3GPP TSG-RAN WG2 Meeting #123bis R2-23xxxxx

Xiamen, China, October 9th – 13th, 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.

* [AT123bis][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

Including LSs and any rapporteur inputs (e.g. work plan)

Running CR rapporteurs of 37.340 (ZTE), 38.300 (China Telecom) and 38.331 (vivo) specifications are requested to provide latest versions running CRs as rapporteur input (which are not counted against the Tdoc limits)

R2-2309461 LS on Dual Tx/Rx Multi-SIM (R4-2314465; contact: MediaTek) RAN4 LS in Rel-18 NR\_DualTxRx\_MUSIM-Core To:RAN2

- Xiaomi asks the clarify whether the 2nd part is only for keep solution. MTK think it is for all the approaches.

* Noted

R2-2309789 [Post123][MUSIM] Remaining Open Issues (vivo) vivo other Rel-18 NR\_DualTxRx\_MUSIM-Core

* Noted

R2-2309790 Running RRC CR for NR MUSIM enhancements vivo draftCR Rel-18 38.331 17.6.0 NR\_DualTxRx\_MUSIM-Core

- vivo clarifies this include also some potential agreements from the long email discussions.

- Ericsson comments that some wording refinement would be necessary in a later phase.

* Take as baseline for further updates.

R2-2309891 Draft running CR to 38.331 for MUSIM UE Capabilities Huawei, HiSilicon draftCR Rel-17 38.331 17.6.0 NR\_DualTxRx\_MUSIM-Core

* Take as baseline for further updates.

R2-2309892 Draft running CR to 38.306 for MUSIM UE Capabilities Huawei, HiSilicon draftCR Rel-17 38.306 17.6.0 NR\_DualTxRx\_MUSIM-Core

* Take as baseline for further updates.

R2-2310918 38.300 Running CR for NR MUSIM enhancements China Telecommunications draftCR Rel-18 38.300 17.6.0 NR\_DualTxRx\_MUSIM-Core

* Take as baseline for further updates.

R2-2310921 38.300 Running CR for NR MUSIM enhancements China Telecommunications draftCR Rel-17 38.300 17.6.0 NR\_DualTxRx\_MUSIM-Core Withdrawn

R2-2311040 37.340 Running CR for Introduction of MUSIM ZTE Corporation, Sanechips draftCR Rel-18 37.340 17.6.0 NR\_DualTxRx\_MUSIM-Core

* Take as baseline for further updates.

### 7.17.2 Procedures for MUSIM temporary capability restriction

Discussion on LCID usage is handled in the main session jointly

Remaining aspects for “proactive” and “reactive” procedures, including output of [Post123][234][MUSIM] UE preferred frequency (vivo)

Including discussion on how UE-network interaction works when UE requests capability restriction (e.g. is there a timer to control when UE applies capability restrictions if network doesn’t provide a reply)

Email discussion report (proposals on the procedure)

R2-2309791 Report of [Post123][234][MUSIM] UE preferred frequency (vivo) vivo report Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1 [13/13] For proactive UE temporary capability reporting, UE reporting of its impacted frequency ranges is sufficient and there is no need for UE to additionally report preferred.*

*Proposal 2 [10/13] UE can indicate impacted band(s) in a BC for the proactive reporting, detailed signalling is FFS.*

*Proposal 3 [11/13] UE is allowed to only report the impacted band(s) based on a frequency/band filter list (e.g. frequencies/bands) configured by the network.*

*Proposal 4 [13/13] UAI based signalling is also used for proactive reporting of temporary UE capability restriction.*

*Proposal 5 [8/13] A single enable/disable configuration is applied for both “Proactive approach” and “Reactive approach”.*

*Proposal 6 [12/13] One configuration is used to control all temporary capabilities update.*

P1:

- OPPO fine with the intention, but want to understand the meaning of frequency ranges.

* For proactive UE temporary capability reporting, UE reporting of the information regarding its impacted frequency is sufficient.

P2:

* UE can indicate impacted band(s)/frequencies in a BC for the proactive reporting, detailed signalling is FFS.

P3:

- *UE is allowed to only report the impacted band(s) based on a frequency/band filter list (e.g. frequencies/bands) configured by the network.*

- QC thinks this is an optimization. Samsung agrees, and think this helps the UE to determine what to report.

- CATT want to understand how the filter works.

- QC thinks this is optional configuration.

* UE is allowed to only report the impacted band(s)/frequencies based on a frequency/band filter list (e.g. frequencies/bands), if configured by the network.

P4:

* UAI based signalling is also used for proactive reporting of temporary UE capability restriction.
* One configuration is used to control all temporary capabilities update

*??Proposal 5 [8/13] A single enable/disable configuration is applied for both “Proactive approach” and “Reactive approach”.*

- Samsung thinks this depends on other discussions, and we should not agree for now.

- Rapp thinks it is fine the consider this in later stage.

Timer related

*Chair: different timer proposals will be discussed seperately, e.g., wait timer, prohibit timer, etc.*

R2-2309715 Further discussion on the MUSIM temporary capability restriction China Telecom Corporation Ltd. discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 4: Introduce the prohibit timer for MUSIM capability restriction report to avoid overloading signalling messages .*

*Proposal 5: Introduce the wait timer for reactive MUSIM capability restrictions reporting to address the UE behavior when no response was received from NW.*

*Proposal 6: When UE receives RRCReconfiguration message in which the configuration related to MUSIM capability is different from the previous one, the wait time can be stopped.*

*Proposal 7: In reactive approach, Upon expiry of the wait timer, UE can reduce the capability locally, FFS whether the UE can request the RRC release on network A.*

R2-2311108 Timer based restriction in MUSIM LG Electronics Deutschland discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1. A timer is introduced to allow the UE to perform the temporary capability restriction upon expiry of the timer.*

*Proposal 2. The UE starts the timer when the UE requests a temporary restriction to the network if the timer is configured. The UE stops the timer when receiving a response to the request for a temporary restriction.*

*Proposal 3. Upon the timer expiry, if the UE requests SCell release or SCG release, the UE performs the SCell release or the SCG release as requested earlier.*

*Proposal 4. Upon the timer expiry, if the UE requests a MIMO capability update for maximum MIMO layer or DL/UL MIMO layer information on affected serving cell(s), the UE applies the MIMO configuration to the related serving cell(s) as requested earlier.*

R2-2309890 Discussion on procedures for temporary capability restriction Huawei, HiSilicon discussion Rel-18

*Proposal 2: Introduce a timer for reactive approach for reporting of temporary capability restriction in UAI. The timer starts when the UE sends the UAI, and stops when a response matching the UAI from the NW is received. The timer length is configured by the NW.*

*Proposal 3: When the timer is running:*

*- if the UE transmits the preference for SCell(s)/SCG to be affected in the UAI, and the NW provides the RRC reconfiguration or MAC CE to release or deactivate the corresponding SCell/SCG; and*

*- if the UE transmits the preference for maximum MIMO layers in the UAI, and the NW provides the RRC reconfiguration with maximum MIMO layer configuration as requested in the UAI; and*

*- if the UE transmits the preference for measurement gap requirement in the UAI, and the NW provides the RRC reconfiguration compatible with the UAI (i.e. RRC reconfiguration with gap configured for the measured frequencies/serving cells, which requires gap in the UAI);*

*- the UE stops the timer.*

*Proposal 4: After the timer expires:*

*- if the UE transmits the preference for SCell(s)/SCG to be released or deactivated in the UAI, the UE releases or deactivates the SCell/SCG;*

*- if the UE transmits the preference for maximum MIMO layers in the UAI, the UE applies the maximum MIMO layer configuration suggested in the UAI for the corresponding serving cell or for all the BWPs of the corresponding serving cell;*

*- if the UE transmits the preference for measurement gap requirement in the UAI, the UE may not perform gap-less measurement on the frequencies/serving cells if requires gap in the UAI.*

*Proposal 6: No prohibit timer is defined for the UAI for R18 MUSIM purpose.*

Discussion on ‘wait timer’ based on the three papers above

- Intel wonders why network does not respond in the first place. QC thinks this is useful in some cases and thus support to introduce a wait timer.

- Ericsson asks whether UE just goes back to idle, don't think it is good to do reduced configuration.

- Regarding the stop condition, Intel thinks ‘any reconfiguraiton’ is not a good way, since configuration can be for various purposes. LG thinks there should be some condition, e.g., the reconfiguration solves the capability restriction issue for the UE. CT thinks we can add ‘if the reconfig’ contains something related to the capabilities that UE reported restriction.

- For behaviour upon expiry, Xiaomi do not think it is necessary to specify detailed behaviour. QC think this is necessary. ZTE also think it useful to specify detailed behaviour. CATT thinks expiry is not a normal case so prefer a simple solution. Samsung shares this view.

- Nokia thinks if UE do something locally, e.g., releasing SCG, it should be known by the network.

- China Telecom think it useful to specify UE behaviour than simply going to Idle. LG also think so.

- OPPO think it is up to UE implementation and thinks some high level description is sufficient.

- WI rapp: It is OK to stay on high level, seems to be a good compromise.

* We will introduce ‘wait timer’ for the reactive approach
	+ - The UE starts the timer when the UE requests a temporary restriction to the network if the timer is configured. We assume network configures the length for this timer.
		- Stop: if UE receives reconfiguration that does not exceed the capabilities that UE suggested via capability restriction report
		- Expiry: UE can apply the temporary UE capability restriction upon the timer expiry.

Discussion on ‘prohibit timer’ based on the CT and Huawei papers

- QC do not think it useful. Nokia think this is different from R17 since UE may request different things. Samsung think we can consider zero value for the timer as a compromise.

- HW asks whether we have this timer also for reactive case

* We will introduce ‘prohibit timer’ for the proactive approach (Network can set zero value for this timer, details can be handled in spec drafting phase)

Removal of capacity restriction

R2-2309793 Procedures for MUSIM temporary capability restriction vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 4 The UE can remove the MUSIM capability restriction information by not including the detailed fields in Rel-18 MUSIM field in the UAI.*

R2-2311014 Further analysis on signalling procedure for capability restriction Nokia, Nokia Shanghai Bell discussion

*Proposal 8: Indication to the restoration of full capability is included as an additional parameter in RRC Reconfiguration completion and measurement report instead of a separate UAI for this scenario.*

*Proposal 9: A simple indication of the change in capability is triggered on partial removal of capability restriction to allow NW to obtain the complete restricted capability information via separate signaling.*

*-* Samsung want to clarify how it works in details, e.g., what if UE send another different report? Apple thinks the vivo proposal works and it is simple.

* The UE can remove the MUSIM capability restriction information by not including any fields in capability restriction report (details will be handled in the specification drafting).

*Chair: other critical issues (if any) can be discussed in the CB session. Details TBD.*

R2-2309553 Remaining Issues on Procedures for MUSIM Temporary Capability Restriction OPPO discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310031 Early capability restriction indication in ResumeRequest Intel Corporation discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310171 Control signaling for Dual-Active MUSIM Qualcomm Incorporated discussion

R2-2310318 Procedures for MUSIM temporary capability restriction Apple discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310583 Timer control for capability restriction Xiaomi discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310592 Discussion on temporary capability restriction Samsung discussion

R2-2310648 Procedures for MUSIM temporary capability restriction NEC discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310966 Indication of restricted capabilities at RRC Setup and Resume by MUSIM UE Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core Revised

R2-2310967 Discussion on MUSIM timers Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2311041 Consideration on the Temporary Capability Reporting procedure ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2311098 Supporting Proactive cases in other scenarios LG Electronics Inc. discussion Rel-18 NR\_DualTxRx\_MUSIM-Core R2-2308788

R2-2311099 Procedures for MUSIM temporary capability restriction DENSO CORPORATION discussion NR\_DualTxRx\_MUSIM-Core

R2-2311107 Timer based restriction in MUSIM LG Electronics France discussion Rel-18 NR\_DualTxRx\_MUSIM-Core Late

R2-2311238 Indication of restricted capabilities at RRC Setup and Resume by MUSIM UE Ericsson discussion Rel-18 R2-2310966

### 7.17.3 Allowed MUSIM temporary capability restrictions

Remaining aspects for the allowed capabiltity restriction reporting (e.g. which capabilities can be coordinated, how are the restrictions signalled, etc.)

Signaling design

R2-2311015 On specific capabilities for restriction and feature interworking scenarios Nokia, Nokia Shanghai Bell discussion

*Proposal 1: Change in measurement gap requirements is reported using UAI. The modification in gap requirement is reported as a change over the first NeedForGapInfo reported from UE.*

*Proposal 2: NW may optionally configure the UE to report the change in gap requirements for the frequencies /bands configured for measurements.*

R2-2309843 Details of allowed MUSIM temporary capability restrictions Huawei, HiSilicon discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 4: The UE can indicate the temporary capability restriction of measurement gap for R18 MUSIM purpose in the UAI by using the existing needForGapInfoNR.*

*Proposal 5: The UE indicates the change of measurement gap capability based on the current RRC configuration.*

- OPPO thinks this is only used for reactive case and the legacy mechanism works.

*-* Samsung agrees with P4 in HW proposal. QC agree as well. HW thinks the legacy mechasnism is not always sufficient.

*-* Ericsson wants to add separate information in UAI to trigger the NW’s reconfig. Samsung understands this takes more time and it not necessary.

* The UE can indicate the temporary capability restriction of measurement gap for R18 MUSIM purpose in the UAI by using the existing NeedForGapInfoNR.

On maximum MIMO layers/bandwidth restriction

R2-2310965 On some restricted capabilities for Rel-18 MUSIM UE Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 1 Rel-18 MUSIM UE indicates restricted frequencies to be avoided for serving cells based on Nw-provided candidate serving frequency list.*

*Proposal 2 Rel-18 MUSIM UE indicates preference on reduced max number of CCs in UL/DL*

*Proposal 3 Rel-18 MUSIM UE indicates preference on max number of MIMO layers per FRx and per UL/DL*

R2-2311042 Consideration on the Temporary Capability Reporting ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 4: Ran 2 to confirm the below agreement is only for the reactive case.*

*- Maximum MIMO layers/bandwidth restriction is reported per CC*

*Proposal 5: For the MIMO layer and Bandwidth reporting in the proactive case, if per FSPC (per cc per BC) granularity can’t be accepted because of the complexity, per Band per BC granularity can be considered.*

P4:

- HW thinks per CC is for proactive case. QC thinks it is for both proactive approach and reactive approach.

- vivo thinks it is OK to confirm at least for reactive case, per cc granularity is supported. For the proactive case, it requires further discussion.

* It is confirmed that the previous agreement that Maximum MIMO layers restriction (and bandwidth restriction, if supported) is reported per CC at least applies for the reactive approach.

Discussion on the granularity for the proactive case:

- Ericsson thinks per CC per band is too complicated report. Samsung share this view and on the other hand the granularity is different to decide for now, i.e., after the report details for the proactive case have been discussed.

- QC thinks per CC is OK and we can start from here.

* Baseline for the proactive approach: Maximum MIMO layers restriction (and bandwidth restriction, if supported) is reported *per FSPC (per cc per BC)*.

*Chair: other critical issues (if any) can be discussed in the CB session. Details TBD.*

R2-2309554 Allowed MUSIM Temporary Capability Restrictions OPPO discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2309792 Discussion on temporary capability restriction for Rel-18 Multi-SIM vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310090 Allowed MUSIM temporary capability restrictions Samsung R&D Institute India discussion Rel-18

R2-2310319 Aspects of allowed MUSIM temporary capability restriction Apple discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310582 Clarification on srs-TxSwitch and MIMO-layer for MUSIM Xiaomi, vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

### 7.17.4 Other

Other remaining aspects, including e.g., aspects related to the RAN4 incoming LS, and UE capabilit(ies).

This agenda item may be deprioritized in this meeting.

*Chair: if time allows, we will start with gap priority related aspect in Monday’s session.*

Gap prioirty realted

R2-2311135 Discussion on MUSIM gap priority MediaTek Inc. discussion

*Proposal 1: RAN2 confirms that no need to request gap priority or configure gap priority for aperiodic gap. Below editor note from running CR could be removed.*

*• Editor’s Note: FFS musim-GapPriorityToAddModList-r18 is for aperodic MUSIM gap.*

*Proposal 2: Introduce single bit indication in MUSIM assistance information to indicate the UE preference of “keep” option.*

*Proposal 3: Reuse existing control flag (i.e. musim-GapPriorityAssistanceConfig-r18 in running CR) to indicate whether the UE could include “keep” option for MUSIM gap.*

*Proposal 4: The prohibit timer configuration for R17 MUSIM gap preference (i.e. musim-GapProhibitTimer) is also apply to R18 MUSIM gap priority preference.*

UE Capabilities

R2-2309844 Discussion on MUSIM gaps and UE capabilities Huawei, HiSilicon discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal 6: For temporary capability restriction mechanism, the following UE capabilities are introduced in per-UE level without xDD/FRx differentiation:*

*- 1 optional bit to indicate the support of “proactive solution”;*

*- 1 optional bit to indicate the support of “reactive solution”;*

*- The support of “early MUSIM indication” is optional without capability signalling, a UE supporting “early MUSIM indication” shall at least support “proactive solution” or “reactive solution”.*

R2-2311043 Consideration on the MN-SN Coordination for the MUSIM ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2309794 Discussion on MUSIM gap priorities vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310032 Feature interaction between R17 and R18 MUSIM Intel Corporation discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310038 Further discussion on MUSIM gap priorities Samsung Electronics Czech discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310584 Remaining issues of MUSIM gap Xiaomi discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2310917 MUSIM gap priority handlling China Telecommunications discussion

R2-2311016 MUSIM Gap collision handling Nokia, Nokia Shanghai Bell discussion

## 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, running CRs submitted by the spec rapporteurs for discussions and endorsements), incoming LS etc.

Email report from [Post123][851][MIMOevo] RRC running CR for MIMO evo (Ericsson)

R2-2309410 LS to RAN2 on CBSR for Rel-18 MIMO (R1-2308396; contact: Samsung) RAN1 LS in Rel-18 NR\_MIMO\_evo\_DL\_UL To:RAN2

=> Withdrawn

R2-2309850 Running CR for TS 38.321 for MIMO Evolution Samsung draftCR Rel-18 38.321 17.6.0 B NR\_MIMO\_evo\_DL\_UL-Core

- OPPO think this version is for info and we can check later when we had more discussions.

- LG has comment on ‘per TRP’ vs ‘per serving cell’. Samsung clarifies the current behaviour captured is for the case when both TAT are expired.

* Noted. Will be used as baseline for further updates.

R2-2310611 Running CR for Introduction of MIMO Evolution Ericsson draftCR Rel-18 38.331 17.6.0 NR\_MIMO\_evo\_DL\_UL-Core

* Noted. Will be used as baseline for further updates.

R2-2310819 Report for Post 123 MIMOevo RRC Ericsson discussion NR\_MIMO\_evo\_DL\_UL-Core

* Revised in R2-2311290

R2-2311290 Report for Post 123 MIMOevo RRC

*Proposal 1 In IE ControlResourceset, add value “None” to applyIndicatedTCI-State (first, second, both, none) and do not configure with followUnifiedTCI-State-r17. FFS if the same can be achieved if this field is not included at all.*

*Proposal 2 Configure the parameter applyIndicatedTCIState-r18 per PUCCH resource and not additionally to PUCCH groups*

 *Proposal 4 In IE SRS-Config applyIndicatedTCIState-r18 and followUnifiedTCI-StateSRS are configured separately for r18 mTRP and r17 sTRP. -Cond is added:*

*FollowUTCI The field is absent if the field followUnifiedTCI-State is present. Otherwise, it is optionally present, Need R.*

*Proposal 5 Do not use numberOfSDCombinations and numberOfSDCombinations-PS*

*Proposal 6 IN IE TDCP(new) in IE CSI-ReportConfig The value of Y can be deferred from the list length of delayDSetofLenghtY-r18*

*Proposal 7 Move parameter m (aperiodicResourceOffset-r18) from IE NZP-CSI-RS-ResourceSet to IE CodebookConfig-r18 under typeII-Doppler-r1 and specify relation in field description.*

*Proposal 9 For codebook config:*

*As baseline assumption CodebookConfig is critically extended.*

*Field description for n1-n2-codebookSubsetRestrictionList includes configuration restriction for same n1-n2 for each element.*

*Optionality of n1-n2-codebookSubsetRestrictionList is removed to ensure at least one element is included.*

*Optionality and field description need further review and it can be considered to send LS from next meeting for RAN1 to review the optionality of the parameters, FFS other things.*

*Proposal 10 Wait for Ran1 input for ”applyIndicatedTCIState should be added within the PDCCH-ConfigCommon to indicate whether/which TCI state to be applied for corset 0”*

* *In IE ControlResourceset, add value “None” to applyIndicatedTCI-State (first, second, both, none) and do not configure with followUnifiedTCI-State-r17. FFS if the same can be achieved if this field is not included at all.*
* P2, P4-7, P9-P10 are taken as baseline for further stage 3 specification development.
* The filed description for *CSI-AssociatedReportConfigInfo will be updated, using P3 in R2-*2311290 as baseline. Details to be further checked.

Chair: we can send LS to RAN1 on the RRC parameters if needed.

*Proposal 3 In IE CSI-AssociatedReportConfigInfo configure:*

 *applyIndicatedTCI-State-r18 CHOICE {*

 *perset-r18 ENUMERATED {first, second}*

 *perresource-r18 SEQUENCE (SIZE(1..maxNrofAP-CSI-RS-ResourcesPerSet)) OF ENUMERATED {first, second}*

*qcl-info, qcl-info2*

*List of references to TCI-States for providing the QCL source and QCL type for each NZP-CSI-RS-Resource listed in nzp-CSI-RS-Resources of the NZP-CSI-RS-ResourceSet indicated by resourceSet within nzp-CSI-RS. Each TCI-StateId refers to the TCI-State which has this value for tci-StateId and is defined in tci-StatesToAddModList or in dl-OrJointTCI-StateList in the PDSCH-Config included in the BWP-Downlink corresponding to the serving cell and to the DL BWP to which the resourcesForChannelMeasurement (in the CSI-ReportConfig indicated by reportConfigId above) belong to. First entry in qcl-info corresponds to first entry in nzp-CSI-RS-Resources of that NZP-CSI-RS-ResourceSet, second entry in qcl-info corresponds to second entry in nzp-CSI-RS-Resources, and so on (see TS 38.214 [19], clause 5.2.1.5.1). When the UE is configured with two SRS resource sets with usage set to Codebook or nonCodebook and this field is absent for aperiodic CSI RS, the UE shall use QCL information included in the "indicated" DL only/Joint TCI state as specified in TS 38.214 or when the UE is configured with more than one value for the field coresetPoolIndex in the DL BWP used to trigger the CSI-report and this field is absent for aperiodic CSI RS, the UE shall use QCL information included in the "indicated" DL only/Joint TCI state as specified in TS 38.213 [13], clause 10.1*

R2-2311127 Draft 38.300 CR for introduction of 2-TA enhancement NTT DOCOMO, INC. draftCR Rel-18 38.300 17.6.0 B NR\_MIMO\_evo\_DL\_UL-Core

- DCM explains that only the part related to 2TA has been captured. And we can send LS to RAN1 for them to check this draft CR.

- CATT think we can have a LS to RAN1.

* Noted. Will be used as baseline for further updates. Will send to RAN1 for checking.

R2-2311167 L1 parameter Excel with rapporteur comments MIMOevo Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

* Noted

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

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

2-PTAG model and related behaviours

R2-2310587 Remaining issues for 2 TA handling of mTRP Xiaomi discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: RAN2 is kindly requested to confirm that the 2-PTAG model (i.e., both TAGs of SpCell are PTAGs) is used.*

*Proposal 2: When the TAT for STAG is expired and the other TAT is running for a serving cell (i.e., SCell), the UE does not perform the following behaviours for this serving cell:*

* flush all HARQ buffers;*

* notify RRC to release PUCCH, if configured;*

* notify RRC to release SRS, if configured;*

* clear any configured downlink assignments and configured uplink grants;*

* clear any PUSCH resource for semi-persistent CSI reporting;*

*Proposal 3: when the TAT for PTAG is expired and the other TAT is running for a serving cell (SpCell or SCell), the UE does not perform the following behaviours for this serving cell:*

* flush all HARQ buffers;*

* notify RRC to release PUCCH, if configured;*

* notify RRC to release SRS, if configured;*

* clear any configured downlink assignments and configured uplink grants;*

* clear any PUSCH resource for semi-persistent CSI reporting;*

R2-2310847 UL time alignment in multi-DCI based multi-TRP with two TAs InterDigital discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: Agree to the following modified working assumption from RAN2#123:*

*- We will use the 2-PTAG model, i.e., both TAGs of SpCell are PTAGs;*

*o When the TAT for STAG is expired and the other TAT is running for a serving cell (i.e., SCell), no impact to the TRP with running TAT; 1 and 3-7 are applied to the TRP with TAT expired,*

*o when the TAT for PTAG is expired and the other TAT is running for a serving cell (SpCell or SCell), no impact to the TRP with running TAT; 1 and 3-7 are applied to the TRP with TAT expired.*

R2-2311188 Handling of two TAGs associated with a Serving Cell Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: If a TAT of a TAG associated with a Serving Cell expires (while the Serving Cell is configured with two TAGs), the UE performs all the same actions for the Serving Cell as in the legacy.*

TAG ID indication in RACH procedure (intra-cell case)

R2-2309690 TAG modeling and TAT expiry in 2TAs mTRP LG Electronics Inc. discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 5. One R bit in Absolute TAC MAC CE is used to indicate TAG ID, i.e. which TAG’s TA is updated.*

*Proposal 6. One R bit in RAR is used to indicate TAG ID, i.e. which TAG’s TA is updated.*

TAG ID indication in RACH procedure (inter-cell case)

R2-2311003 Remaining issues on 2TA for mTRP Huawei, HiSilicon discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 4: For inter-cell multi-DCI based multi-TRP operation, TAG ID is not included in the RAR and absolute TA command MAC CE, i.e. the UE can know the TAG information based on the RACH configuration which the UE has used.*

R2-2309913 Discussions on Two TAs for Multi-DCI Multi-TRP CATT discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 3: For the inter-cell scenario, reuse the mechanism agreed for intra-cell case, i.e., use the RA RAR to indicate the TAG.*

*Proposal 4: Using one reserved bit to indicate the TAG ID via the Absolute TA Command MAC CE.*

RRC aspects (e.g., PRACH configuration for inter-cell CFRA)

R2-2311251 On 2TA operation RRC parts Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 5 Do not extend RACH-Configdedicated for additionalPCI.*

*Proposal 6 RAN2 extend the PRACH configuration in the BWP-UplinkCommon.*

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

*Chair: other critical issues (if any) can be discussed in the CB session. Details TBD.*

R2-2309665 Discussion on multiple TAG OPPO discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2309912 Consideration on the TAG Indication upon CBRA CATT discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2309953 Discussion on the impacts of Two TAs for multi-DCI multi-TRP operation Lenovo discussion Rel-18

R2-2309954 Discussion on the UE-initiated RACH procedure in multi-TRP operation Lenovo discussion Rel-18

R2-2309955 Consideration on RLF in multi-TRP operation Lenovo discussion Rel-18

R2-2310063 Open issues on two TAs for multi-DCI multi-TRP Samsung Research America discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2310101 Further Discussion on RACH for mDCI mTRP with 2TA enhancement ZTE Corporation,Sanechips discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2310103 On RRC parameter for mDCI mTRP with 2TA enhancement ZTE Corporation,Sanechips discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2310193 Discussion on two TAs for multiple TRPs SHARP Corporation discussion NR\_MIMO\_evo\_DL\_UL-Core

R2-2310315 Support of Two TAs for multi-DCI multi-TRP Apple discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2310809 Discussion on multi-DCI multi-TRP with two TAs Qualcomm Incorporated discussion NR\_MIMO\_evo\_DL\_UL-Core

R2-2310932 MAC issues for multi-DCI multi-TRP with two TAs Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

´: Revised in R2-2311252

R2-2311252 MAC issues for multi-DCI multi-TRP with two TAs Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2311125 Current status of functional issues on 2TA enhancement NTT DOCOMO, INC. discussion Rel-18

R2-2311169 On 2TA operation RRC parts Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

´: Revised in R2-2311251

R2-2311187 RA procedure while SpCell is configured with 2 TAGs Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

### 7.20.3 Unified TCI extension to mTRP operation

Remaining open issues on unified TCI extension to mTRP operation, including the cases for sDCI and mDCI

*Chair: if time allows, we will discuss sDCI related aspects in the Monday’s session.*

sDCI

R2-2309849 Remaining Issues on Single-DCI based unified TCI extension to multi-TRP operation Samsung discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: RAN2 confirm that separate MAC CEs on the enhanced unified TCI state for Single-DCI based multi-TRP operation are introduced for joint TCI State and separate DL/UL TCI States, respectively.*

*Proposal 2: The simultaneous TCI state update for the RRC configured serving cell sets are supported in Rel-18 enhanced unified TCI state activation/deactivation MAC CE(s) for multi-TRP operations.*

*-* Samsung clarifies that there is no real issue if we use separate MAC CEs for the joint and separate cases.

R2-2310906 Design of MAC CE for Rel-18 MIMO Nokia. Nokia Shanghai Bell discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

*Proposal 1: Reuse MAC CE for unified TCI state activation as defined TS38.321 clause 6.1.3.47 for mDCI by replacing one R-bit with CORESET pool index (e.g. as shown below).*

 *Proposal 2: Define new MAC CE (with eLCID) for joint TCI state activation with sDCI (e.g. as shown below).*

 *Proposal 3: Define another new MAC CE (with eLCID) for separate TCI state activation with sDCI (e.g. as shown below).*

* RAN2 confirm that separate MAC CEs on the enhanced unified TCI state for Single-DCI based multi-TRP operation are introduced for joint TCI State and separate DL/UL TCI States, respectively.
* The current running CR for MAC spec is used as the base line. Details can be further discussed.

R2-2309666 Discussion on MAC CE design for mTRP OPPO discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2309691 Discussion on Unified State MAC CE for mDCI LG Electronics Inc. discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2309693 Discussion on Unified State MAC CE for sDCI LG Electronics Inc. discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2309743 Discussion on MAC CE design for MTRP CEWiT discussion

R2-2309914 Discussion on Unified TCI Framework Extension for sDCI and mDCI based Multi-TRP CATT discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2310064 Open issues on MIMO RRC parameters Samsung Research America discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2310102 Further DIscussion on remaining UP issues for MIMO-evo ZTE Corporation,Sanechips discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2311004 Extension of unified TCI framework for mTRP Huawei, HiSilicon discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2311128 Discussion on remaining issues on Unified TCI framework extension NTT DOCOMO INC., discussion Rel-18

### 7.20.4 Other

Other issues if not covered by 7.20.1, 7.20.2, and 7.20.3.

Depending on the number of contributions/proposals, a summary of this agenda item may be used.

*Chair: the following can be discussed in the CB session if time allows. Details TBD.*

R2-2311005 Overlapping UL grants handling for STxMP Huawei, HiSilicon discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2311130 Discussion on overlapping UL grants in STxMP NTT DOCOMO, INC. discussion Rel-18

R2-2311165 On other than 2TA parameters MIMOevo Rel18 Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

## List of post meeting email discussions

TBD