is up to UE implementation how to apply it. If UE does not go to IDLE in this case, UE still considers the received configuration as the current configuration as the baseline for delta configuration for future reconfigurations.

MN-SN coordination, remaining aspects

R2-2313334 Consideration on the MN-SN Coordination for the MUSIM ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1: The MN can indicate the forbidden band entries (for the MUSIM purpose) info to the SN by reusing the existing selectedBandEntriesMNList.*

Discussions:

* Samsung prefer the other alternative and think it is clean way. HW agrees.
* Ericsson is not so clear about how to index within such band entry list, and think the Uu signaling is not completely clear yet. Vivo think the indexing is up to MN implementation.

R2-2313632 Proposal on the MN-SN Coordination for the MUSIM ZTE Corporation, Sanechips, vivo

*WF 1: The MN can indicate the proactive/reactive temporary capabilities restriction (e.g. musim-CapRestriction-r18) to the SN together with the musim-candidateBandList-r18.*

*WF 2: The “Keep solution indication” should be transferred from the MN to the SN node in the CG-ConfigInfo inter-node message.*

*WF 3: MUSIM temporary capability restriction reporting on measurement gap requirement is not supported in NR-DC.*

Discussions:

WF 1

- Samsung wants to clarify if this is for proactive or for reactive?

* The MN can indicate the proactive/reactive temporary capabilities restriction (e.g. musim-CapRestriction-r18) to the SN together with the musim-candidateBandList-r18 (only for the proactive case).

WF 2

- Samsung thinks the configuration of gap priority should be added as well.

- OPPO suggests to add more condition regarding whether those info ‘can’ be shared. Samsung think the current wording is fine and further details can be sorted out during CR discussions.

* The configuration of gap priority and the “Keep solution indication” can be transferred from the MN to the SN node in the CG-ConfigInfo inter-node message.

WF 3

- Nokia want to clarify this WF3 does not require any specification changes. ZTE confirms.

* MUSIM temporary capability restriction reporting on measurement gap requirement is not supported in NR-DC.

R2-2311802 Procedures and signalling for MUSIM temporary capability restriction OPPO discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

WI rapp suggests to discuss this in the CB session.

R2-2311846 Discussion on the remaining issue of MUSIM temporary capability restriction vivo report Rel-18 NR\_DualTxRx\_MUSIM-Core

Discussons:

P6:

- QC think this is good and think it is useful to indicate in a per band granularity. HW do not see a need to go with per band, since in the reported info there is already aggregated BW. Vivo share this view from HW.

* For MUSIM capability restriction reporting, the UE can indicate the temporary maximum number of CCs per DL/UL to the network via UAI.

R2-2312303 Leftover issues on MUSIM temporary capability restriction Apple discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312304 Clarification on the gap information reporting Apple discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312305 Early MUSIM indication during RRC resume procedure Apple discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312395 Discussion on solution of early indication of temporary capability restriction NEC discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312430 Remaining consideration on MUSIM early indication DENSO CORPORATION discussion NR\_DualTxRx\_MUSIM-Core

R2-2312642 Discussion on remaining issues for temporary capability restriction Huawei, HiSilicon discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312729 Discussion on MUSIM temporary capability restriction in NR-DC Huawei, HiSilicon discussion

R2-2312816 On some restricted capabilities for Rel-18 MUSIM UE Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312817 Indication of restricted capabilities at RRC Setup and Resume by MUSIM UE Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312818 Discussion on remaining open issues on capability restriction Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312862 Further analysis on signalling procedure for capability restriction Nokia, Nokia Shanghai Bell discussion

R2-2312863 Capability restriction for specific capabilities and Interworking issues with existing features Nokia, Nokia Shanghai Bell discussion

R2-2313064 Control signaling for Dual-Active MUSIM Qualcomm Incorporated discussion

R2-2313068 Early Indication in RRC Resume procedure LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2313069 Supporting Proactive cases in other scenarios LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core R2-2311098

R2-2313237 Procedure for MUSIM temporary capability restriction China Telecom Corporation Ltd. discussion

R2-2313289 Considerations on Wait Timer Configuration and Handling Samsung discussion Rel-18

R2-2313332 Consideration on the Reactive Procedure ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2313333 Consideration on the Temporory Capability Reporting ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2313386 Clarification on the wait timer for capability restriction Xiaomi discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2313387 Capability restriction for the proactive approach Xiaomi discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2313388 Required UE capability bits for Rel-18 MUSIM Xiaomi discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

### 7.17.3 Other

Other remaining aspects if not covered by the previous agenda items, including e.g., aspects related to the RAN4 agreements/reqeusts, if any, and UE capabilit(ies) for the MU-SIM feature(s).

UE capability aspects

R2-2312643 Discussion on MUSIM UE capabilities Huawei, HiSilicon, Nokia discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*UE capability for MUSIM gap priority*

*Proposal 1: Reuse existing UE capability bit for MUSIM gap priority configuration and preference to indicate whether the UE supports providing the UE preference of “keep solution” in MUSIM assistance information.*

*UE capability for temporary capability restriction*

*Proposal 2: Introduce 1 optional per-UE capability bit without xDD/FRx differentiation to indicate whether the UE supports providing MUSIM assistance information with temporary capability restriction (i.e. not differentiate the capability to support proactive approach and reactive approach).*

*Proposal 3: The support of “early MUSIM indication” is defined as optional without capability signalling. UE supporting “early MUSIM indication” shall support MUSIM assistance information with temporary capability restriction.*

Discussions:

P1: *Reuse existing UE capability bit for MUSIM gap priority configuration and preference to indicate whether the UE supports providing the UE preference of “keep solution” in MUSIM assistance information.*

- Xiaomi thinks R4 already agreed to have a separate UE capability for keep solution. QC think this is R4 feature and we should follow, but if no clear indication we can discuss and decide. Vivo has different understanding on the R4 agreement and think this is not against P1 here.

* Reuse the agreed Rel-18 UE capability bit for MUSIM gap priority configuration and preference to indicate whether the UE supports providing the UE preference of “keep solution” in MUSIM assistance information.

P2: *Introduce 1 optional per-UE capability bit without xDD/FRx differentiation to indicate whether the UE supports providing MUSIM assistance information with temporary capability restriction (i.e. not differentiate the capability to support proactive approach and reactive approach).*

P3: *The support of “early MUSIM indication” is defined as optional without capability signalling. UE supporting “early MUSIM indication” shall support MUSIM assistance information with temporary capability restriction.*

- QC thinks this is not optional since NW should be able to know whether UE supports and suggest it being part of the capability in P2. Nokia agree.

* Introduce 1 optional per-UE capability bit without xDD/FRx differentiation to indicate whether the UE supports providing MUSIM assistance information with temporary capability restriction and early indication in Msg5.

R2-2311847 Discussion on UE capability for MUSIM features vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2311848 Discussion on MUSIM gap priorities vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2312864 MUSIM Gap collision handling and MUSIM capability interactions Nokia, Nokia Shanghai Bell discussion

R2-2313420 Further discussion on UE capabilities and MN-SN coordination Samsung discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

## 7.20 NR MIMO evolution

(NR\_MIMO\_evo\_DL\_UL-Core; leading WG: RAN1; REL-18; WID: [RP-223276](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_98e/Docs/RP-223276.zip))

Time budget: 0.75 TU

Tdoc Limitation: 3 tdoc

### 7.20.1 Organizational

Rapporteur input (e.g., work plan, open issue list), incoming LS etc.

Latest verison of running CRs submitted by the spec rapporteurs.

Including report from long email discussion [203] and [204].

LSs

R2-2313910       Reply LS on MIMOevo (R1-2312371; contact: Samsung)

* Noted

R2-2313911       Reply LS on Stage-2 CR for MIMO evolution (R1-2312526; contact: NTT DOCOMO)

* Noted

CRs

R2-2313417 Introduction of 2-TA enhancement NTT DOCOMO, INC. CR Rel-18 38.300 17.6.0 0742 - B NR\_MIMO\_evo\_DL\_UL-Core

R2-2311976 Introduction of Rel-18 MIMO for TS 38.321 Samsung CR Rel-18 38.321 17.6.0 1696 - B NR\_MIMO\_evo\_DL\_UL-Core

R2-2312045 Introduction of MIMO Evolution Ericsson CR Rel-18 38.331 17.6.0 4406 - B NR\_MIMO\_evo\_DL\_UL-Core

Discussions:

- Fujitsu has some comments, referring to P4 of their contribution. Fujitsu is OK to endorse the MAC CR and further discuss this issue with the MAC spec editor.

* The above CRs are endorsed. Will be updated and reviewed in post meeting email discussion.

Open issue list from WI Rapp

R2-2313423 Remaining open issue list for MIMO evolution NTT DOCOMO, INC. discussion Rel-18

* Noted

Other aspects

R2-2312563 Copy of R1-2310692 Consolidated\_Rel-18\_higher\_layer\_parameters\_list Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

* Noted

Email discussion report

R2-2312101 report of [Post123bis][203][MIMOevo] MAC remaining issues Samsung discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: (9/11) For inter-cell PDCCH order, use the R bit in RAR to indicate TAG, i.e., same as intra-cell PDCCH order CFRA.*

*Proposal 2: (10/11) RRC configures the association between TAG ID and 1st/2nd TAG in RAR. FFS a RRC parameter to indicate the association.*

*Proposal 3: Discuss if 2TAG configuration for multi-TRP operation is released when initiating RRC resume and TAG indication in successRAR is not needed.*

*Proposal 4: (11/11) RACH configuration for the additionalPCI shall only be used for inter-cell PDCCH ordered CFRA, i.e., not used for UE initiated RACH.*

*Proposal 5: (8/11) If the MTTD between a STAG and a PTAG is exceeded, UE considers the TAT of a STAG (up to UE implementation) as expired and stops UL transmission associated to the STAG. FFS for MTTD between two STAGs whether both or any one STAG is considered as expired.*

*Proposal 6: (8/11) If the MTTD between PTAGs in different MAC entities is exceeded, the TAT of any PTAGs is not considered as expired.*

*Proposal 7: FFS if the MTTD between PTAGs in one MAC entity is exceeded, UE considers the TAT of a PTAG (up to UE implementation) as expired and stops UL transmission associated to the PTAG. FFS LS to RAN4.*

*Proposal 8-1 : FFS whether the coexistence of deactivated SCG and multi-TRP is supported in R18.*

*Proposal 8-2: (9/11) If the coexistence of deactivated SCG and multi-TRP is supported in R18, if two PTAGs are configured for the PSCell, indicate to uppler layers that RA is needed for SCG activation if TATs of both PTAGs are not running.*

*Proposal 9: (10/11) HARQ ACK is not generated if the TCI state to be applied for the HARQ feedback transmission is associated to a TAG with TAT expired.*

Discussions:

P1: *For inter-cell PDCCH order, use the R bit in RAR to indicate TAG, i.e., same as intra-cell PDCCH order CFRA.*

* QC has different view than P1, thinks legacy way should be used instead. QC think in this particular case no enh is needed as there is no ambiguity to which TAG it applies.
* OPPO wonders whether intra and inter cell can be configured for the same serving cell.
* ZTE thinks P1 gives unified solution and makes the spec work simpler. LG shares this view and therefore ok with P1.
* Ericsson and Nokia both fine with P1.
* For inter-cell PDCCH order, use the R bit in RAR to indicate TAG, i.e., same as intra-cell PDCCH order CFRA.

P2:

* QC thinks R1 spec already covers this association for TCI states. Samsung thinks R1 spec is not against this and here we need to further define the parameter in RRC.
* RRC configures the association between TAG ID and 1st/2nd TAG in RAR. FFS a RRC parameter to indicate the association.

P4:

* RACH configuration for the additionalPCI shall only be used for inter-cell PDCCH ordered CFRA, i.e., not used for UE initiated RACH.

P9:

* HW see a need to confirm with R1 on P9.
* Samsung explains the issue was resolved via offline and we can therefore agree.
* HARQ ACK is not generated if the TCI state to be applied for the HARQ feedback transmission is associated to a TAG with TAT expired.

R2-2312552 Report of Post 123bis MIMOevo RRC Ericsson report Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1 Discuss on RAN2#124 on LS need and content*

*Proposal 2 RAN2 to adopt as content for RACH configuration per additionaPCI(7 of these) IE RACH-ConfigGeneric, ssb-perRACH-Occasion and prach-RootSequenceIndex*

*Proposal 3 RAN2 extend the PRACH configuration in the BWP-UplinkCommon allowed in IE UplinkConfigCommon and not in IE UplinkConfigCommonSIB*

*Proposal 4 RAN2 to introduce the parameters tag-Id2-r18 n-TimingAdvanceOffset2-r18 in ServingCellConfig*

*Proposal 5 RAN2 to discuss whether multi-TRPs with two Tas can be supported in handover case.*

Discussions:

P2:

* ZTE think one parameter on msgA SCS is missing. OPPO see the possibility to reuse what’s configured by common configuration.
* RAN2 to at least adopt as content for RACH configuration per additionaPCI(7 of these) IE RACH-ConfigGeneric, ssb-perRACH-Occasion and prach-RootSequenceIndex. Can further discuss if any other parameter(s) are needed.

 P3: *RAN2 extend the PRACH configuration in the BWP-UplinkCommon allowed in IE UplinkConfigCommon and not in IE UplinkConfigCommonSIB*

- CATT has concern and think this should be put under dedicated configuration. LG agrees.

P4:

* RAN2 to introduce the parameters tag-Id2-r18 n-TimingAdvanceOffset2-r18 in ServingCellConfig

Post meeting email discussions

* [Post124][206][MIMOevo] CR for TS 38.300 (Docomo)

**Scope**: Update and review the CR for TS 38.300

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][207][MIMOevo] CR for TS 38.321 (Samsung)

**Scope**: Update and review the CR for TS 38.321

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][208][MIMOevo] CR for TS 38.331 (Ericsson)

**Scope**: Update and review the CR for TS 38.331

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

Completion of the WI

* NR\_MIMO\_evo\_DL\_UL WI is considered complete from RAN2 point of view.

### 7.20.2 Two TAs for multi-DCI multi-TRP

Remaining open issues on two TAs for multi-DCI multi-TRP operation

Contributions on open issues addressed explicitly by the email discussion [203] and [204], should be avioded.

Remaining MAC aspects

R2-2312043 Discussion on MAC aspects for Two TAs for multi-DCI multi-TRP CATT discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Consideration on multi-DCI multi-TRP with two TAs upon handover*

*Proposal 1: RAN2 to support to configure multi-DCI multi-TRP with two TAs upon handover.*

*Proposal 2: For multi-DCI multi-TRP with two TAs, do not make enhancement upon performing handover to the target cell associated with two TAGs, i.e., UE performs RACH to acquire the TA of one PTAG for the serving cell.*

*TAG indication for 2-step RACH*

*Proposal 3a: Confirm that the TAG indication is included in the fallbackRAR for 2-step CBRA.*

*Proposal 3b: Confirm that the TAG indication is not needed in the fallbackRAR for 2-step CFRA.*

*Proposal 4a: TAG indication is not included in successRAR.*

*Proposal 4b: Upon RRC resume by 2-step RACH, UE applies the TA received in successRAR to PTAG with TAG ID 0. It’s up to NW implementation to ensure the correct TAG indication configured in the TCI state.*

*Proposal 4c: Two-TA configuration for multi-TRP operation does not need to be released when initiating RRC resume, which follows legacy behavior.*

*RACH completion for 2-step RACH triggered by SR*

*Proposal 5: For the RACH triggered by SR, if the TAT(s) associated with at least one PTAG is running, the UE considers the RACH completion upon reception of C-RNTI addressed PDCCH that schedules a new UL transmission.*

*Co-existence of deactivated SCG with mTRP*

*Proposal 6: Do not support the co-existence of deactivated SCG with mTRP.*

R2-2312409 Discussion on remaining issues on MIMO OPPO discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: Two TA operation is supported only in Connected state*

*Proposal 2: no TAG indication in successRAR is needed*

*Proposal 3: TAG indication is supported for FallbackRAR*

*Proposal 4: For RACH procedure triggered by SR, legacy text is applied i.e. no change is needed*

*Proposal 5: For the case where MTTD exceeds between STAGs, the TAT of one of the STAGs will stop*

*Proposal 5a: RAN2 need discuss whether it can be completely left for UE’s implementation*

*Proposal 6: For the case where MTTD exceeds between PTAGs, TAT of both PTAGs keep running*

*Proposal 7: two TA operation is also supported for CFRA or CBRA triggered by mobility event without parallel RACH procedures for two TAGs.*

*Proposal 8: RAN2 discuss whether one shot siganling principle is still applied for MAC CEs activating Rel18 TCI states*

Discussions based on the two papers above

*??TAG indication is not included in successRAR.*

* LG thinks if UE stores the 2TA related configs then UE may need this TAG indication. ZTE agrees. Vivo agrees.
* QC agree that TAG ind is not needed in sucessRAR. Nokia agree and think this enh is not needed. CATT agrees. Ericsson agrees as well and think it is new configuration anyway.
* Samsung think at this particular time period UE only have one TAG. Hw agrees.
* TAG indication is not included in successRAR
* TAG indication is supported for FallbackRAR

OPPO suggests to further discuss P8 in the CB session:

P8:

- Xiaomi and Ericsson both think it is just as the legacy, i.e., one shot.

R2-2313428 Contention resolution while SpCell is configured with 2 TAGs Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: When MsgA is transmitted (for no BFR case), when the UL grant indicates a new transmission towards a PTAG for which TAT is running, the UE can consider the RA procedure successfully completed; otherwise, the UE attempts to receive the Absolute TAC MAC CE.*

*Proposal 2: For 4-step RA, if the Random Access procedure was initiated by the MAC sublayer itself (other than for BFR case) or by the RRC sublayer, the contention resolution is considered successful only if the UL grant for new transmission is addressed to a TAG for which TAT is running.*

Discussions:

* Samsung do no see a need for further enhancement.
* For 2-step RACH: For the RACH triggered by SR, if the TAT(s) associated with at least one PTAG is running, the UE considers the RACH completion upon reception of C-RNTI addressed PDCCH that schedules a new UL transmission.

R2-2313439 Discussion on remaining issues on 2TA enhancement NTT DOCOMO, INC. discussion Rel-18

*Proposal 2. PSCells with 2 TAs are not assumed to be deactivated in this release.*

Discussions:

* Samsung ok with P2.
* PSCells with 2 TAs are not assumed to be deactivated in this release.

R2-2312392 Discussion on MTTD in 2TAs mTRP LG Electronics Inc. discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1. RAN2 waits RAN4 to define the UE behaviour related to uplink transmission for MTTD between TAGs configured per TRP.*

*Proposal 2. RAN2 defines the detailed UE behaviour related to TAT expiry for MTTD between TAGs configured per TRPs based on RAN4 decision.*

*Proposal 3. RAN2 considers the following as a baseline if RAN4 decides that the UE behaviour is to stop UL transmission or left up to UE implementation.*

*- The MAC entity considers TAT associated the concerned TRP as expired.*

*Proposal 4. RAN2 does not need to define anything about the UE behaviour related to TAT expiry if RAN4 decides that the UE behaviour is to monitor RTD consistently.*

*Proposal 5. Whether the concerned TAG is both TAGs or one TAG is determined based on RAN4 decision.*

Discussions:

* ZTE agree we should wait for R4 on MTTD aspects.
* Xiaomi thinks how to handle this case is decided in R2.
* Samsung suggest to first try P3 in R2, and the others may wait for R4.
* ZTE ok with P3 and for the others we should wait.
* Samsung indicates there is new agreement in R4, which means it is up to UE implementation whether to transmit or not in this case. Samsung think we can just follow the existing paragraph in the MAC spec. LG E has similar view as Samsung, and think P3 can be discussed.
* Xiaomi think the case of 2 PTAG is still not so clear. OPPO suggest improved wording.
* RAN2 considers the following as a baseline (which follows the legacy behaviour)

- The MAC entity considers TAT associated with the concerned sTAG as expired, when UE stops UL transmission for the STAG due to MTTD issue.

Remaining RRC aspects

R2-2313537 Remaining CP issues Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core Late

* Noted

R2-2312103 RRC remaining issues on two TAs for multi-DCI multi-TRP Samsung discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: Introduce tag-Id2 in addition to the legacy tag-Id.*

*Proposal 2: Use the same RRC parameter to indicate the mapping between a TAG ID and 1st/2nd TAG indication in RAR, and the association between a TCI state and 1st/2nd TAG.*

*Proposal 3: The list of RACH configurations with each entry for an additional PCI is configured per BWP.*

*Proposal 4: Discuss whether RRC or MAC capture the description that “the RACH configuration for AdditionalPCIIndex is applied when PDDCH indicates CFRA for the AdditionalPCIIndex, as specified in TS 38.212 clause 7.3.1.2.”*

WI rapp suggests to discuss P4 in this paper in the CB session

P4:

Discussions:

- Ericsson think it should be in MAC. OPPO agree and think this should be normative procedure. Samsung think a note is sufficient. CATT agree this is MAC and a Note is good. LG agree with this view. Ericsson and Huawei think we should use procedure text. Xiaomi agree.

* MAC captures the description that “the RACH configuration for AdditionalPCIIndex is applied when PDDCH indicates CFRA for the AdditionalPCIIndex, as specified in TS 38.212 clause 7.3.1.2.”.

R2-2312783 Further Consideration on the RRC parameter for MIMO evo ZTE Corporation,Sanechips discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

* Noted

R2-2312044 Discussion on RRC aspects for Two TAs for multi-DCI multi-TRP CATT discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2312372 Further corrections on the MIMO RRC parameters Samsung discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

* Offline discussions, taking into account the above RRC related proposals, and also remaining open issues from the email discussion #203, to form a set of agreeable proposals for RRC open issues (prioritize critical open issues for WI completion from R2 point of view). Report to be treated in CB session.
* [AT124][201][MIMOevo] Remaining RRC open issues (Ericsson)

**Scope**: To form a set of agreeable proposals for RRC open issues (prioritize critical open issues for WI completion from R2 point of view), taking into account the RRC related proposals from the companies, and also remaining open issues from the email discussion report R2-2312552.

**Intended outcome**: Report with proposals in R2-2313631

**Deadline**: before CB session

R2-2313631 Report of [AT124][201][MIMOevo] Remaining RRC open issues (Ericsson)

*P1:* *RACH configuration for additionalPCIs is configured in dedicated signaling either initialBWP or dedicated BWPs.*

*P2: Add additionalRACH-perPCI-ToAddModList in IE BWP-UplinkCommon in RRC CR. Make separate IE for the RACH config.*

*P3: Add in IE servingcellConfig a field which maps one TAG id to value 0 or 1*

Discussions:

P1:

- OPPO suggests to change to ‘and/or’.

* RACH configuration for additionalPCIs is configured in dedicated signaling either initialBWP and/or dedicated BWPs.

P2:

- CATT think it should be added in the dedicated configuration, not common configuration, there may be some redundancy in the singaling. Ericsson do not think there is a need to align the configs to all the UEs. CATT disagree.

- OPPO agree with Ericsson.

- Samsung think either way can work. CATT also agree.

- CATT wants to clarify in the filed that this parameter can be configured differently for different UEs. LG agree that some clarification is needed in the RRC CR.

- OPPO ask whether we can reduce the control overhead, e.g., only configure a single additional RACH resource. CATT understands that in the current RRC spec the resource is associated with SSB index which is configured per PCI. Samsung agree with CATT.

* Add additionalRACH-perPCI-ToAddModList in IE BWP-UplinkCommon in RRC CR. Make separate IE for the RACH config. It is clarified in the field description that the configuration can differ for different UEs.

*P3: Add in IE servingcellConfig a field which maps one TAG id to value 0 or 1*

- CATT think this is not only for R bit in RAR.

* Add in IE servingcellConfig a field which maps one TAG id to value 0 or 1 (for the R bit in RAR and in the absolute TAC MAC CE)

R2-2312011 Discussion of supporting 2 TAGs in a serving cell Fujitsu discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2312102 MAC remaining issues on two TAs for multi-DCI multi-TRP Samsung discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2312221 Discussion on two TAs for multiple TRPs SHARP Corporation discussion NR\_MIMO\_evo\_DL\_UL-Core

R2-2312391 Remaining issues on RA procedure in 2TAs mTRP LG Electronics Inc. discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2312479 Remaining issues on Two TAs for multi-TRP operation Lenovo discussion Rel-18

R2-2312784 Further consideration on RACH for MTRP With 2TA ZTE Corporation,Sanechips discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2312785 Further Consideration on TA Handling for MTRP With 2TA ZTE Corporation,Sanechips discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2312919 Remaining issues on multi-DCI multi-TRP with two TAs Qualcomm Incorporated discussion NR\_MIMO\_evo\_DL\_UL-Core

R2-2313390 Clarification on the PUCCH or SRS release Xiaomi discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

WI rapp suggests to discuss P1 in this paper in the CB session

Discussions

P1:

* The RRC configurations for PUCCH/SRS are kept, when the TAT for STAG/PTAG is expired and the other TAT of the same cell is running.

R2-2313429 Miscellaneous issues with 2 TAGs framework Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2313524 Remaining issues on 2TA for mTRP Huawei, HiSilicon discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2313540 Discussion on OIs for multi-DCI\_TRP 2TAs Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core Late

### 7.20.3 Other

Other issues if not covered by the previous agenda items, including e.g., unified TCI extension to mTRP operation, etc..

Contributions on open issues addressed explicitly by the email discussion [203] and [204], should be avioded.

R2-2312611 Design of sDCI MAC CE for Rel-18 MIMO Nokia Corporation discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

WI rapp suggests to discuss P1 in this paper in the CB session

Discussions:

P1:

- Samsung think the intention is to update the current MAC CR to better align with what R1 agreed.

- DCM and OPPO see no issue, and think it is about the wording of the R1 agreement.

- Ericsson think we should avoid using the term TRP.

Chair: Can discuss further the wording of the related MAC CE paramter in the post meeting email, to see if any change is really needed.

R2-2313525 Extension of unified TCI framework for mTRP Huawei, HiSilicon discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2313526 Overlapping UL grants handling for STxMP and codebook configuration for CJT Huawei, HiSilicon discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

## List of post meeting email discussions

* [Post124][202][MUSIM] CR for TS 38.300 (China Telecom)

**Scope**: Update and review the CR for TS 38.300.

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][203][MUSIM] CR for TS 38.331 (vivo)

**Scope**: Update and review the CR for TS 38.331.

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][204][MUSIM] CR for TS 37.340 (ZTE)

**Scope**: Update and review the CR for TS 37.340.

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][205][MUSIM] CR for UE capability (Huawei)

**Scope**: Update and review the CR for TS 38.331/306, on UE capability

**Intended outcome**: Endorsed CRs

**Deadline**: Nov. 23rd

* [Post124][206][MIMOevo] CR for TS 38.300 (Docomo)

**Scope**: Update and review the CR for TS 38.300

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][207][MIMOevo] CR for TS 38.321 (Samsung)

**Scope**: Update and review the CR for TS 38.321

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks

* [Post124][208][MIMOevo] CR for TS 38.331 (Ericsson)

**Scope**: Update and review the CR for TS 38.331

**Intended outcome**: Agreed CR

**Deadline**: 2 weeks