3GPP TSG-RAN WG2 Meeting #126 draft R2-2405702

Fukuoka, Japan May 20th – 26th, 2024

Source: RAN2 Vice Chairman (CATT)

Title: Report from session on R18 MIMOevo, R18 MUSIM, and R19 LP-WUS

## Orgnizational email discussion

* [AT126][200] Organizational – MIMOevo, MUSIM, and LPWUS (RAN2 VC)

Scope: a) Share plans and list of ongoing email discussions for the related sessions, and b) 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-233071](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_100/Docs/RP-231461.zip))

Time budget: 0 TU

Tdoc Limitation: 2 tdocs

### 7.17.1 Organizational

Rapporteur input, i.e., WI/Spec Rapporteur(s) are invited to provide updated open issues lists that need to be handled.

Incoming LS.

Corrections to TS 38.300.

R2-2404386 RILs\_conclusion\_MUSIM vivo(Rapporteur) other Rel-18 NR\_DualTxRx\_MUSIM-Core

* RILs with status ‘PropAgree’ are agreed.
* RILs with status ‘PropReject’ are rejected.

R2-2404387 Correction on NR MUSIM enhancements vivo CR Rel-18 38.331 18.1.0 4776 - F NR\_DualTxRx\_MUSIM-Core

R2-2404388 Correction on NR MUSIM enhancements vivo CR Rel-18 38.331 18.1.0 4777 - F NR\_DualTxRx\_MUSIM-Core

* Vivo explains the 1st one is what we already endorsed, and the 2nd one can be considered as baseline for further discussions. Vivo explains some new changes based on Huawei new RILs have been taken into account in the 2nd CR.
* Both CRs are noted. R2-2404388 is taken as baseline for further updates.

### 7.17.2 RRC

Corrections to RRC (other than UE capabilities, which should be submitted to 7.17.3).

Discussions and proposals on the RRC open issues if listed by Rapporteur(s) or triggered by LSs, etc..

RILs

R2-2404610 [Z103][Z115][Z117] Discussion on MUSIM RILs vivo discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2404719 [RIL Z116] [RIL Z103] Consideration on the MUSIM UAI Reporting ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2404744 [RIL Z115] [RIL Z117] Correction to the MUSIM Gap Configuration ZTE Corporation, Sanechips, Samsung discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

Z103

* ZTE points out some condition may be needed based on offline discussion. vivo do not think the added condition ‘the UE supports the capability of the nr-NeedForGap-Reporting-r16’ needed.

Samsung and Huawei think vivo changes are ok.

* Ericsson think it is better to replace ‘measurement gap requirement information’ with some filed names.
* Z103 is agreed, and changes proposed in R2-2404610 taken as baseline. Can further improve the wordings (e.g., replacing some parts with exact field names)

Z116

* Vivo agrees, because different behaviours are needed for the two cases, i.e., the parent IE does not exist or it is reported but it’s empty. Xiaomi also agree, and think there is a typo. Ericsson also agree. Samsung wonders whether there is anything wrong.
* Samsung and Nokia think some further checking is needed.

Chair: will check in the CB.

Z115 & Z117

* Both RILs are agreed. TPs in R2-2404744 taken as baseline. Can further improve the wording.

Timer related

R2-2404706 Discussion on stopping of the wait timer Huawei, HiSilicon discussion

* Samsung and LG E think P3 is not needed. Vivo think it is OK.
* For P3, only the change ‘transmitted -> indicated’ is agreed, other parts not pursued.

R2-2405537 Wait Timer Stop Handling LG Electronics discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

* Nokia think Huawei P1&P2 and its TP is good.
* LG E think we already agree to include something to the procedure text. also ok with using Huawei TP as baseline.
* TP for 5.3.5.3 from R2-2404706 is taken as baseline, with ‘resulting from the RRCReconfiguration’ removed. Can further improve the wording.

R2-2405642 Discussion on UE behavior upon T348 stop and T348 expiry Samsung Electronics Czech discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

*Proposal #1: RAN2 to confirm which understanding is correct upon T348 expriy:*

*- Understanding #1: UE autonomously releases dedicated configuration associated with musim-CapRestriction.*

*- Understanding #2: UE still considers the latest configuration as the current configuration but does not perform any required behaviors about dedicated configuration associated with musim-CapRestriction.*

P1

* QC, Intel, Huawei think #2 is correct.
* Samsung want to check the intended UE behaviour for the case of PScell release, and think this in this caes UE can just release the SCG configuration. ZTE think this create issue if later UE receive more configurations for SCG.
* Intel think SCG release is a corner case and do not require a normative behaviour. Nokia, CATT agree.
* Samsung think we can confirm #2 and we need to remove ‘releases SCG’ from the informative table.

?? Understanding #2 is confirmed.

?? ‘UE may apply the temporary capability restriction that SCG is not supported if ServCellIndex of PSCell was included in indicated MUSIM-CellToRelease-r18, UE releases SCG.’ Is removed from the informative table.

?? No other changes required to RRC spec.

Chair: can discuss in later stage, with the understanding that this is mainly about improving the informative table and it does not impact the RRC procedure text.

R2-2405689 Discussion on clarification of the action upon T348 expiry China Telecom Corporation Ltd. discussion NR\_DualTxRx\_MUSIM-Core

Other issues

R2-2405641 Discussion on PSCell release for MUSIM operation Samsung Electronics Czech discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2405191 Additional capability restrictions related to measurement gaps Nokia discussion

R2-2404745 Consideration on the Reconfiguration Failure Processing When T348 is Running ZTE Corporation, Sanechips discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2404792 SpCells in MUSIM capability restriction signalling Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2404793 Intra-band CA in MUSIM capability restriction signalling Ericsson discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

R2-2405192 Clarification on DAPS Handover for MUSIM Dual TX/RX operation Nokia discussion

R2-2404242 Discussion on restriction of per FR/UE report for maximum CC number Huawei, HiSilicon discussion Rel-18 NR\_DualTxRx\_MUSIM-Core

### 7.17.3 Other

UE capabilities related corrections.

Corrections to TS 37.340.

Other issues if not covered by the previous agenda items.

R2-2404478 Clarification to R18 MUSIM UE Capabilities Huawei, HiSilicon draftCR Rel-18 38.306 18.1.0 NR\_DualTxRx\_MUSIM-Core

* ZTE suggest to improve the wording as ‘For a UE supporting nr-NeedForGap-Reporting-r16, this field also indicates UE supports providing musim-NeedForGapsInfoNR-r18 with temporary capability restriction as defined in TS 38.331 [9].’
* The CR is endorsed in R2-2405731 for inclusion in the mega CR, with the update ‘for a UE supporting nr-NeedForGap-Reporting-r16, this field also indicates UE supports providing musim-NeedForGapsInfoNR-r18 with temporary capability restriction as defined in TS 38.331 [9].’

R2-2405731 Clarification to R18 MUSIM UE Capabilities

* The CR is endorsed, as per the previous agreement

## 7.20 NR MIMO evolution

(NR\_MIMO\_evo\_DL\_UL-Core; leading WG: RAN1; REL-18; WID: [RP-233028](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_98e/Docs/RP-223276.zip))

Time budget: 0TU

Tdoc Limitation: 2 tdoc

### 7.20.1 Organizational

Rapporteur input, i.e., WI/Spec Rapporteur(s) are invited to provide updated open issues lists that need to be handled.

Incoming LS.

Stage 2 corrections.

R2-2404215 Correction to MIMO Evolution Ericsson CR Rel-18 38.331 18.1.0 4775 - F NR\_MIMO\_evo\_DL\_UL-Core

* Ericsson think this is basically the endorsed version, with one editorial change.
* Noted, will be updated after the meeting.

R2-2405589 Clarification of PDCCH ordered CFRA for 2TA NTT DOCOMO, INC., Samsung draftCR Rel-18 38.300 18.1.0 F NR\_MIMO\_evo\_DL\_UL-Core

* Xiaomi think the intention is OK, but suggest to change ‘second TA’ to ‘TA of another TAG’.
* Ericsson think the wording can improve.
* Nokia think this is not entirely correct and think the TA can also be obtained via CBRA. Samsung think this for the case when the timing of ‘2nd TA’ is initially established.

Chair: We will try to agree it after wording improvement in the CB.

R2-2405732 Clarification of PDCCH ordered CFRA for 2TA

* ? Agreed

### 7.20.2 MAC

Corrections to MAC.

Discussions and propsoals on the open issues if listed by Rapporteur(s) or triggered by LSs, ect..

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

*Proposal 1: For Rel-18 multi-entry PHR MAC CE for STx2P, if conditions for PHR are met,*

*- if the active BWP of a serving cell is configured with multipanelSchemeSDM or multipanelSchemeSFN for twoPHRmode, two type 1 PH values and the corresponding two Pcmax values are reported;*

*- if the active BWP of a serving cell is configured with multiple TRP PUSCH repetition (i.e., not configured with multipanelSchemeSDM or multipanelSchemeSFN) for twoPHRmode, two type 1 value and the corresponding Pcmax are reported; (whether one type 3 PH instead of two type 1 values is reported can be discussed separately which depends on RAN1 reply)*

*- otherwise, one type 1 or type 3 PH value and the corresponding Pcmax value are reported as Rel15/16.*

* OPPO think it is safer to wait for R1 reply. LG E think P1 is aligned with R1 spec, so agreeable.
* LG E think with the TP for P1, there is misalignment btw R1 and R2 spec.
* ZTE think the TP should reflect ‘active BWP of a serving cell’.
* QC ok with P1 and think detailed changes can be further checked.
* RAN2 assume P1 is agreeable, unless otherwise informed by R1 reply LS. Detailed changes can be checked further.

Proposal 2-1: In PHR procedure, the procedure similar to multi-entry PHR is applied for single-entry PHR, to capture “instruct the Multiplexing and Assembly procedure to generate and transmit the Enhanced Single Entry PHR for multiple TRP STx2P MAC CE”.

Proposal 2-2: For proposal 2-1, adopt the TP in Appendix 5.2 for TS 38.321 clause 5.4.6.

* P2-1 is agreed. TP in Appendix 5.2 for TS 38.321 clause 5.4.6 is taken as baseline. Detailed changes can be checked further.

*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.

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.

*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.

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

* Noted
* Discuss the remaining issues for MAC in offline, and check the proposals in CB.
* [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

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

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

R2-2405182 Cosideration On PHR and PHR MA CE for STxMP ZTE Corporation discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

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

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

* ? The 5 contributions above are noted

R2-2405733

### 7.20.3 RRC

Corrections to RRC, RILs.

Discussions and proposals on the open issues if listed by Rapporteur(s) or triggered by LSs, ect..

R2-2404214 Remaining aspects on RRC for MIMOevo Ericsson discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2405222 [H169] Configuration of RACH for MIMO with 2TA Huawei, HiSilicon discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

* Ericsson suggest to discuss the HW paper.

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

* Ericsson not sure whether P1 is needed in RRC, think it can be discussed in MAC.

Chair: document missing for Rapp’s RIL resolution proposal.

* Discuss the remaining issues for RRC in offline, and check the proposals in CB.
* [AT126][202][MIMOevo] Offline discussion on the remaining RRC issues (Ericsson)

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

Intended outcome: Summary and agreeable proposals in R2-2405734

Deadline: before CB session

R2-2405734

R2-2405172 Clarification on UE capability enquiry with codebook type request Samsung discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2405183 Consideration on 2TA RRC Aspect ZTE Corporation discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

R2-2405690 Aperiodic CSI report with 2 resources for channel measurement and unified TCI framework Huawei, HiSilicon discussion Rel-18 NR\_MIMO\_evo\_DL\_UL-Core

## 8.4 Low-power wake-up signal and receiver for NR (LP-WUS/WUR)

(NR\_LPWUS-Core; leading WG: RAN1; REL-19; WID: [RP-240801](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_103/Docs/RP-240801.zip))

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 8.4.1 Organizational

LS, Rapporteur input, including workplan, etc.

### 8.4.2 Procedure and configuration of LP-WUS in RRC\_IDLE/INACTIVE

Procedure and configuration of LP-WUS indicating paging monitoring triggered by LP-WUS, including at least configuration, sub-grouping and entry/exit condition for LP-WUS monitoring

Entry/exit condition

R2-2404460 Entering/Exit conditions, relaxed serving cell measurements on the main receiver and offload of measurements to LP-WUR Vodafone discussion Rel-19

*Proposal 2: It is proposed to define LP-WUR entering and exit conditions as follow:*

*• LP-WUR entering conditions are satisfied if corresponding thresholds as provided over broadcast using SIBs or dedicated signalling are fulfilled and the corresponding functionality is taken over by the LP-Receiver in accordance with the performance as defined by RAN WG4.*

*• LP-WUR exit conditions are satisfied if corresponding thresholds as provided over broadcast using SIBs or dedicated signalling are fulfilled and the corresponding functionality are taken over by the main receiver in accordance with the performance as defined by RAN WG4.*

R2-2404562 Discussion on LP-WUS in RRC\_IDLE/INACTIVE HONOR discussion Rel-19 NR\_LPWUS-Core

*Proposal 2: If the serving cell quality, e.g. legacy RSRP, (FFS the new measurement result based on LP-SS), is above configured threshold(s), UE can monitor LP-WUS and decide whether to monitor legacy (PEI) PO as indicated by LP-WUS.*

*Proposal 3: If the serving cell quality, e.g. legacy RSRP and / or the new measurement result based on LP-SS, is below a configured threshold, UE should monitor (PEI) PO as in legacy.*

Discussions:

* Xiaomi, Samsung, Huawei, Sony generally fine with the direction of having seving cell quality as the base of those conditions, but not sure why we need to discuss more procedures as in VDF’s paper. VDF clarifies that the paper discuss more than paging procedure.
* OPPO think R1 already have assumptions on entry/exit conditions, so not sure if we need to repeat the discussions in R2. QC share this view.
* Apple think R2 can first confirm R1’s working assumption on the conditions, and then see if in R2 we can progress further on the FFS parts.
* Huawei think it is convenient to use the terminologies such as MR/LR. CATT agrees.
* IDT, Ericsson agree with Honor, and think it is up to UE whether to monitor LP-WUS. Ericsson think we should first discuss what the UE does when the conditions are fulfilled, e.g., it is related to how measurements are done.
* Sony think entry condition is clear and it is based on MR, for exit condition it is based on LR.
* Vivo think from the comments almost all agree that R1’s assumption is agreeable. ZTE agree. ZTE think R1 assume that it is R2 to discuss the conditions, and ZTE think in R2 we should confirm that those conditions are provided by gNB to UE.
* RAN2 will further discuss the details about LP-WUS monitoring entry/exit conditions based on RAN1’s existing working assumptions.

Discussions based on Honor P2/3

- Xiaomi wonders whether ‘low mobility’ type of condition is included in these proposals or not. NEC think it should be considered. Honor think it is open for discussion. OPPO not sure why we need to consider low mobility, as now what matters is mainly coverage.

- ZTE, LG E fine with these proposals and ask do we also add RSRQ.

- LG E think we cannot force UE to do measurement based on LR before the entry condition is met.

- VDF think we do need to mention UE implementation in the definition of the conditions.

- VDF and Nokia think after the condition is fulfilled the UE behaviour starts with ‘shall’, not ‘may’. QC, Apple, IDT think we should align with R1 wording, which is ‘may’.

- Vivo think the only new thing we are discussing here is about the metrics, i.e., RSRP/RSRQ.

- Ericsson think we need to discuss measurements.

- QC and Apple think for the exit condition R2 should not discuss the metrics from LR, and it is R1 discussion. Vivo think R1 already agreed on RSRP/RSRQ from LR, and they are discussing on possibility of using SINR.

* Baseline for entry condition definition: If the serving cell quality, e.g. RSRP, RSRQ from MR, is above threshold(s) (if configured), UE may start to monitor LP-WUS, if UE monitors LP-WUS, it may stop monitoring the legacy PO. FFS if any measurement from LR is needed.
* Baseline for exit condition definition: If the serving cell measurement result based on LR is below a threshold (if configured), UE monitors PO as in legacy and it may stop monitoring the LP-WUS.

Sub-grouping

R2-2404376 LP-WUS Operation in RRC\_IDLE/INACTIVE CATT discussion Rel-19 NR\_LPWUS-Core

*Proposal 1: The maximum number of subgroups for LP-WUS depends on RAN1 conclusion.*

*Proposal 2: For CN assigned subgrouping for LP-WUS, the similar procedure for CN assigned subgrouping for PEI is reused.*

*Proposal 3: Send an LS to SA2/CT1/RAN3 for the design of CN assigned subgrouping for LP-WUS.*

*Proposal 4: For UE\_ID based subgrouping for LP-WUS, similar formula for PEI subgrouping is reused, i.e.,*

*SubgroupID = (floor (UE\_ID/(N\*Ns)) mod subgroupsNumForUEID\_LP) + (subgroupsNumPerPO\_LP – subgroupsNumForUEID\_LP), where*

*UE\_ID is related to 5G-S-TMSI, detail FFS,*

*N is the number of total paging frames in DRX cycle,*

*Ns is the number of the PO for a PF,*

*subgroupsNumForUEID\_LP and subgroupsNumPerPO\_LP are the subgroup number for UE\_ID based subgrouping for LP-WUS and the total subgroup number for LP-WUS, respectively.*

*Proposal 5: It is up to network implementation that UEs belong to the same LP-WUS subgrouping are expected to be assigned to different PEI subgroupings. No specification impact is needed.*

R2-2405637 Procedure and Configuration of LP-WUS in RRC IDLE/INACTIVE Lenovo discussion Rel-19 NR\_LPWUS-Core

*Proposal 6: The maximum number of subgroups that can be configured for LP-WUS subgrouping is 8.*

*Proposal 7: RAN2 to discuss the inclusion of a LP-WUS Subgrouping Configuration in the SIB signalling.*

*Proposal 8: RAN2 to discuss the configuration of 2-level subgrouping to reduce false alarm rates in comparison to legacy PEI.*

Discussions:

* OPPO, ZTE, NEC think maximum # of subgroups should wait for R1. Vivo think for PEI R2 decided, so now R2 can conclude as well.
* Ericsson think 3 bits is not enough to reduce the false alarm. Lenovo think we do not need to talk about # of bits, which is designed by R1.
* LG E think we can decide, and think 8 is sufficient, think we can inform R1. Spreadrum agree it is a balanced value.
* HW think at least 16 to reduce false alarm.
* QC think this is also controversial in R1 since it impact signal design/payload.
* Sony think we do not need to limit in R2 and think we should consider what is the impact for different values.
* RAN2 assume the maximum number of subgroups that can be configured for LP-WUS subgrouping is no less than 8. RAN2 informs RAN1 about this assumption.

SI reception

R2-2404459 Discussion on procedure and configuration of LP-WUS in RRC\_IDLE/INACTIVE Huawei, HiSilicon discussion

*Proposal 9: Only the necessary system information needs to be maintained when UE is working with LP-WUR in RRC\_IDLE/INACTIVE modes.*

*Proposal 10: Introduce a common LP-WUS to wake up all the UEs in RRC\_IDLE/INACTIVE if the subgrouping information in LP-WUS is indicated in a codepoint way.*

R2-2405577 LP-WUS operation in IDLE/Inactive state Qualcomm Incorporated discussion NR\_LPWUS-Core

*Proposal 12 From RAN2 perspective, LP-WUS should be able to wake up all UEs to monitor paging for SI update/ETWS/CMAS notification. How to support LP-WUS to indicate all the UEs is left to RAN1 discussion.*

Discussion:

* Samsung wonders if P9 in HW paper requires new functionality regarding SI reception. HW think we can further discuss.
* Nokia, ZTE, Apple do not think new functionality is needed.
* LG E not sure what is necessary SI in P9.
* From RAN2 perspective, no new procedure is introduced for SI reception/updates.

R2-2404295 General considerations on the procedure for RRC\_IDLE\_INACTIVE Xiaomi Communications discussion

R2-2404314 LP-WUS procedure in RRC\_IDLE INACTIVE NEC discussion Rel-19 NR\_LPWUS-Core

R2-2404418 Discussion on LP-WUS WUR in RRC\_IDLE INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

R2-2404469 LP-WUS in IDLE and INACTIVE Nokia discussion Rel-19 NR\_LPWUS-Core

R2-2404588 Discussion on procedure and configuration of LP-WUS in RRC\_IDLE/INACTIVE OPPO discussion Rel-19 NR\_LPWUS-Core

R2-2404674 Procedure and configuration of LP-WUS in RRC\_IDLE/INACTIVE Apple discussion Rel-19 NR\_LPWUS-Core

R2-2404860 Procedure and configuration of LP-WUS for IDLE and INACTIVE mode ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

R2-2404906 RAN2 aspects on LP-WUS/WUR in RRC Idle/Inactive mode Sony discussion Rel-19 NR\_LPWUS-Core

R2-2404927 Discussion on LP-WUS operation in IDLEI/NACTIVE mode Spreadtrum Communications discussion Rel-19

R2-2404996 WUR in Idle and Inactive Ericsson discussion Rel-19 NR\_LPWUS-Core

R2-2405223 LP-WUS in RRC\_IDLE and RRC\_INACTIVE LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2405308 Discussion on procedure and configuration of LP-WUS in RRC\_IDLE/INACTIVE China Telecom discussion Rel-19 NR\_LPWUS-Core

R2-2405325 Discussion on LP-WUS operation in RRC\_IDLE/INACTIVE modes InterDigital, Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2405354 Discussion on entry exit conditions for LP-WUS monitoring Sharp discussion

R2-2405409 Procedure and Configuration of LP-WUS in RRC Idle Inactive Mode Samsung discussion Rel-19

R2-2405497 LP-WUS operation in IDLE/INACTIVE modes CMCC discussion Rel-19 NR\_LPWUS-Core

R2-2405638 Discussion on Procedure and configuration in RRC\_IDLE-INACTIVE NTT DOCOMO INC.. discussion Rel-19 NR\_LPWUS-Core

R2-2405695 Discussion on LP-WUS\_WUR entry and exit conditions for RRC Idle\_Inactive mode KT Corp. discussion Rel-19 NR\_LPWUS-Core Late

### 8.4.3 RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE

RRM relaxation of UE MR for both serving and neighbor cell measurements, and UE serving cell RRM measurement offloaded from MR to LP-WUR, including the necessary conditions

Serving cell measurements related

R2-2404315 LP-WUS RRM measurement relaxation NEC discussion Rel-19 NR\_LPWUS-Core

*Proposal 1: RAN2 to consider the following solutions on serving cell measurement during LP-WUS monitoring mode:*

*Option-1: serving cell measurement fully offloaded to LR (i.e., no serving cell measurement via MR is required), the LR serving cell measurement requirement is decided by RAN4/1.*

*Option-2: serving cell measurement partially offloaded to LR (i.e., relaxed serving cell measurement via MR is still required), the LR and MR serving cell measurement requirement is decided by RAN4/1*

*Proposal 2: if proposal 1 is agreed, send an LS to RAN4/1 to ask discussing those feasibilities and related requirements.*

R2-2405224 RRM relaxation and RRM offloading LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

*Proposal 1 The RRM relaxation in this WI means the RRM measurements using MR with relaxed measurement requirements to be defined by RAN4 without any involvement of LP-WUS/LP-WUR.*

*Proposal 2 The RRM offloading in this WI means performing LP-SS or PSS/SSS measurement using LP-WUR and not performing serving cell measurements using MR.*

*Proposal 3 For serving cell measurement relaxation, RAN2 should focus on specifying the relaxed measurement criterion for serving cell, and assume that RAN4 will define the relaxed measurement requirements for serving cell.*

*Proposal 4 Consider the two relaxed measurement criteria in Rel-16, i.e. criterion for UE with low mobility and criterion for UE not at cell edge, as baseline for relaxed measurement criterion for serving cell.*

*Proposal 6 RAN2 specifies the criterion for serving cell measurement offloading.*

*?? For serving cell measurement relaxation, RAN2 should focus on specifying the relaxed measurement criterion for serving cell for UEs supporting LP-WUS, and assume that RAN4 will define the relaxed measurement requirements for serving cell. FFS if this involves LR measurements.*

Discussion on LG E P3

* OPPO think there may be the case when both MR and LR are doing measurement.
* NEC think for relaxation it is possible to have measurements from both MR and LR. NEC think we can discuss whether fully loading to LR is supported. Apple also agree.
* Lenovo think R2 should first discuss on condition and support P4 from LG E paper as baseline.
* Ericsson think P3 should only be limited to UE that support LP-WUS. Apple agree. Vivo, QC has different view.
* VDF think relaxation is only used when UE is within LP-WUS coverage.
* QC think both cases should be included, whether LR is involved or not.
* Lenovo think P3 is fine.
* Xiaomi think the TR says that relaxation only happens when measurement if offloaded to LR. Samsung share this view.

Neighboring cell measurements related

R2-2405013 Discussion on RRM measurement relaxation/offloading in IDLE/INACTIVE modes CMCC discussion Rel-19 NR\_LPWUS-Core

*Proposal 8: The RRM measurement of the neighboring cell can only be performed by MR.*

*Proposal 9: The neighbor cell measurement relaxation mechanism in Release 16 can be reused(e.g., not at cell edge and low mobility).*

*Proposal 10a: For high-priority neighboring cells, if Threshold1>SSearchThresholdP, the “low mobility” relaxation entry condition uses the LR-based serving cell measurement results.*

*Proposal 10b: For high-priority neighboring cells, if Threshold1<SSearchThresholdP, both “low mobility” relaxation entry condition and “not at cell edge” relaxation entry condition uses the LR-based serving cell measurement results.*

*Proposal 11a: For equal or low priority neighboring cells, if SnonIntraSearchP>Threshold1>SSearchThresholdP, the “low mobility” relaxation entry condition uses the LR-based serving cell measurement results.*

*Proposal 11b: For equal or low priority neighboring cells, if SSearchThresholdP>Threshold1, both “low mobility” relaxation entry condition and “not at cell edge” relaxation entry condition uses the LR-based serving cell measurement results.*

*Proposal 11c: For equal or low priority neighboring cells, if Threshold1> SnonIntraSearchP, there is no effect on existing conditions.*

R2-2404301 Discussion on RRM measurement relaxation for RRC\_IDLE\_INACTIVE Xiaomi Communications discussion

R2-2404323 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

R2-2404377 RRM Relaxation and Offloading in RRC\_IDLE/INACTIVE CATT discussion Rel-19 NR\_LPWUS-Core

R2-2404399 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE China Telecom discussion

R2-2404419 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

R2-2404470 RRM measurement relaxation in RRC\_IDLE/INACTIVE Nokia discussion Rel-19 NR\_LPWUS-Core

R2-2404583 Discussion on RRM measurement in RRC IDLE and INACTIVE OPPO discussion Rel-19 NR\_LPWUS-Core

R2-2404675 RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE Apple discussion Rel-19 NR\_LPWUS-Core

R2-2404808 RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE Lenovo discussion Rel-19

R2-2404861 RRM measurement relaxation for IDLE and INACTIVE mode ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

R2-2404907 Discussion on RRMRAN2 aspects foron LP-WUS/WUR Sony discussion Rel-19 NR\_LPWUS-Core

R2-2404928 Discussion on RRM measurement relaxation and offloading in IDLE/INACTIVE mode Spreadtrum Communications discussion Rel-19

R2-2404997 WUR and RRM measurements Ericsson discussion Rel-19 NR\_LPWUS-Core

R2-2405328 Discussion on RRM measurement relaxation and offloading InterDigital, Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2405355 Discussion on serving cell RRM measurement offloading Sharp discussion

R2-2405410 RRM measurement relaxation and offloading in RRC Idle Inactive Mode Samsung discussion Rel-19

R2-2405579 LP-WUS RRM measurement relaxation and offloading Qualcomm Incorporated discussion NR\_LPWUS-Core

### 8.4.4 Procedures for LP-WUS in RRC\_CONNECTED

Procedures to allow UE MR PDCCH monitoring triggered by LP-WUS including activation and deactivation procedure of LP-WUS monitoring.

R2-2404420 Discussion on LP-WUS WUR in RRC\_Connected vivo discussion Rel-19 NR\_LPWUS-Core

=> Revised in R2-2405935

R2-2405935 Discussion on LP-WUS/WUR in RRC\_CONNECTED vivo discussion Rel-19 NR\_LPWUS-Core

*Proposal 1: In RRC\_CONNECTED mode, RAN2 to further discuss the impacts of LP-WUS operation methods identified in RAN1.*

*Proposal 2: For LP-WUS procedure to trigger PDCCH monitoring Option 1-1, similar as DCP, the LP-WUS monitoring occasion locates at a configured time offset before the start of drx-onDurationTimer. The range of time offset can be determined by RAN1.*

*Proposal 3: For LP-WUS procedure to trigger PDCCH monitoring Option 1-1, RAN2 assumes the solutions/ operations introduced for DCP are re-used by default, unless any critical issue is identified.*

*Proposal 4: RAN2 assumes Option 1-2-1 could excluded.*

*Proposal 5: For LP-WUS procedure to trigger PDCCH monitoring Option 1-2-2, LP-WUS only impacts the PDCCH monitoring outside C-DRX Active Time and during legacy drx-onDurationTimer, i.e. UE should keep monitoring PDCCH during the C-DRX Active Time other than the time when drx-onDurationTimer is running, even no LP-WUS has been detected.*

*Proposal 6: For LP-WUS procedure to trigger PDCCH monitoring Option 1-2-2, the following solutions on how to stop the PDCCH monitoring could be considered:*

*− The UE stops the PDCCH monitoring upon receiving the PDCCH skipping indication;*

*− Using a timer for PDCCH monitoring triggered by LP-WUS, and the UE performs PDCCH monitoring until the timer is expired. FFS whether a new timer or reuse legacy DRX timer, e.g. drx-InactivityTimer.*

*Proposal 7: For LP-WUS procedures to trigger PDCCH monitoring Option 1-3, UE monitors the LP-WUS within the drx-onDurationTimer duration and the UE starts to monitor PDCCH only if the detected LP-WUS indicates UE to monitor PDCCH.*

*Proposal 8: For LP-WUS procedure to trigger PDCCH monitoring Option 1-3, LP-WUS only impacts the PDCCH monitoring during legacy drx-onDurationTimer, i.e. UE should keep monitoring PDCCH during the C-DRX Active Time other than the time when drx-onDurationTimer is running, even no LP-WUS has been detected.*

*Proposal 9: RAN2 assumes Option 1-2-2 should be supported for LP-WUS in RRC\_CONNECTED mode.*

*Proposal 10: In RRC\_CONNECTED mode, PDCCH monitoring triggered by LP-WUS is enabled/disabled by the corresponding configuration of LP-WUS. No additional assistance information from UE is needed.*

*Proposal 11: LP-WUS configuration is configured in RRCResume/RRCReconfiguration message.*

*Activation and deactivation procedure for LP-WUS monitoring*

*Proposal 12: In RRC\_CONNECTED mode, in case LP-WUS monitoring is enabled, activation/deactivation of LP-WUS monitoring by L1/L2 signaling is introduced. Details FFS.*

R2-2404862 Procedure for LP-WUS in RRC\_CONNECTED ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

*Proposal 1: LP-WUS configuration for RRC-CONNECTED should be provided by UE specific signaling, and FFS on what information is configured.*

*Proposal 2: The provision of LP-WUS configuration via dedicated signaling is seen as an implicit activation to apply LP-WUS for UE in RRC\_CONNECTED state.*

*Proposal 3: RAN2 can postpone the discussion on whether to support L1/L2 activation/deactivation of LP-WUS in RRC-CONNECTED until there is agreement for the LP-SS and LP-WUS design in RAN1.*

*Proposal 4: RAN2 consider the option 1-1(e.g. LP-WUS replace DCP) as baseline for LP-WUS monitoring in RRC\_CONNECTED state.*

*Proposal 5: Whether to support Option 1-2(monitoring LP-WUS outside the C-DRX active time) or Option 1-3(monitoring LP-WUS inside the C-DRX active time) can wait for RAN1’s further agreement.*

R2-2405411 Procedures for LP-WUS in RRC Connected Mode Samsung discussion Rel-19

*Proposal 1. As a baseline scenario, RAN2 supports LP-WUS configuration before C-DRX on duration, similar as DCP (option 1-1).*

*Proposal 2. For the support of LP-WUS and associated PDCCH monitoring outside of C-DRX on duration, we need to wait for RAN1 progress.*

*Proposal 3. The LP-WUS related configuration for RRC CONNECTED state UE is provided via UE dedicated message, e.g., RRCReconfiguration.*

R2-2404244 Discussion on LP-WUS for RRC\_CONNECTED mode Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

R2-2404302 Discussing on LP-WUS monitoring for RRC\_Connected Xiaomi Communications discussion

R2-2404316 LP-WUS procedure in RRC\_CONNECTED NEC discussion Rel-19 NR\_LPWUS-Core

R2-2404378 Analysis on LP-WUS in RRC\_CONNECTED CATT discussion Rel-19 NR\_LPWUS-Core

R2-2404380 LP-WUS in RRC\_CONNECTED Nokia discussion NR\_LPWUS-Core

R2-2404584 Discussion on LP-WUS in RRC\_CONNECTED OPPO discussion Rel-19 NR\_LPWUS-Core

R2-2404676 Procedures for LP-WUS in RRC\_CONNECTED Apple discussion Rel-19 NR\_LPWUS-Core

R2-2404908 Considerations on LP-WUS/WUR in RRC Connected mode Sony discussion Rel-19 NR\_LPWUS-Core

R2-2404998 WUR in Connected Ericsson discussion Rel-19 NR\_LPWUS-Core

R2-2405033 Discussion on LP-WUS operation in CONNECTED mode CMCC discussion Rel-19 NR\_LPWUS-Core

R2-2405309 Discussion on procedures for LP-WUS in RRC\_CONNECTED China Telecom discussion Rel-19 NR\_LPWUS-Core

R2-2405332 Discussion on LP-WUS operation in RRC\_CONNECTED mode InterDigital, Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2405468 Discussion on LP-WUS in RRC\_CONNECTED mode LG Electronics Inc. discussion Rel-19

R2-2405578 LP-WUS operation in CONNECTED state Qualcomm Incorporated discussion NR\_LPWUS-Core

R2-2405639 LP-WUS in RRC Connected Mode Lenovo discussion Rel-19 NR\_LPWUS-Core

R2-2405687 Discussion on LP-WUS in RRC\_CONNECTED NTT DOCOMO INC.. discussion Rel-19 NR\_LPWUS-Core

## List of post meeting email discussions

Chair: the following tentative plan for the post meeting email discussions is to confirmed in the R18 CB session

* ?? [Post126][203][MUSIM] CR for TS 38.331 (vivo)

Scope: Update and review the CR for TS 38.331, update the RIL list based on agreements in this meeting.

Intended outcome: Agreed CR and updated RIL list

Deadline: Short

* ?? [Post126][204][MIMOevo] CR for TS 38.321 (Samsung)

Scope: Update and review the CR for TS 38.321.

Intended outcome: Agreed CR

Deadline: Short

* ?? [Post126][205][MIMOevo] CR for TS 38.331 (Ericsson)

Scope: Update and review the CR for TS 38.331, update the RIL list based on agreements in this meeting.

Intended outcome: Agreed CR and updated RIL list

Deadline: Short

* ?? [Post126][206][LPWUS] LS to RAN1 (TBD)

Scope: LS to RAN1 (also RAN4?) to inform RAN2 agreements in this meeting.

Intended outcome: Approved LS to RAN1 (also RAN4?)

Deadline: Short