3GPP TSG-RAN WG2 Meeting #130 draft R2-2504672

St.Julians, Malta, May 19th – 23rd, 2025

Source: RAN2 Vice Chairman (CATT)

Title: Report from session on Rel-18 MIMO, Rel-19 MIMO, LPWUS, SBFD, NR Others

Agenda item: 9.2

## Organizational email discussion

* [AT130][200] Organizational – Rel-18 MIMO, Rel-19 MIMO, LPWUS, SBFD, NR Others (RAN2 VC)

Scope:

a) Share plans for online/offline discussions during the meeting, and

b) Share draft session notes and agreements for review

#### 7.0.2.13 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))

R2-2503740 Corrections on simultaneousU-TCI-UpdateListx and RACH-ConfigTwoTA CATT CR Rel-18 38.331 18.5.1 5291 1 F NR\_MIMO\_evo\_DL\_UL-Core R2-2502105

* The CR is agreed.

R2-2504213 Correction on PHR for STx2P multi-panel scheme Samsung CR Rel-18 38.321 18.5.0 2084 - F NR\_MIMO\_evo\_DL\_UL-Core

* The CR is not pursed.

R2-2504258 Correction to epre-Ratio field description Ericsson CR Rel-18 38.331 18.5.1 5368 - F NR\_MIMO\_evo\_DL\_UL-Core

* Update CR in R2-2504733, to refer to a new table in the RAN1 spec.

Discussion

- Samsung think the text has been there from R15 so no need to change. Samsung think if we change anything it should start from R15.

- OPPO agree with the intention and also think in R1 spec no codepoint is mentioned. OPPO ask whether this should change from R15.

- Nokia, LG E ok with the change.

[CB]

R2-2504733

IPA CR

R2-2504480 Correction on supporting 8Tx in MAC specification ASUSTeK, Samsung, ZTE, Ericsson CR Rel-18 38.321 18.5.0 2092 - F NR\_MIMO\_evo\_DL\_UL-Core Withdrawn

R2-2504501 Correction on supporting 8Tx in MAC specification ASUSTeK, Samsung, ZTE, Ericsson CR Rel-18 38.321 18.5.0 1990 4 F NR\_MIMO\_evo\_DL\_UL-Core R2-2503034

* The CR is agreed.

# 8 Rel-19

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

(NR\_LPWUS-Core; leading WG: RAN1; REL-19; WID [RP-241824](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_105/Docs/RP-241824.zip))

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 8.4.1 Organizational

LS, Rapporteur input, including workplan, Running CRs, open issue list(s), etc.

LS

R2-2503313 LS on the RRM measurement metrics for OFDM-based LP-WUR (R1-2503103; contact: Apple) RAN1 LS in Rel-19 NR\_LPWUS-Core To:RAN4 Cc:RAN2

* Noted

Running CR

R2-2503612 RRC Running CR for LP-WUS WUR vivo (Rapporteur) draftCR Rel-19 38.331 18.5.1 B NR\_LPWUS-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

Discussion

- Samsung point out that R1 is now discussing terminology changes so we may need to update and align. vivo think this comment is reasonable. Vivo think we can endorse and update based on R1 input.

R2-2503657 38.304 Running CR for LP-WUS CATT draftCR Rel-19 38.304 18.4.0 NR\_LPWUS-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

Discussion

- Samsung think some of the content can just refer to R1 spec.

R2-2503759 Running 37.340 CR for LP-WUS ZTE Corporation, Sanechips draftCR Rel-19 37.340 18.5.0 B NR\_LPWUS-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

R2-2503807 Running MAC CR for LP-WUS Apple (Rapporteur) draftCR Rel-19 38.321 18.5.0 B NR\_LPWUS-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

R2-2504578 Introduction of Low-Power Wake-Up Signal and Receiver for NR Ericsson draftCR Rel-19 38.331 18.5.1 B NR\_LPWUS-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

Discussion summary and open issue list

R2-2503658 Summary of [Post129bis][208][LPWUS] Running CR for 38.304 (CATT) CATT discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 1: RAN2 discuss which option (option 2 or option 3) is adopted for X.*

*• Option 2: X is depended on if eDRX is applied without considering different cases of Np*

*If eDRX is not applied, X=262144 (256\*4\*8\*32);*

*If eDRX is applied, X= 1048576 (1024\*4\*8\*32).*

*• Option 3: X is 1048576, i.e., the largest UE ID range in all LP\_WUS cases is be used for all LP-WUS monitoring cases.*

*LP-WUS in idle/inactive mode*

*Open issue 38304-5: FFS the UEs expecting MBS group notification should monitor its PO to receive the MBS group notification regardless of LP-WUS.*

*Open issue 38304-8: Whether LP-WUS is only used in the last used cell or in any cell.*

Discussion

P1

- NEC prefer O2. Xiaomi agree.

- ZTE think O3 is simplest. OPPO agree.

* For UE\_ID based subgrouping , X is 1048576, i.e., the largest UE ID range in all LP\_WUS cases is be used for all LP-WUS monitoring cases.
* UEs expecting MBS group notification should monitor its PO to receive the MBS group notification regardless of LP-WUS.

[CB]

*?? Open issue 38304-8: Whether LP-WUS is only used in the last used cell or in any cell.*

Discussion on 38304-8

- Ericsson think this is needed, similar as PEI. Xiaomi agree.

- vivo think this situation is different from PEI, because in LPWUS there is more subgroup # compared to PEI so the paging false alarm probability is relatively lower. Vivo think last use cell is not so useful. OPPO, Huawei, LG E share this view.

- LG E think the complexity of this feature is anyway low.

R2-2503765 Discussion summary and list of RRC open issue for LP-WUS WUR vivo discussion Rel-19 NR\_LPWUS-Core

* Noted

*Open issue RRC-1 (essential): whether RRM relaxation configuration is provided in SIB2*

*Proposal 1: (11/11) RRM relaxation / offloading configuration is provided in SIB2.*

*Open issue RRC-11 (essential): how to report the UAI for preferred time offset*

*Proposal 3: (8/9) RAN2 assumes the design of UAI reporting for preferred time offset is same as the legacy, e.g. including the configuration, procedure, as well as prohibit timer, etc.*

* RRM relaxation / offloading configuration is provided in SIB2.
* RAN2 assumes the design of UAI reporting for preferred time offset is same as the legacy, e.g. including the configuration, procedure, as well as prohibit timer, etc.

R2-2503808 Report of [Post129bis][210][LPWUS] Running CR for TS 38.321 (Apple) Apple (Rapporteur) discussion Rel-19 NR\_LPWUS-Core

* Noted

*Open issue 2: In Option 1-2, whether the UE should start the lpwus\_PDCCHMonitoringTimer (as if LP-WUS was detected) when the UE is not able to monitor the LP-WUS occasion(s).*

Discussion

- Apple think issue 1 can be discussed based on contributions, and issue 2 can postpone.

R2-2503758 Summary of [Post129bis][206] Remaining issue of LP-WUS in MR-DC ZTE Corporation, Sanechips discussion NR\_LPWUS-Core

* Noted

*Proposal: LP-WUS, if supported by UE, can only be configured to be monitored on the PCell, if the MN is a gNB (i.e. for NE-DC and NR-DC) and/or with LP-WUS to be monitored on the PSCell, if the SN is a gNB (i.e. for EN-DC, NGEN-DC and NR-DC).*

* LP-WUS, if supported by UE, can only be configured to be monitored on the PCell, if the MN is a gNB (i.e. for NE-DC and NR-DC) and/or with LP-WUS to be monitored on the PSCell, if the SN is a gNB (i.e. for EN-DC, NGEN-DC and NR-DC).

R2-2503899 Summary of [Post129bis][218][LPWUS] UE Capabilities (Huawei) Huawei, HiSilicon discussion Rel-19

* Noted

*Proposal 1 (10/10): A UE indicating support of LP-WUS reception in IDLE/INACTIVE shall support UE-ID based subgrouping.*

*Proposal 2 (6/10): RRM measurement relaxation and RRM measurement fully offloading are defined as RAN2 capability without UE capability signalling. Send LS to RAN1 to inform the agreement.*

*Proposal 3: Way forward on the supported use cases regarding UE supporting LP-WUS reception, and RRM measurement relaxation and fully offloading:*

*1) Agree to support “Case 1” (8/10 support Case 1): UE supporting LP-WUS reception shall also support RRM measurement relaxation and RRM measurement fully offloading*

*2) Discuss on supporting “Case 2” (2/10 support Case 2): UE supports LP-WUS reception, but does not support RRM measurement relaxation and RRM measurement fully offloading*

*3) Preclude “Case 3” (1/10 support Case 3): UE supports RRM measurement relaxation and RRM measurement fully offloading, but does not support LP-WUS reception*

*Proposal 4: Wait for further discussions in RAN1 and RAN2 for CONNECTED state LP-WUS capability.*

* A UE indicating support of LP-WUS reception in IDLE/INACTIVE shall support UE-ID based subgrouping.
* From R2 point of view, RRM measurement relaxation and RRM measurement fully offloading are defined as RAN2 capability without UE capability signalling.

Discussion

- Samsung think we can wait for R1 progress. Xiaomi share this view.

- Interdigital wonders why it is capability without signalling.

- vivo think RRM rlx and offloading is R2 feature to discuss, Ericsson, OPPO, Apple share this view. Vivo think whether this is with or without signalling depends on the next proposal in the summary.

- Apple think for PEI the related cap are decided by R2.

- vivo suggest to discuss P3 first.

*Proposal 3: Way forward on the supported use cases regarding UE supporting LP-WUS reception, and RRM measurement relaxation and fully offloading:*

*1) Agree to support “Case 1” (8/10 support Case 1): UE supporting LP-WUS reception shall also support RRM measurement relaxation and RRM measurement fully offloading*

*2) Discuss on supporting “Case 2” (2/10 support Case 2): UE supports LP-WUS reception, but does not support RRM measurement relaxation and RRM measurement fully offloading*

*3) Preclude “Case 3” (1/10 support Case 3): UE supports RRM measurement relaxation and RRM measurement fully offloading, but does not support LP-WUS reception*

Discussion

Case 1

- Ericsson support case 1.

- OPPO wants flexibility to separate lpwus reception and RRM rlx/offloading.

- Apple think R2 already agree that RRM rlx/offloading are for LPWUS capable UEs so case 1 is obvious. Lenovo think otherwise there is no power saving gain at all.

* UE supporting LP-WUS reception shall also support RRM measurement relaxation and RRM measurement fully offloading

Case 2

- Ericsson think UE implementation allows not to do rrm relx/offloading.

- HW think based on agreed case 1 we can just preclude case 2/3.

### 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

*[RRC-2, whether entry/exit condition is mandatory or optional]*

R2-2504555 Open issues on LP-WUS operation in IDLE/Inactive state Qualcomm Incorporated discussion NR\_LPWUS-Core

* Noted

*Proposal 1 It is up to UE implementation to choose which measurement type is used for entry/exit condition if both of SSB based measurement, OOK based LP-SS measurement types conditions are configured.*

*Proposal 2 It is up to UE implementation to determine the entry/exit condition if there is no entry/exit condition configured for the supported measurement type.*

R2-2503837 Remaining issues on LP-WUS in RRC IDLE or INACTIVE LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 4 The entry/exit condition for LP-WUS monitoring is mandatory in LP-WUS configuration.*

Discussion

- Xiaomi think QC P1 is up to R1. Xiaomi, vivo, Nokia, Samsung support P4 from LG E.

- Interdigital has concern on QC P1 since there are different UE behaviour and it is different for NW to handle.

- Ericsson think full cell coverage of LPWUS is not precluded, and think if we agree this condition is mandatory then we should inform R1/R4 about this.

- vivo do not think coverage of LPWUS matters much to this issue, and think it is easy for NW to configure the threshold if the LPWUS coverage is really good. Vivo do not see impact to R1/R4.

- ZTE, OPPO prefer to have it as optional. QC think nothing is broken if that condition is absent. Vivo think there is issue because without network configuration of the condition we need other indication to inform that NW support LPWUS. Samsung share this view from vivo.

- Apple and LG E support P1 from QC.

* The entry/exit condition for LP-WUS monitoring is mandatory in LP-WUS configuration, if the LP-WUS configuration is provided by the NW.
* Full coverage for LP-WUS is not precluded, e.g., if there needs to be a threshold value so that the condition is always fulfilled for all LPWUS UEs.

[CB]

?? It is up to UE implementation to choose which measurement type is used for LP-WUS monitoring entry/exit condition if both SSB measurement based and OOK LP-SS measurement based conditions for LP-WUS monitoring are configured.

*[RRC-12, whether/how to enable/disable LP-WUS, e.g. by RRC/NAS]*

R2-2503809 Remaining issues of LP-WUS in RRC\_IDLE/INACTIVE Apple discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 2: For UE in RRC\_IDLE state to enable/disable the LP-WUS feature, there is no need to introduce additional UE dedicated signaling for control, i.e. UE level control can be performed by means of the LP-WUS group ID allocated by CN.*

*Proposal 3: For UE in RRC\_INACTIVE state to enable/disable the LP-WUS feature, network can enable/disable the LP-WUS feature within RNA through RRCRelease message.*

R2-2503900 Further discussion on the LP-WUS in RRC\_IDLE/INACTIVE mode Huawei, HiSilicon discussion Rel-19

* Noted

*Proposal 2: (RRC-12) The CN indicates whether LP-WUS capable UE(s) is/are allowed to use the LP-WUS functionality by NAS signaling: the absence of indication means UE is allowed to use LP-WUS functionality, and presence of indication to disable means UE is not allowed to use LP-WUS functionality.*

*Proposal 2a: If above proposal is agreed, send LS to SA2/CT1/RAN3 to inform the agreement and to update the signalling between CN and RAN.*

Discussion

- CATT think there is other way, e.g., UE can decide whether LPWUS is enabled or disabled based on latency.

- ZTE think for CN based way it is not up to R2.

- Ericsson think it can base on CN assigned subgrouping. Ericsson think if we introduce disable/enable signalling in RRCRelease it introduce impact to other WGs.

- Docomo think it is based on gNB implementation, and support RRC based indication.

- Sony wonders what is the requirement to UE.

* [AT130][204][LPWUS] Proposals on whether/how to enable/disable LP-WUS, e.g. by RRC/NAS (Huawei)

Intended outcome: Summary with proposals in R2-2504738.

Deadline: before Thursday CB

Chair: other issues can also be discussed in the CB sesion, if time allows

R2-2503568 Discussion on LP-WUS in RRC\_IDLE INACTIVE NEC discussion Rel-19 NR\_LPWUS-Core

R2-2503603 Procedure and Configuration of LP-WUS in RRC Idle Inactive Mode Samsung discussion Rel-19

R2-2503613 Discussion on LP-WUS WUR in RRC\_IDLE INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

R2-2503651 Remaining issues on LP-WUS paging monitoring Xiaomi Communications discussion

R2-2503659 Remaining issues on LP-WUS in IDLE and INACTIVE CATT discussion Rel-19 NR\_LPWUS-Core

R2-2503763 Procedure and configuration of LP-WUS for IDLE and INACTIVE mode ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

R2-2503790 Discussion on LP-WUS in RRC\_IDLE and INACTIVE China Telecom discussion Rel-19

R2-2503809 Remaining issues of LP-WUS in RRC\_IDLE/INACTIVE Apple discussion Rel-19 NR\_LPWUS-Core

R2-2503837 Remaining issues on LP-WUS in RRC IDLE or INACTIVE LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2503867 Open issues on LP-WUS in IDLE/INACTIVE mode Tejas Network Limited discussion Rel-19

R2-2503881 Discussion on LP-WUS in RRC\_IDLE and RRC\_INACTIVE Sharp discussion Rel-19

R2-2503900 Further discussion on the LP-WUS in RRC\_IDLE/INACTIVE mode Huawei, HiSilicon discussion Rel-19

R2-2503953 Discussion on prioritizing the frequencies supporting LP-WUS Huawei, HiSilicon, vivo, CMCC, CATT, Nokia, Samsung, LG Electronics Inc., Apple, Ericsson, OPPO, Sharp, NEC discussion Rel-19 NR\_LPWUS-Core

R2-2504003 Discussion on LP-WUS procedure and configuration OPPO discussion Rel-19 NR\_LPWUS-Core Late

=> Revised in R2-2504677

R2-2504677 Discussion on LP-WUS procedure and configuration OPPO discussion Rel-19 NR\_LPWUS-Core Late

R2-2504264 LP-WUS in IDLE and INACTIVE Nokia discussion Rel-19 NR\_LPWUS-Core

R2-2504288 LP-WUS in Idle and Inactive Ericsson discussion Rel-19 NR\_LPWUS-Core R2-2502910

R2-2504363 Discussion on LP-WUS operation in RRC\_IDLE/INACTIVE modes InterDigital, Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2504404 Further Consideration on LP-WUS operation in IDLE/INACTIVE CMCC discussion Rel-19 NR\_LPWUS-Core

R2-2504468 Discussion on LP-WUS in RRC\_IDLE/INACTIVE HONOR discussion Rel-19 NR\_LPWUS-Core

R2-2504555 Open issues on LP-WUS operation in IDLE/Inactive state Qualcomm Incorporated discussion NR\_LPWUS-Core

R2-2504603 Procedure and Configuration of LP-WUS in RRC Idle/ Inactive Lenovo discussion NR\_LPWUS-Core

R2-2504643 Discussion on the LP-WUS deactivation with RRC dedicated message NTT DOCOMO INC.. discussion Rel-19 NR\_LPWUS

### 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

*[RRC-7,38304-3, on exit condition for serving cell RRM relaxation]*

R2-2504403 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE INACTIVE CMCC discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 8: No separate exit condition is needed, and the exit condition can be defined as failing to meet the entry condition.*

R2-2503660 RRM Relaxation and Offloading in RRC\_IDLE/INACTIVE CATT discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 1: (RRC-7/38304-3) The exit condition of MR measurement relaxation is only based on LR serving cell quality.*

Discussion

- NEC wonders whether CATT P1 means seperate exit condition, CATT think yes.

- Lenovo think this issue depends on whether we merge these conditions with other conditions. Samsung share this view.

- ZTE support CMCC proposal 8, do not see it critical to optimize exit condition.

- Xiaomi think R4 is not adding new requirements for MR based measurements so it can still be used.

*[RRC-8, 38304-4, on whether/how to reduce the threshold number for LP-WUS/WUR]*

R2-2504678 Discussion on RRM measurement in RRC IDLE and INACTIVE OPPO discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 2 Define the separate entry/exit condition for LP-WUS monitoring and serving cell & neighbour cell measurement relaxation.*

R2-2503604 RRM measurement relaxation and offloading in RRC Idle Inactive Mode Samsung discussion Rel-19

* Noted

*Proposal 4: For Rel19 LP-WUS, no additional merging of thresholds or functions is required.*

R2-2503614 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 3-1: (38304-4) Merge LP-WUS monitoring entry/exit condition and serving cell RRM offloading if only serving cell RRM offloading is supported in the camped cell or UE only supports serving cell RRM offloading.*

*Proposal 3-2: (38304-4) Merge LP-WUS monitoring entry/exit condition and Rel-19 serving/neighboring cell RRM relaxation if only Rel-19 serving/neighboring cell RRM relaxation is supported in the camped cell or UE only supports Rel-19 serving/neighboring cell RRM relaxation.*

*Proposal 3-3: (38304-4) It is up to network configuration to merge LP-WUS monitoring entry/exit condition with serving cell RRM offloading or Rel-19 serving/neighboring cell RRM relaxation if both are supported in the camped cell and UE supports both.*

R2-2504066 Further discussion on the criteria for RRM measurement relaxation and offloading Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 1: The threshold(s) for RRM measurement fully offloading (CASE#1) should be higher than threshold(s) for RRM measurement relaxation (CASE#3).*

*Proposal 2: (38304-4/RRC-8) RAN2 to agree on the following cases for merging the thresholds of RRM measurement relaxation (CASE#3) or RRM measurement fully offloading (CASE#1) with LP-WUS monitoring:*

*• If the network configures the RRM measurement relaxation (CASE#3), the UE can regard the entry/exit condition of RRM measurement relaxation (CASE#3) as the entry/exit condition of LP-WUS monitoring, regardless of whether the RRM measurement fully offloading (CASE#1) is configured.*

*• If the network ONLY configures the RRM measurement fully offloading (CASE#1), the UE can regard the entry/exit condition of RRM measurement fully offloading (CASE#1) as the entry/exit condition of LP-WUS monitoring.*

* [AT130][205][LPWUS] Proposals to address the open issues RRC-7,38304-3, RRC-8, 38304-4 (vivo)

Intended outcome: Summary with proposals in R2-2504739 to address the listed open issues.

Deadline: before Thursday CB

*[RRC-10, 38304-6, on low mobility criteria] in CB*

R2-2503882 Discussion on RRM measurement relaxation and offloading Sharp discussion Rel-19

*Proposal 1: The entry/exit conditions for serving cell measurement offloading include ‘low mobility’ criteria.*

*Proposal 2: The entry/exit conditions for neighbour cell measurement relaxation for UEs capable of LP-WUS include ‘low mobility’ criteria.*

*Chair: other issues can also be discussed in the CB sesion, if time allows*

R2-2503569 Discussion on LP-WUS RRM NEC discussion Rel-19 NR\_LPWUS-Core

R2-2503604 RRM measurement relaxation and offloading in RRC Idle Inactive Mode Samsung discussion Rel-19

R2-2503614 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

R2-2503652 Remaining issues on RRM measurement relaxation for RRC\_IDLE\_INACTIVE Xiaomi Communications discussion

R2-2503660 RRM Relaxation and Offloading in RRC\_IDLE/INACTIVE CATT discussion Rel-19 NR\_LPWUS-Core

R2-2503791 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE and INACTIVE China Telecom discussion Rel-19

R2-2503810 Remaining issues of LP-WUS RRM Measurement Apple discussion Rel-19 NR\_LPWUS-Core

R2-2503838 Remaining issues on measurement offloading and relaxation LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2503882 Discussion on RRM measurement relaxation and offloading Sharp discussion Rel-19

R2-2503902 RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE Lenovo discussion Rel-19

R2-2504004 Discussion on RRM measurement in RRC IDLE and INACTIVE OPPO discussion Rel-19 NR\_LPWUS-Core

=> Revised in R2-2504678

R2-2504678 Discussion on RRM measurement in RRC IDLE and INACTIVE OPPO discussion Rel-19 NR\_LPWUS-Core

R2-2504066 Further discussion on the criteria for RRM measurement relaxation and offloading Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

R2-2504265 RRM measurement relaxation in RRC\_IDLE/INACTIVE Nokia discussion Rel-19 NR\_LPWUS-Core

R2-2504289 LP-WUS and RRM measurements Ericsson discussion Rel-19 NR\_LPWUS-Core R2-2502911

R2-2504364 Discussion on RRM measurement relaxation and offloading InterDigital, Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2504365 Discussion on neighboring cell measurement with LR InterDigital, Ericsson, Nokia, Sony, Vodafone, KT, Turkcell discussion Rel-19 NR\_LPWUS-Core

R2-2504403 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE INACTIVE CMCC discussion Rel-19 NR\_LPWUS-Core

R2-2504557 LP-WUS RRM measurement relaxation and offloading Qualcomm Incorporated discussion NR\_LPWUS-Core

R2-2504565 RRM measurement relaxation and offloading in RRC IDLEINACTIVE for LP-WUS/WUR Panasonic discussion Rel-19

R2-2504623 Remaining issues for LP-WUS RRM ZTE Corporation, Sanechips discussion Rel-19 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.

*[RRC-3, MAC-1, on whether/how to support LP-WUS (including Option 1-1 and 1-2) and dual DRX group]*

R2-2503349 Discussing on LP-WUS monitoring in Connected mode Xiaomi discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 4 (RRC-3) LP-WUS (including Option 1-1 and 1-2) for dual DRX group is not supported in this release.*

R2-2504514 LP-WUS in RRC\_CONNECTED Nokia, Nokia Shanghai Bell discussion

* Noted

*Proposal 1: LP-WUS can be configured with secondary DRX group.*

R2-2504291 LP-WUS and secondary DRX Ericsson, Huawei, HiSilicon, NEC, LGE, Apple, InterDigital, CATT discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 1 LP-WUS can be configured on the PCell with secondary DRX. LP-WUS with secondary DRX is supported with option 1-1 and 1-2, i.e. the UE monitors LP-WUS before the on-duration occasion or periodically outside ActiveTime. When LP-WUS is detected, then UE starts the drx-onDurationTimer (with option 1-1) or the lpwus-PDCCHMonitoringTimer (with option 1-2) in both DRX groups.*

R2-2504556 Open issues on LP-WUS operation in CONNECTED state Qualcomm Incorporated discussion NR\_LPWUS-Core

* Noted

*Proposal 1 For a UE configured with CA with dual-DRX groups, support LP-WUS monitoring on a serving cell per DRX group. The LP-WUS configurations are independent for each DRX group. LP-WUS monitored on a cell within a DRX group triggers PDCCH monitoring on the cells of the DRX group.*

*Proposal 2 Support maintenance of lpwus\_PDCCHMonitoringTimer is per DRX group.*

Discussion

- ZTE do not agree with Xiaomi, and think QC proposals are good. Vivo, OPPO share this view.

- HW think the additional PS gain is limited to support separate LPWUS operation for 2nd DRX group, but introduces complexity. LG E agree. CATT also agree with HW, but also OK to not support it if we cannot agree anything.

- Samsung also support Ericsson joint proposal.

- Qualcomm do not think we should restrict to Pcell.

- Ericsson think QC proposal should be based on UE capability.

- Xiaomi think Ericsson proposal has some R1 impact. Vivo share this view.

- Nokia think R1 discuss this topic already and think if we support this combination then Ericsson proposal is the only WF.

* Working assumption: LP-WUS can be configured on the PCell with secondary DRX. LP-WUS with secondary DRX is supported with option 1-1 and 1-2, i.e. the UE monitors LP-WUS before the on-duration occasion or periodically outside ActiveTime. When LP-WUS is detected, then UE starts the drx-onDurationTimer (with option 1-1) or the lpwus-PDCCHMonitoringTimer (with option 1-2) in both DRX groups.

*[RRC-5, whether it is allowed to report an empty UAI on offset for LP-WUS monitoring for both option 1-1 and option 1-2]*

R2-2503615 Discussion on LP-WUS WUR in RRC\_Connected vivo discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 3: (RRC-5) It is allowed to report an empty UAI on time offset for LP-WUS monitoring for both option 1-1 and option 1-2, which means UE has no preference on the time offset between LP-WUS and PDCCH monitoring.*

Discussion

- NEC support the proposal and think this is basic UAI framework. Apple agree.

- Nokia wonders what NW should do if it get this empty UAI report.

- Ericsson do not see a strong need for this and think NW can just configure.

[CB]

?? It is allowed to report an empty UAI on time offset for LP-WUS monitoring for both option 1-1 and option 1-2, which means UE has no preference on the time offset between LP-WUS and PDCCH monitoring.

*Chair: other issues can also be discussed in the CB sesion, if time allows*

R2-2503349 Discussing on LP-WUS monitoring in Connected mode Xiaomi discussion Rel-19 NR\_LPWUS-Core

R2-2503570 Discussion on LP-WUS in RRC\_CONNECTED NEC discussion Rel-19 NR\_LPWUS-Core

R2-2503605 Procedures for LP-WUS in RRC Connected Mode Samsung discussion Rel-19

R2-2503615 Discussion on LP-WUS WUR in RRC\_Connected vivo discussion Rel-19 NR\_LPWUS-Core

R2-2503661 Analysis on LP-WUS for RRC\_CONNECTED CATT discussion Rel-19 NR\_LPWUS-Core

R2-2503764 Procedures for LP-WUS in RRC\_CONNECTED ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

R2-2503811 Remaining issues of LP-WUS in RRC\_CONNECTED Apple discussion Rel-19 NR\_LPWUS-Core

R2-2503819 Remainng issues on LP-WUS in RRC\_CONNECTED LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2503833 LP-WUS in CONNECTED mode InterDigital discussion Rel-19 NR\_LPWUS-Core

R2-2503869 Open issues on LP-WUS operation in CONNECTED mode Tejas Network Limited discussion Rel-19

R2-2503954 Further discussion on LP-WUS for RRC\_CONNECTED mode Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

R2-2504005 Discussion on support of dual DRX group with LP-WUS in RRC\_CONNECTED OPPO discussion Rel-19 NR\_LPWUS-Core

=> Revised in R2-2504679

R2-2504679 Discussion on support of dual DRX group with LP-WUS in RRC\_CONNECTED OPPO discussion Rel-19 NR\_LPWUS-Core

R2-2504290 LP-WUS in Connected Ericsson discussion Rel-19 NR\_LPWUS-Core R2-2502912

R2-2504291 LP-WUS and secondary DRX Ericsson, Huawei, HiSilicon, NEC, LGE, Apple, InterDigital, CATT discussion Rel-19 NR\_LPWUS-Core

R2-2504385 Discussion on LP-WUS operation in CONNECTED mode CMCC discussion Rel-19 NR\_LPWUS-Core

R2-2504469 Discussion on LP-WUS in RRC\_CONNECTED HONOR discussion Rel-19 NR\_LPWUS-Core

R2-2504514 LP-WUS in RRC\_CONNECTED Nokia, Nokia Shanghai Bell discussion

R2-2504556 Open issues on LP-WUS operation in CONNECTED state Qualcomm Incorporated discussion NR\_LPWUS-Core

R2-2504601 LP-WUS in RRC Connected Mode Lenovo discussion NR\_LPWUS-Core

## 8.11 Evolution of NR duplex operation: Sub-band full duplex (SBFD)

(NR\_duplex\_evo-Core; leading WG: RAN1; REL-19; WID: [RP‑241614](https://www.3gpp.org/ftp/meetings_3gpp_sync/ran/docs/RP-241614.zip))

Time budget: 0.75 TU

Tdoc Limitation: 2 tdocs

### 8.11.1 Organizational

Incoming LS, Rapporteur input, including workplan, running CRs, open issue list(s), etc..

Running CR

R2-2503422 Introduction of SBFD in TS 38300 (Running CR) CATT draftCR Rel-19 38.300 18.5.0 NR\_duplex\_evo-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

R2-2503862 RRC running CR for Evolution of NR duplex operation (SBFD) Huawei, HiSilicon draftCR Rel-19 38.331 18.5.1 B NR\_duplex\_evo-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

R2-2504444 MAC running CR for Evolution of NR duplex operation: SBFD Samsung draftCR Rel-19 38.321 18.5.0 B NR\_duplex\_evo-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

Summary and open issue list

R2-2503866 Remaining RRC open issues in feature SBFD Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*[Proposals for easy agreement]*

*[Proposal for RRC-1] To use RRC signaling, e.g., additional field in RACH-ConfigCommon IE to indicate RO type for CBRA. (15/16 support, no need for meeting contributions on this issue.)*

*[Proposal for RRC-3] The value range of preamble transmission number threshold for fallback between legacy RO and additional RO is {n1, n2, n4, n6, n8, n10, n20, n50, n100, n200}. (Acceptable by 11/15, no strong preference for the alternative option. No meeting contributions are needed.)*

*[Proposal for RRC-4] RAN2 confirms that the separate Layer 3 measurement report for CSI-RS resources in SBFD symbol is not supported, no RRC spec impact is expected. (13/15 support. No contributions for May meeting are needed as the opponents only propose to wait for RAN4 conclusion.)*

Discussions

RRC-1

- HW think exact place to put this config can be further discussed. ZTE think it is under per BWP, QC agree.

- LG E think we can first agree that we will use RRC signalling. QC think it should be RRC signalling.

* To use RRC signalling to indicate (per BWP indication) RO type for CBRA.

RRC-3

- Ericsson think the values should be smaller than legacy.

- LG E think it is up to NW configuration.

* The value range of preamble transmission number threshold for fallback between legacy RO and additional RO is {n1, n2, n4, n6, n8, n10, n20, n50, n100, n200}.

RRC-4

Discussion

- Nokia ok with the proposal, and think we should inform R4.

- Charter think R4 already agree that the resources should be configured separately for SBFD and non-SBFD symbol. Apple ok with the proposal, think for L3 there is no such agreement, and think for some of the cases it is still open.

- Ericsson ok with the proposal, do not see a need to send LS to R4. QC, Samsung, LG E, ZTE share this view.

- ZTE think we can also add ‘SSB resources’ to the proposal.

* Working assumption: RAN2 confirms that the separate Layer 3 measurement report for CSI-RS resources in SBFD symbol is not supported, no RRC spec impact is expected.

*[Proposals for discussion]*

*[Proposal for RRC-2] RAN2 to decide whether ” Early UL synchronization with an LTM candidate cell” and/or ”RACH-based LTM” can be supported in SBFD symbols and the RRC signallings if to support. (based on companies’ meeting contributions, 11/16 companies prefer not to support.)*

R2-2504437 Remaining MAC open issues for Rel-19 SBFD Samsung discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Issue MAC-4: RO Type Signalling in LTM Cell Switch Command MAC CE*

*Proposal 4: If SBFD RO is supported for RACH-based LTM, RAN2 to discuss how to modify the LTM Cell Switch Command MAC CE for RO type signalling.*

Discussion

- Apple fine with early UL sync, but for RACH-based LTM if we exclude then there is confliction with previous agreements.

- CATT see some benefits. ZTE also see benefit.

- LG E ok to support RACH-based LTM since there is benefit in latency. LG E do not support UL early sync, since more information need to be provided to UE.

- OPPO do not think such combination so essential. Charter, QC agree. Charter do not see a need to include RO type in the MAC CE. QC think it is needed.

- Samsung see impact to RAN3, also think this is x-WI issue, and think it cannot be done in time. Lenovo, QC, Ericsson, Nokia agree.

- ZTE think R3 impact hasn’t be discussed, and think there is no new signalling.

[CB]

Rapp suggest two alternatives, a) only support RACH-based LTM, or b) neither.

### 8.11.2 Random access in SBFD

RAN2 impacts to support SBFD operation to support random access in SBFD symbols by UEs in RRC \_CONNECTED mode and RRC\_IDLE/INACTIVE mode.

[Issue MAC-1: CSI-RS based CFRA with SBFD RO]

R2-2503874 Discussion on random access procedure in SBFD ZTE Corporation discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 12: Support using CSI-RS beam for SBFD RO in BFR and ReconfigurationWtihSync kind of CFRA, and there is no need to design separate SSB-RSRP or CSI-RSRP threshold than legacy.*

R2-2504169 Remaining issues for RACH in SBFD Apple discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 1: Send an LS to RAN1/RAN4 to check if CSI-RS based CFRA should be supported in SBFD WI.*

Discussion

- Samsung, LG E, Nokia support ZTE P12.

- Xiaomi support Apple and also think this hasn’t been discussed in R1, so not sure if it works.

- LG E think R1 didn’t have issue to support CSI-RS based CFRA. LG E think we can send our agreement to RAN1/4. Nokia and HW share the view from LG E.

- Ericsson wonders whether BFR and HO should be discussed separately in ZTE P12.

- Ericsson not sure why we need to send LS because R1/R4 already discussed.

* CSI-RS based CFRA using SBFD RO is supported from RAN2 perspective. Send LS to RAN1/4 to inform this conclusion.

Chair: will use post meeting email discussion to approve the LS to R1/R4.

[Issue MAC-2: RA Resource Set Reselection at RO Type Switching]

R2-2504223 Views on random access for SBFD Qualcomm Incorporated discussion NR\_duplex\_evo-Core

* Noted

*Proposal 7: When RO type switches from one type of RO to the other type of RO, UE should evaluate the set of RACH resources of the feature combinations configured in the other type of RO.*

*Proposal 8: For RACH fallback from one type of RO to the other type of RO, at least UE is allowed to switch the type of RO configured with the same feature combinations. FFS the case of no same feature combination configured on the other type of RO when performing RACH fallback.*

R2-2503477 Remaining issues on Random Access procedure for SBFD LG Electronics Inc. discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 4. For PRACH transmission re-attempt in one RA procedure, UE is allowed to switch between SBFD RO and non SBFD-RO only in the same feature combination and the same repetition number.*

R2-2504169 Remaining issues for RACH in SBFD Apple discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 2: Feature specific RACH resource set configurations are independent between SBFD and non-SBFD RO types. Once UE switches to a different RO type, RACH resource set selection is re-started.*

Discussion

- Samsung, Ericsson support LG E proposal. Samsung think P2 from Apple is complex.

- Ericsson think we can start with P8 from QC, and it can be left to NW implementation to ensure those configurations are the same.

- CATT think ‘same feature combination’ is important. CATT see benefit of keeping ‘same or higher’ repetition number. ZTE share this view.

- ZTE, CMCC agree with P8 from QC.

- Apple think with the 1st half of QC P8, it means NW should configure the same feature set combination for both RO types. QC confirms this understanding. CATT think there is no NW restriction.

- LG E do not want the complexity of choosing different feature set comb for different ROs.

- QC open to discuss UE behavor if NW configures different FSC for different ROs.

- Xiaomi agree with Apple. Charter share this view.

*?? For RACH fallback from one type of RO to the other type of RO, at least UE is allowed to switch the type of RO configured with the same feature combinations.*

*?? FFS the case of no same feature combination configured on the other type of RO when performing RACH fallback.*

[Issue MAC-3: Msg 1 Repetition Number Fallback with SBFD RO]

R2-2503423 Random Access in SBFD symbols CATT discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 7: (MAC-3) Msg1 repetition number fallback can be supported within SBFD RO.*

*Proposal 8: Once RO type fallback condition is met, UE should first perform RO type fallback and determine the Msg1 repetition number based on the new RO type.*

R2-2503379 Impacts on the random access by the evolution of duplex operation Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 5: After the RO type switching with preamble repetition, UE needs to select RACH resource set with same or higher Msg1 repetition number, i.e. fallback to lower Msg1 repetition number should be avoided.*

Discussion P7 of CATT paper

- Samsung, LG E, Lenovo support CATT P7. Samsung prefer the repetition # should be the same in case of fallback.

- Ericsson think UE should check rsrp threshold as well.

- LG E think after RO switch UE can further increase repetition # based on the threshold.

* Msg1 repetition number fallback can be supported within SBFD RO.

Discusison P8 of CATT paper

- LG has concern on UE complexity.

- ZTE not sure how it works, since UE should base on the repetition number that UE uses before RO type switching. Samsung also wonders. Lenovo share view form ZTE. CATT agree and think another alternative is for UE to determine the repetition number solely based on rsrp threshold.

- Nokia support P8 from CATT, and think after RO type switch the link condition may be quite different, so it is not obvious the same repetition # is still needed.

- Ericsson think it possible to consider both old repetition number and also the rsrp threshold for new RO type.

?? Once RO type fallback condition is met, UE should first perform RO type fallback and determine the Msg1 repetition number based on the new RO type.

* Once the conditions for both RO type fallback and Msg1 repetition number fallback are met, UE should perform RO type switch. FFS the Msg1 repetition number after RO type switch in this case.
* [AT130][209][SBFD] Proposals to address MAC-2 and MAC-3 (Samsung)

Intended outcome: Summary with proposals in R2-2504743 to address MAC-2 and MAC-3.

Deadline: before Friday CB

Chair: other issues can also be discussed in the CB sesion, if time allows

R2-2503379 Impacts on the random access by the evolution of duplex operation Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

R2-2503386 Random Access for SBFD NEC discussion Rel-19 NR\_duplex\_evo-Core

R2-2503423 Random Access in SBFD symbols CATT discussion Rel-19 NR\_duplex\_evo-Core

R2-2503434 Discussion on RACH in SBFD Xiaomi discussion Rel-19

R2-2503477 Remaining issues on Random Access procedure for SBFD LG Electronics Inc. discussion Rel-19 NR\_duplex\_evo-Core

R2-2503513 Open Issues on SBFD Random Access Sharp discussion Rel-19 NR\_duplex\_evo-Core

R2-2503606 Random access in SBFD Samsung discussion Rel-19

R2-2503646 Remaining issues of SBFD RACH procedure OPPO discussion Rel-19 NR\_duplex\_evo-Core

R2-2503840 Random Access Operation of SBFD Nokia Corporation discussion Rel-19 NR\_duplex\_evo-Core

R2-2503874 Discussion on random access procedure in SBFD ZTE Corporation discussion Rel-19 NR\_duplex\_evo-Core

R2-2504039 Remaining issues on RACH procedure in SBFD vivo discussion Rel-19 NR\_duplex\_evo-Core

R2-2504059 Remaining issues for Random Access in SBFD Operation Sony discussion Rel-19 NR\_duplex\_evo-Core

R2-2504169 Remaining issues for RACH in SBFD Apple discussion Rel-19 NR\_duplex\_evo-Core

R2-2504223 Views on random access for SBFD Qualcomm Incorporated discussion NR\_duplex\_evo-Core

R2-2504255 SBFD RA remaining aspects Ericsson discussion Rel-19 NR\_duplex\_evo-Core

R2-2504327 Discussion on RACH aspect in SBFD InterDigital, Inc. discussion Rel-19 NR\_duplex\_evo-Core

R2-2504397 Discussion on random access in SBFD CMCC discussion Rel-19 NR\_duplex\_evo-Core

R2-2504602 Random Access in SBFD Lenovo discussion NR\_duplex\_evo-Core

### 8.11.3 Other aspects

Other RAN2 impacts with SBFD if not covered by the previous agenda items.

R2-2504640 Other aspects about the evolution of duplex operation Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 1: RAN2 to confirm that the field sbfd-RACH-SingleConfig-r19 is included in RACH-ConfigCommonSBFD-r19 in BWP-UplinkCommon.*

Discussion

- QC think R1 is still discussing.

Chair: further signalling details will be checked in the post meeting email discussion.

R2-2504447 Other Aspects of SBFD Samsung discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 5: RAN2 confirm that the legacy Aperiodic CSI Trigger State Subselection MAC CE is also used to indicate the selection status of the Aperiodic Trigger States configured for aperiodic CLI measurement report.*

* RAN2 confirm that the legacy Aperiodic CSI Trigger State Subselection MAC CE is also used to indicate the selection status of the Aperiodic Trigger States configured for aperiodic CLI measurement report. No spec change is needed.

R2-2504256 CSI-RS measurements in SBFD Ericsson discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 1 No enhancement is needed for CSI-RS based RLM/BFD/CBD measurements.*

*Proposal 2 Keep the legacy RLM, BFD and BFR procedure in the MAC layer, i.e., no need for the MAC entity to trigger RLF, BFD and BFR for non SBFD symbols and SBFD symbols separately.*

*Proposal 3 Enhancement for L3 mobility CSI-RS measurement is not pursued.*

Discussion

- Nokia agree with P1 and P2. For P3, Nokia think for inter cell measurement UE needs to know the CSI-RS is in SBFD or non-SBFD symbol.

- LG E agree, QC with P1-3. For P3, LG E think there is no impact to L3 mobility measurement.

- QC think P3 already agreed.

* No enhancement is needed for CSI-RS based RLM/BFD/CBD measurements.
* Keep the legacy RLM, BFD and BFR procedure, i.e., no need to trigger RLF, BFD and BFR for non SBFD symbols and SBFD symbols separately.

Chair: other issues can also be discussed in the CB sesion, if time allows

R2-2503424 Discussion on other aspects of SBFD CATT discussion Rel-19 NR\_duplex\_evo-Core

R2-2503441 Other aspects of SBFD Xiaomi discussion Rel-19 NR\_duplex\_evo-Core

R2-2503647 Discussion on the SBFD related issues OPPO discussion Rel-19 NR\_duplex\_evo-Core

R2-2503875 Discussion on L3 measurements in SBFD ZTE Corporation discussion Rel-19 NR\_duplex\_evo-Core

R2-2503896 Other aspects of SBFD Nokia discussion Rel-19 NR\_duplex\_evo-Core

R2-2504040 SBFD other aspects vivo discussion Rel-19 NR\_duplex\_evo-Core

R2-2504225 Other aspects of SBFD Qualcomm Incorporated discussion NR\_duplex\_evo-Core

R2-2504256 CSI-RS measurements in SBFD Ericsson discussion Rel-19 NR\_duplex\_evo-Core

R2-2504328 Discussion on resource configuration aspect in SBFD InterDigital, Inc. discussion Rel-19 NR\_duplex\_evo-Core

R2-2504447 Other Aspects of SBFD Samsung discussion Rel-19 NR\_duplex\_evo-Core

R2-2504640 Other aspects about the evolution of duplex operation Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

## 8.12 NR MIMO Phase 5

(NR\_MIMO\_Ph5-Core; leading WG: RAN1; REL-19; WID: [RP-242394](http://ftp.3gpp.org/tsg_ran/TSG_RAN/TSGR_105/Docs/RP-242394.zip))

Time budget: 0.75 TU

Tdoc Limitation: 2 tdocs

### 8.12.1 Organizational

LSs and rapporteur input, including workplan, running CRs, open issue list(s), etc.

Work plan

R2-2504370 Work Plan for Rel-19 on NR MIMO Phase 5 CMCC, Samsung, MediaTek Work Plan Rel-19 NR\_MIMO\_Ph5-Core

* Noted

Running CR

R2-2504184 Running CR for MIMO Phase 5 Ericsson draftCR Rel-19 38.331 18.5.1 B NR\_MIMO\_Ph5-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

R2-2504209 Introduction of MIMO Samsung draftCR Rel-19 38.321 18.5.0 B NR\_MIMO\_Ph5-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

R2-2504371 Running CR for Rel-19 MIMO Phase 5 CMCC draftCR Rel-19 38.300 18.5.0 B NR\_MIMO\_Ph5-Core

* Endorsed. Will be updated and reviewed in post meeting email discussion.

Summary and open issue list

R2-2504185 Open issues for MIMO on 38.331 Ericsson discussion

* Noted

R2-2504210 Report of MAC open issues for MIMO Samsung discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

[Proposals for easy agreement:]

* UL skipping is not applicable to mode-B type-1 CG event-triggered beam report (i.e., MAC PDU is not generated).
* For Rel-16 UL skipping (enhancedSkipUplinkTxDynamic), the UCI for mode-A DG-based UE-initiated report follows the existing procedure (i.e., MAC PDU is generated), there is no MAC impact.
* The existing rule is applied to handle the overlapping/prioritization between the PUSCH of mode-A UE-initiated report and SR/other PUSCH in MAC. No MAC impact is expected.

[Issues for discussion:]

*Proposal 3: For Rel-15 UL skipping (skipUplinkTxDynamic is configured), discuss whether to generate MAC PDU for multiplexing UCI of mode-A DG-based UE-initiated report in PUSCH.*

Discussion

- Nokia think same principle as aCSI applies. Ofinno, Ericsson agree.

- LG E think all companies agree but issue is how to capture in spec.

- Samsung think how to capture requires more discussion, and think UEI BM is different type of CSI than aCSI.

- ZTE think maybe we can use a general sentence to say this case uses the same behaviour as aCSI.

* For Rel-15 UL skipping (skipUplinkTxDynamic is configured), same principle as legacy aperiodic CSI applies for multiplexing UCI of mode-A DG-based UE-initiated report in PUSCH. Exact MAC spec can be discussed further.

[CB]

*Proposal 6: discuss to support sDCI mTRP 2TA for intra-DU LTM, in the same way as Rel-18 mDCI mTRP 2TA, i.e., the TA included in the LTM cell switch command is applied to the TAG configured for the indicated TCI state in LTM cell switch command.*

*Proposal 7: Regarding PL offset in LTM, discuss*

*i) how to apply the PL offset in intra-DU LTM when PL offset is provided in LTM configuration (e.g., the PL offset for the indicated TCI state in the LTM cell switch command is applied for the first PUSCH transmission in RACH-less LTM cell switch);*

*ii) whether to support PL offset in intra-DU LTM when PL offset is not provided in LTM configuration for the target cell.*

*Proposal 10: Discuss whether the same rule of CSI report transmission is applied to UEI report (e.g., for activated/deactivated SCell/SCG, handling of measurement gaps, handling of FR2 UL gaps, BWP operation, cell DRX operation).*

### 8.12.2 Asymmetric DL sTRP/UL mTRP

RRC/MAC aspects related to asymmetric DL sTRP/UL mTRP

[R2-2504210, Proposal 5: discuss the scenario asymmetric DL sTRL/UL mTRP with no PL offset (i.e. the UL TRP may transmit SSB) based on RAN1/RAN4 LS (R1-2503091) and spec. impact regarding 2TA for sDCI mTRP.]

R2-2504211 Open issues on Asymmetric DL sTRP/UL mTRP Samsung discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: 2TA operation is supported for single-DCI mTRP without the restriction that coresetPoolIndex needs to be configured with more than one value, and single-DCI mTRP 2TA is applied to both the scenarios that PL offset is configured (i.e., asymmetric DL sTRP/UL mTRP) and PL offset is not configured (i.e., ICBM).*

[CB]

*Proposal 1-1: Discuss how to capture field description for tag2 to keep backward compatibility for Rel-18 mDCI mTRP 2TA and also make the field applicable to Rel-19 sDCI mTRP 2TA.*

* *Option 1: as a clean solution, introduce a new RRC parameter per BWP that explicitly enables the Rel-19 sDCI-mTRP 2TA, and clarify in FD of tag2 to include all cases where tag2 is configured that “it is optionally configured in a serving cell for mDCI mTRP 2TA if coresetPoolIndex for a BWP is configured with more than one value, and for sDCI mTRP 2TA if [the new parameter is configured].”;*
* *Option 2: use coresetPoolIndex to implicitly enable Rel-18 mDCI mTRP 2TA or Rel-19 sDCI mTRP 2TA, i.e., update the FD of tag2 that “it is optionally configured for a serving cell for mDCI mTRP 2TA if coresetPoolIndex for a BWP is configured with more than one value, and for sDCI mTRP 2TA if coresetPoolIndex for a BWP is not configured or coresetPoolIndex is configured with no more than one value”;*
* *Option 3: use UE capability to distinguish Rel-19 feature, i.e., update the FD of tag2 that “For UE not supporting 2TA for sDCI mTRP, it is optionally configured in a serving cell if and only if the serving cell is configured with more than one value for the coresetPoolIndex for a BWP. For UE supporting 2TA for sDCI mTRP, it is optionally configured in a serving cell for mTRP operation if coresetPoolIndex for a BWP is not configured or configured with only one value.”.*

*Proposal 2: Regarding sDCI mTRP 2TA operation for the scenario PL offset is not configured (UE is configured with SSB-MTC-additionalPCI), discuss how to configure n-TimingAdvanceoffset or n-TimingAdvanceOffset2.*

* *Option 1: RAN2 assumes both n-TimingAdvanceoffset and n-TimingAdvanceOffset2 are configured unless RAN1 has different agreement.*
* *Option 2: send LS to ask RAN1.*

R2-2504245 Discussion on UL only mTRP Qualcomm Incorporated discussion

* Noted

*Proposal 1. RAN2 support the follows for 2 TAs when PL offset is not configured, based on Rel-18 2TA configuration:*

*• remove the restriction that RRC field tag2 is configured only if coresetPoolIndex is configured with more than one value;*

*• keep both single n-TimingAdvanceoffset and n-TimingAdvanceOffset2.*

Discussion

- OPPO think O3 from Samsung is good, ZTE share this view. OPPO agree to have both TA offsets.

- ZTE support Qualcomm proposal.

* 2TA operation is supported for Rel-19 single-DCI mTRP without the restriction that coresetPoolIndex needs to be configured with more than one value, and single-DCI mTRP 2TA is applied to both the scenarios that PL offset is configured and PL offset is not configured.
* Regarding Rel-19 sDCI mTRP 2TA operation for the scenario PL offset is not configured (UE is configured with SSB-MTC-additionalPCI), RAN2 assumes both n-TimingAdvanceoffset and n-TimingAdvanceOffset2 are configured unless RAN1 has different agreement.

[R2-2504210, Proposal 8: Discuss whether/how Rel-18 TCI state activation MAC CEs for sDCI mTRP is applied for asymmetric DL sTRP/UL mTRP.]

R2-2503820 Consideration on Asymmetric DL sTRP/UL mTRP LG Electronics Inc. discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 2. Reuse Rel-18 Unified TCI States A/D MAC CE for asymmetric DL sTRP/UL mTRP deployment.*

R2-2503857 Discussion on asymmetric DL sTRP/UL mTRP Nokia Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 4: Reuse the Release-18 TCI State activation/deactivation MAC Control Element (CE) to support both joint and separate TCI modes in the asymmetric mTRP scenario. In the case of separate TCI mode, where a UL-only TRP is present without a corresponding DL TCI State, the associated Fi,j field in the MAC CE shall be set to 0, and the UE shall ignore this field.*

R2-2503626 Discussion on open issues for asymmetric DL sTRPUL mTRP vivo discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: (MAC-4) Send an LS to RAN1 to check whether to design new MAC CE(s) for the TCI States Activation/Deactivation or to extend Rel-18 Enhanced Unified TCI States Activation/Deactivation MAC CE for Joint TCI States and Enhanced Unified TCI States Activation/Deactivation MAC CE for Separate TCI States for the asymmetric DL sTRP/UL mTRP scenarios.*

* Rel-17/18 Unified TCI States A/D MAC CE is reused for asymmetric DL sTRP/UL mTRP deployment.
* No MAC spec impact is expect, can confirm in the post meeting email discussion

[PL offset for RRCresume / HO]

R2-2504100 Discussion on remaining issues on Asymmetric DL sTRP/UL mTRP Huawei, HiSilicon discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 3a: Select one from the following two options for PL offset update for handover:*

*• Option1: Delta signalling is not supported for PL offset.*

*• Option2:*

*Delta signalling is supported for PL offset.*

*Before RRC reconfiguration, the latest PL offset should be indicated from DU to CU for handover.*

*To clarify in TS 38.331 that when the pathlossOffset is absent in RRC configuration, the “current” pathlossOffset configuration stored at the UE refers to the latest configuration provided by RRC message or MAC CE.*

*Proposal 3b: If Option 2 is adopted, a LS to RAN3 is needed to ask for if any potential impacts.*

R2-2503644 Remaining issues of asymmetric DL sTRP and UL mTRP OPPO discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: RAN2 is kindly requested to clarify that the pathlossOffset configuration stored in RRC refers to the latest configuration provided by RRC message or MAC CE.*

*Proposal 2: To clarify in TS 38.321 that the path offset provided by the Pathloss Offset Update MAC CE is indicated to RRC (i.e. upper layer).*

*Proposal 4: During handover, the pathlossOffset forwarded from the source node to the target node is the latest configuration provided by RRC message or MAC CE.*

*Proposal 5: The INACTIVE UE stores the latest pathlossOffset provided by RRC message or MAC CE.*

*Proposal 6: The gNB can provide the latest pathlossOffset via the CellGroupConfig of the RRCResume message. No specification change is needed.*

R2-2503741 Discussion on Asymmetric DL sTRP UL mTRP CATT discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: No further spec impact is needed for delta configuration upon handover or RRCResume procedure even if the PL offset had been updated by the PL offset update MAC CE.*

Discussion

- Ericsson do not see an issue. Ericsson think we can confirm that delta signalling is not supported.

- QC think for the case of high mobility and or FR2 the pathloss will anyway need to be reconfigured upon RRC resume.

*?? The pathlossOffset configuration stored in RRC refers to the latest configuration provided by RRC message or MAC CE.*

*?? Delta signalling is not supported for PL offset.*

* [AT130][201][MIMO\_Ph5] Proposals for PL offset for RRCresume / HO (Huawei)

Scope: Discuss proposals on PL offset for RRCresume / HO, taking into account R2-2504100 and R2-2503644

Intended outcome: Summary with Proposals in R2-2504731.

Deadline: before Friday CB

*Chair: other issues can be discussed in the CB session if time allows*

R2-2503388 RACH Procedure for Asymmetric DL sTRP/ UL mTRP NEC discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503524 Enhancements for Asymmetric DL sTRP and UL mTRP Ofinno discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503626 Discussion on open issues for asymmetric DL sTRPUL mTRP vivo discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503644 Remaining issues of asymmetric DL sTRP and UL mTRP OPPO discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503735 Discussion on asymmetric UL mTRP in LTM cell switch SHARP Corporation discussion NR\_MIMO\_Ph5-Core

R2-2503741 Discussion on Asymmetric DL sTRP UL mTRP CATT discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503820 Consideration on Asymmetric DL sTRP/UL mTRP LG Electronics Inc. discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503857 Discussion on asymmetric DL sTRP/UL mTRP Nokia Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503917 Discussion on PL offset Lenovo discussion Rel-19

R2-2504031 Asymmetric DL/UL mTRP user plane impact from MIMO ph. 5 Ericsson discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2504100 Discussion on remaining issues on Asymmetric DL sTRP/UL mTRP Huawei, HiSilicon discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2504211 Open issues on Asymmetric DL sTRP/UL mTRP Samsung discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2504245 Discussion on UL only mTRP Qualcomm Incorporated discussion

R2-2504248 Discussion on asymmetric DL sTRP/UL mTRP China Telecom Corporation Ltd. discussion

R2-2504368 Discussion on Asymmetric DL sTRP/UL mTRP CMCC discussion Rel-19 NR\_MIMO\_Ph5-Core

=> Revised in R2-2504665

R2-2504665 Discussion on Asymmetric DL sTRP/UL mTRP CMCC discussion Rel-19 NR\_MIMO\_Ph5-Core R2-2504368 Late

R2-2504625 Consideration on the Remaining Issues of Asymmetric TRP ZTE Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

### 8.12.3Others

Other issues if not covered by the previous agenda items.

[R2-2504210, Proposal 9: Discuss UE behavior when UE-initiated report is triggered but there is no valid PUCCH/PUSCH resource to transmit UE-initiated report (e.g., PUCCH resource is released by RRC and type-1 CG is cleared in MAC due to TAT expired).]

R2-2504626 Consideration on the Remaining Issues of UEIBM ZTE Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 4: When UE-initiated report is triggered but there is no valid PUCCH/PUSCH resource to transmit UE-initiated report, the RACH procedure can be triggered without MAC spec impact/or enhancement.*

R2-2504369 Discussion on other issues of NR MIMO Phase 5 CMCC discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: We believe that when a UEI report is triggered and TAT expires (UL out-of-sync), the UE should prioritize initiating random access (RACH) to recover synchronization, and the UEI report may be suspended or discarded.*

*Proposal 2: When a UEI report is triggered and TAT expires, UEs with beam report buffering capabilities may prioritize initiating random access (RACH) and carry the UEI beam report in Msg3 or MsgA, though this mechanism requires further discussion on potential protocol impacts.*

Discussion

- LG E wonder whether ZTE proposal means the RACH is triggered to send the UEI BM, and think if this is the case there is MAC impact.

- Samsung think this involves a new case to trigger the RACH.

- OPPO think ZTE proposal is enhancement and think NW should provide UL grant.

- Nokia think the first PUCCH is similar to SR behaviour, and think there is some MAC impact.

- Apple think we need to discuss the case of TAT expiration, whether the resource for the 1st PUCCH is released or not. HW think in this case the PUCCH/PUSCH resources are released.

- CATT think we need also to discuss that if RACH is triggered, whether the BM report is kept or discarded (e.g., due to outdated CSI), and think this is related to RAN1 discussion.

* [AT130][202][MIMO\_Ph5] On UE behaviour when UE-initiated report is triggered but there is no valid PUCCH/PUSCH resource (Samsung)

Scope: Discuss the UE behaviour when TAT expires and there is no valid PUCCH/PUSCH resource to transmit UE-initiated report

Intended outcome: Summary with Proposals in R2-2504732.

Deadline: before Friday CB

[Event configuration]

R2-2504186 Impacts from UE-initiated/event-driven beam management Ericsson discussion

* Noted

*Proposal 1 As a baseline, the events defined for UEI BM should be captured as a new reportConfigType which can also include parameters applicable only for one event. This can be captured once more parameters for this objective are defined by RAN1.*

* As a baseline, the events defined for UEI BM should be captured as a new reportConfigType which can also include parameters applicable only for one event. This can be captured once more parameters for this objective are defined by RAN1.

*Chair: other issues can be discussed in offline/CB/post meeting email discussions*

R2-2503525 Enhancements for UE-initiated/event-driven beam management Ofinno discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503627 Discussion on MAC and RRC open issues for UEI BMR vivo discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503645 Clarification on the UL skipping for event-triggered beam reporting OPPO discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503737 Discussion on overlapping rule for mode-A beam report in PUSCH SHARP Corporation discussion NR\_MIMO\_Ph5-Core

R2-2503742 Discussion on UE-initiated Beam Reporting CATT discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503821 Discussion on UEI beam reporting impact LG Electronics Inc. discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2503865 RAN2 Aspects of the NR MIMO Nokia Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2504099 Discussion on remaining issues of UE-initiated/event-driven beam management Huawei, HiSilicon discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2504186 Impacts from UE-initiated/event-driven beam management Ericsson discussion

R2-2504212 Open issues on UE-initiated Reporting and RRC parameters Samsung discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2504246 Discussion on UE Initiated Beam Report Qualcomm Incorporated discussion

R2-2504249 Discussion on UE Initiated Beam Report China Telecom Corporation Ltd. discussion

R2-2504369 Discussion on other issues of NR MIMO Phase 5 CMCC discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2504499 Discussion on RRC impacts for UEI Beam Reporting Mode B ASUSTeK discussion Rel-19 38.331 NR\_MIMO\_Ph5-Core

R2-2504500 Discussion on MAC impacts for UEI Beam Reporting Mode B ASUSTeK discussion Rel-19 38.321 NR\_MIMO\_Ph5-Core

R2-2504626 Consideration on the Remaining Issues of UEIBM ZTE Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

## 8.20 NR Others

Tdoc limit: 2

Specific items may be allocated to a breakout session for treatment.

Impacts from Other RAN WGs and TSGs that has no separate TU budget in RAN2. LS ins for Rel-19 specific WIs/SIs that has no RAN WI.

Additional tdocs on top of limit can be allowed for co-sourced contribution with 3 or more companies

### 8.20.1 RAN4

LS with no action to RAN2

R2-2503327 LS of RAN4 RRM agreements on LB CA via switching (R4-2504956; contact: Apple) RAN4 LS in Rel-19 NR\_LBCA\_Sw-Core To:RAN1 Cc:RAN2

* Noted

Rx BSF optimization

R2-2503326 LS on Rx BSF optimization for NR RRM Ph5 (R4-2504962; contact: CICT Mobile) RAN4 LS in Rel-19 NR\_RRM\_Ph5-Core To:RAN2

* Noted

R2-2503580 Discussion on Rx BSF optimization for NR RRM Ph5 CATT discussion Rel-19 NR\_RRM\_Ph5-Core

* Noted

*Proposal 1: RAN2 waits for RAN4 further progress for Rx BSF optimization.*

[CB] Friday, check potential progress from R4 during the week

R2-2504030 Discussion on Rx BSF optimization ZTE Corporation discussion Rel-19 NR\_RRM\_Ph5-Core

* Noted

*Proposal 1: Multi-Rx L3 measurement is only applicable when the UE is configured with FR2-1 PCell only, and there is only one SSB-based MO configured, the MO is FR2-1 carrier and can be different from PCell’s frequency.*

*Proposal 2: Separate RSRP threshold and RSRQ threshold are introduced. If both are configured, it means the UE activates multi-Rx L3 measurement when both of the thresholds are satisfied.*

*Proposal 3: Do not consider TimeToTrigger and Hysteresis in activation condition.*

*Proposal 4: RAN2 assumes the UE at least deactivates multi-Rx L3 measurement when the threshold becomes not satisfied. FFS on other conditions, pending RAN4.*

Discussion

- OPPO think we can wait for more info from R4.

R2-2503897 Reduced Beam Sweeping Factor Nokia CR Rel-19 38.331 18.5.1 5354 - B NR\_RRM\_Ph5-Core

Simultaneous Tx-Rx capability for TDD-SDL and TDD-FDD combinations

R2-2503329 LS on simultaneous Tx-Rx capability for TDD-SDL and TDD-FDD combinations (R4-2505123; contact: Huawei) RAN4 LS in Rel-19 LTE\_NR\_R19\_Simult\_RxTx To:RAN2

* Noted

R2-2503951 Discussion on simultaneous Tx-Rx capability for TDD-SDL and TDD-FDD combinations Huawei, HiSilicon discussion Rel-19 LTE\_NR\_R19\_Simult\_RxTx

*Proposal 1: RAN2 confirms that no RAN2 specification impacts for FDD-TDD CA band combination.*

*Proposal 2: The simultaneousRxTxInterBandCA is extended to cover TDD-SDL BC from Rel-15.*

*Proposal 3: If the Proposal 2 can be agreed, the similar changes for simultaneousRxTxInterBandCA are applied to simultaneousRxTxInterBandENDC, simultaneousRxTxInterBandCAPerBandPair and simultaneousRxTxInterBandENDCPerBandPair.*

R2-2504188 Simultaneous Tx-Rx capability for TDD-SDL and TDD-FDD Ericsson discussion

*Proposal 1 A note is added to simultaneousRxTxInterBandCA (from Rel-19) to clarify that TDD-FDD also includes the case of TDD-SDL.*

*Proposal 2 Discuss how to update simultaneousRxTxInterBandCAPerBandPair to be applicable to all band pairs and if any update is also needed for simultaneousRxTxInterBandCA.*

Discussion

- Ericsson think if we agree P2 from HW then P1 from their contribution is resolved.

* The simultaneousRxTxInterBandCA is extended to cover TDD-SDL BC from Rel-15.
* Similar changes for simultaneousRxTxInterBandCA are applied to simultaneousRxTxInterBandENDC, simultaneousRxTxInterBandCAPerBandPair and simultaneousRxTxInterBandENDCPerBandPair.
* [AT130][203][NR\_Others] CR for Simultaneous Tx-Rx capability for TDD-SDL and TDD-FDD (Huawei)

Intended outcome: Agreeable Rel-15/16/17/18 CRs for TS 38.306 (Rel-15 CR in R2-2504734, Rel-16 CR in R2-2504735, Rel-17 CR in R2-2504736, and Rel-18 CR in R2-2504737)

Deadline: before Friday CB

UE capabilities for FR2 MPR improvement

R2-2503330 LS on introduction of new UE capabilities for FR2 MPR improvement (R4-2505144; contact: Samsung, Qualcomm) RAN4 LS in Rel-19 NR\_ENDC\_RF\_Ph4-Core To:RAN2

* Noted

Discussion

- Samsung explains R4 will provide more information and no need to agree on CR in this meeting.

R2-2504449 Introduction of new UE capabilities for FR2 MPR improvement Samsung CR Rel-19 38.306 18.5.0 1297 - B NR\_ENDC\_RF\_Ph4-Core

R2-2504450 Introduction of new UE capabilities for FR2 MPR improvement Samsung CR Rel-19 38.331 18.5.1 5374 - B NR\_ENDC\_RF\_Ph4-Core

* The CRs are postponed

Type 4 for non-collocated deployment

R2-2503331 LS to RAN2 on Type 4 for non-collocated deployment (R4-2505161; contact: Samsung) RAN4 LS in Rel-19 NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core To:RAN2

* Noted

R2-2503817 Discussion on singling design for Non-collocated feature KDDI Corporation, Samsung discussion Rel-19

* Noted

*Proposal 1: RAN2 confirm to specify one capability and one BS signaling for NR-CA*

*Proposal 2: RAN2 discuss and confirm that one capability and one BS signaling for EN-DC, type 4a and type 4b capability can be differentiated by legacy capability, MIMO-CapabilityDL-r10 on E-UTRA carrier can work effectively. If not, separate capabilities and BS signaling may be considered.*

*Proposal 3: RAN2 confirm that a Rel-19 UE supporting type 4a/4b should also support and report type2 capability.*

*Proposal 4: RAN2 confirms that, when both the gNB and UE support the Rel-19 signaling associated with the non-collocated feature, the gNB may provide Rel-19 signaling. If the Rel-19 signaling is not supported by either the gNB or UE, the gNB using Rel-18 signaling associated with the Rel-18 non-collocated feature (if supported).*

*Proposal 5: RAN2 discuss the pros and cons of the two options below and clarify that the UE follow the Rel-18 behavior has less demerits when*

*- the gNB does not support Rel-19 BS signaling, or*

*- the gNB supports Rel-19 BS signaling but does not provide it to the UE,*

*That is, when configured with 4 MIMO layers, the UE applies the type 1 (collocated) requirements as specified in Rel-18.*

*Op1: Rel-19 UE applies the type 4 (non-collocated) requirements without Rel-19 BS signaling*

*OP2: Rel-19 UE follow the Rel-18 behavior without Rel-19 BS signaling e.g. applies the type 1 (collocated) requirements*

*Proposal 6: RAN2 discuss the pros and cons of the two options and select one of the options as a way forward*

*- Op1. Rel-19 UE applies the type 4 (non-collocated) requirements with Rel-19 BS signaling*

*- Op2. Rel-19 UE applies either type1 (collocated) or type4 (non-collocated) requirements based on explicit Rel-19 BS signaling with value 0/1*

*Proposal 7: RAN2 discuss and decide whether to introduce new Rel-19 signaling, rather than extending the existing Rel-18 signaling to support 4 MIMO layers non-collocated requirements.*

R2-2504189 Additional aspects on Type 4 for non-collocated deployment Ericsson discussion

* Noted

*Proposal 1 Type 4a/b capabilities for EN-DC are defined separately.*

*Proposal 2 For EN-DC, Type 4a and Type 4b are configured separately.*

R2-2504176 Discussion on Type 4 requirements for intra-band non-collocated ENDC/NR SA Apple discussion Rel-19 NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core

* Noted

*BS signaling:*

*Proposal 1: For BS signaling, introduce Rel-19 nonCollocatedTypeNR-CA/MRDC-r19 with two code points {Type 1, Type 4} into CellGroupConfig, applicable when MaxMIMO-layers is configured as 4.*

*Proposal 2: If Rel-19 nonCollocatedTypeNR-CA/MRDC-r19 is absent, Rel-19 UE(s) apply Rel-18 principle accordingly.*

*UE capability:*

*Proposal 3: Introduce per-BC UE capability interBandMRDC-WithOverlapDL-Bands-r19 into MRDC-Parameters, and per-BC UE capability intraBandNR-CA-non-collocated-r19 into CA-ParametersNR.*

*Proposal 4: Capture that if a UE supports Type 4 UE capabilities, it also reports support on corresponding Type 2 UE capabilities.*

Discussion on P1/P2 from R2-2504176

- OPPO not sure whether two codepoints are needed.

- ZTE think for R19 the default type is type 1 so one codepoint is sufficient.

- Nokia, Ericsson think Apple P1 is clean design.

- HW think if we only use one codepoint then we should follow Rel-18.

BS signaling

* For BS signaling, introduce Rel-19 nonCollocatedTypeNR-CA/MRDC-r19 with two code points {Type 1, Type 4} into CellGroupConfig, applicable when MaxMIMO-layers is configured as 4.
* If Rel-19 nonCollocatedTypeNR-CA/MRDC-r19 is absent, Rel-19 UE(s) apply Rel-18 principle accordingly.

UE capability:

* Introduce per-BC UE capability interBandMRDC-WithOverlapDL-Bands-r19 into MRDC-Parameters, and per-BC UE capability intraBandNR-CA-non-collocated-r19 into CA-ParametersNR.
* Capture that if a UE supports Type 4 UE capabilities, it also reports support on corresponding Type 2 UE capabilities.

[CB] Wednesday

*Proposal 1 Type 4a/b capabilities for EN-DC are defined separately.*

*Proposal 2 For EN-DC, Type 4a and Type 4b are configured separately.*

Discussion

- Ericsson think it is fine to have single capability and configuration.

- KDDI think R4 need our reply in August. Nokia think it is ok now that we have high level agreements. Samsung think email discussion for CR is not needed.

R2-2503375 Discussion on R4 LS on UE Architecture Type-4a/4b OPPO discussion Rel-19 NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core

* Noted

R2-2504627 Consideration on the Type 4 UE for Non-collocated Deployment ZTE Corporation discussion Rel-19 NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core

* Noted

R2-2504564 Introduction of signaling support for intra-band non-collocated EN-DC/NR-CA deployment Phase 2: new receiver type(s) KDDI CR Rel-19 38.331 18.5.1 5382 - B NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core

* Postponed

R2-2504566 signalling support for intra-band non-collocated NR-CA EN-DC KDDI Corporation CR Rel-19 38.306 18.5.0 1299 - B NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core

* Postponed

R2-2503816 iscussion on singling design for Non-collocated feature KDDI Corporation, Samsung discussion Withdrawn

R2-2504563 draftCR 38.331 signalling support for intra-band non-collocated NR-CA EN-DC KDDI Corporation draftCR Rel-18 38.331 18.5.1 B NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core Withdrawn

DL MIMO layers capabilities for 6Rx UEs

R2-2503334 LS on DL MIMO layers capabilities for 6Rx UEs (R4-2505225; contact: Intel) RAN4 LS in Rel-19 NR\_ENDC\_RF\_Ph4 To:RAN2 Cc:RAN1

* Noted

Discussions

- MediaTek think there is no conclusion that this capability is captured in R4 spec.

R2-2503446 Discussion on DL MIMO layer capability for 6Rx UE Xiaomi, Intel Corporation, Oppo, Ericsson, Nokia, Qualcomm Incorporated, ZTE, Sanechips, CATT, T-mobile USA, CHTTL discussion Rel-19 NR\_ENDC\_RF\_Ph4

* Noted

*Proposal 1: Introduce a new capability for maximum 6 DL MIMO layer as optional capability.*

*Proposal 2: RAN2 specification will not capture 6 DL MIMO layer is only applicable for FWA.*

*Proposal 3: A UE supporting 6 DL MIMO layer shall indicate both maxNumberMIMO-LayersPDSCH and maxNumberMIMO-LayersPDSCH-v1900 for a CC. When both capabilities are reported, the network which is able to decode the maxNumberMIMO-LayersPDSCH-v1900 ignores the maxNumberMIMO-LayersPDSCH.*

R2-2504594 Discussion on 6 DL MIMO layers Huawei, HiSilicon, MediaTek Inc., Samsung, Apple discussion Rel-19 NR\_ENDC\_RF\_Ph4

* Noted

*Proposal 1: Introduce a new optional per-CC capability to indicate support of maximum 6 DL MIMO layers only for FWA UE.*

*Proposal 2: If the new capability is included, the legacy maxNumberMIMO-LayersPDSCH shall be set to fourLayers for the corresponding component carrier. The network ignores the maxNumberMIMO-LayersPDSCH if the new capability is included.*

Discussion on P1 from R2-2504594

- T-Mobile USA think signalling should be generic.

- CATT agree with Xiaomi and think it is not so clear how to specify FWA from R2 point of view. QC share this view and think there are other examples that we don’t do so. Nokia, OPPO, Xiaomi, ZTE, Ericsson agree.

- Samsung think signalling design from the above two papers are similar but the only difference is do we mention FWA in 306 spec. Samsung think this restriction to FWA is very important so prefer to reflect in the field description of the capability. Apple agree.

- MediaTek think it is quite clear from RP that this capability is only for FWA, so no reason for R2 not to specify it.

Chair: the main controversy is whether to have FWA restriction (a note) in 38.306.

?? Introduce a new optional per-CC capability to indicate support of maximum 6 DL MIMO layers.

?? RAN2 understand this new capability is only for FWA, and RAN2 assume this will be captured in RAN4 spec.

* A UE supporting 6 DL MIMO layer shall indicate both maxNumberMIMO-LayersPDSCH and maxNumberMIMO-LayersPDSCH-v1900 for a CC. When both capabilities are reported, the network which is able to decode the maxNumberMIMO-LayersPDSCH-v1900 ignores the maxNumberMIMO-LayersPDSCH.

R2-2503447 Introduction of 6 DL MIMO layer Xiaomi, Intel Corporation, Oppo, Ericsson, Nokia, Qualcomm Incorporated, ZTE, Sanechips, CATT, T-mobile USA, CHTTL draftCR Rel-19 38.306 18.5.0 B NR\_ENDC\_RF\_Ph4

R2-2503448 Introduction of 6 DL MIMO layer Xiaomi, Intel Corporation, Oppo, Ericsson, Nokia, Qualcomm Incorporated, ZTE, Sanechips, CATT, T-mobile USA, CHTTL draftCR Rel-19 38.331 18.5.1 B NR\_ENDC\_RF\_Ph4

* The CRs are postponed

CSSF optimization

R2-2503579 Consideration on CSSF optimization CATT discussion Rel-19 NR\_RRM\_Ph5-Core

* Noted

*Proposal 1: Introduce a new MAC CE to indicate the specific SCC per-band for CSSF optimization.*

R2-2503814 RAN2 impact on CSSF optimization Apple, Ericsson discussion Rel-19 NR\_RRM\_Ph5-Core

* Noted

*Propsoal 1: To support R19 CSSF optimization feature, the RAN2 signaling design should not affect the configuration state of the SCell.*

*Proposal 2: The new RAN2 signaling needs to be introduced to support R19 CSSF optimization.*

*<RAN2 signalling design>*

*Proposal 3: Introduce the UE specific RRC configuration to enable/disable the CSSF optimization feature.*

*Proposal 4: Introduce a new MAC CE to indicate the specific SCC per-band for serving and neighbor measurement.*

*Proposal 5: If proposal 4 is not agreed, alternative 1 and alternative 2 are proposed for down selection.*

*o Alternative 1: Introduce new RRC configuation to indicate which SCell/SCC to be measured.*

*o Alternative 2: The existing SSC selection rule is used for neighbor measurement is reused to cover the serving cell measurement (No additional configuration is introduced).*

*<UE capability>*

*Proposal 6: Wait for RAN4 to introduce the UE capabilities for this feature.*

R2-2503942 Discussion on CSSF optimization and Rx BSF optimization for NR RRM ph5 Huawei, HiSilicon discussion Rel-19 NR\_RRM\_Ph5-Core

* Noted

*Proposal 1: Introduce an indication in measConfig to enable/disable CSSF enhancement.*

*Proposal 2: If the new indication is present, based on RAN4 requirements, UE may not measure a serving cell and the corresponding intra-frequency neighbour cells even if servingCellMO is configured for this serving cell.*

*Proposal 3: RAN2 to down-select from the following:*

*• Option 1: As indicated in RAN4 LS, NW indicates the SCC(s) to be measured.*

*• Option 2: When neither PCC nor PSCC is in the band, if there are multiple SCells configured with SSB based measurements it is up to UE implementation which SCell to measure; if there are multiple SCells configured with servingCellMO and none of them is configured with SSB based measurements, it is up to UE implementation which SCell to measure. This will be not be captured in RAN2 spec.*

On RRC signalling

- Nokia think such generic indication is needed.

* Introduce the UE specific RRC configuration (per UE) to enable/disable the CSSF optimization feature.

On need of new MAC

- Nokia think this is L3 measurement so RRC based indication is the baseline.

- OPPO think there is no need for MAC CE, and think the current measurement configuration can already achieve this. Vivo agree. QC agree and think MAC CE based indication is not necessary.

- Ericsson think this is needed, otherwise this feature is useless.

- CATT think it is clear from R4 LS that this is needed, and think if we cannot agree with MAC CE then we should do RRC based.

On need for further RRC signalling (P5 from Apple)

- ZTE think no need.

- Ericsson fine to have further RRC signalling.

- QC think both can be considered.

- OPPO support alt. 2 only. HW agree.

??

*Proposal 5: If proposal 4 is not agreed, alternative 1 and alternative 2 are proposed for down selection.*

*o Alternative 1: Introduce new RRC configuation to indicate which SCell/SCC to be measured.*

*o Alternative 2: The existing SSC selection rule is used for neighbor measurement is reused to cover the serving cell measurement (No additional configuration is introduced).*

* [AT130][206][NR\_Others] CSSF enhancements (Apple)

Intended outcome: agreeable proposals on RRC signalling in R2-2504740 (if needed)

Deadline: Before Friday CB

*The following contributions will be handled in other BO session.*

R2-2503324 LS on UE capability signalling for NTN less than 5MHz (R4-2504712; contact: ZTE, Xiaomi) RAN4 LS in Rel-19 NR\_IoT\_NTN\_req\_test\_enh To:RAN2

R2-2504668 Introduction of UE capability signalling for NTN less than 5MHz Xiaomi CR Rel-19 38.306 18.5.0 1306 - B NR\_NTN\_Ph3-Core

R2-2504669 Introduce UE capability signalling for NTN less than 5MHz ZTE Corporation, Sanechips CR Rel-19 38.306 18.5.0 1307 - B NR\_NTN\_Ph3-Core

### 8.20.2 Other WGs

*Including input for LS from S4-250739*

MCE

R2-2503602 Running RRC CR for Rel-19 Multi-carrier enhancements Lenovo Information Technology draftCR Rel-19 38.331 18.5.1 B NR\_MC\_enh2

Discussion

- Lenovo suggest to endorse this as baseline and use email discussion to update. Lenovo point out R1 will provide final parameters since it is their last meeting on WID.

- OPPO think it is useful to discuss during the week, e.g., some parameters details need to be checked.

* [AT130][207][NR\_Others] MCE CR (Lenovo)

Intended outcome: review and update the CR in R2-2504741 for endorsement (if needed)

Deadline: Before Friday CB

IPA CR

R2-2503684 Introduction of number of UEs in RRC\_INACTIVE state with data transmission China Telecom, Huawei, HiSilicon, ZTE Corporation, Sanechips, CATT, Ericsson CR Rel-19 38.314 18.0.0 0034 2 B PM\_KPI\_5G\_Ph4 R2-2503035

Discussion

- CT explains there is new discussions in R3 and we should keep the existing section but add new section. CT want more time to update the CR.

* [AT130][208][NR\_Others] Number of UEs in RRC\_INACTIVE state with data transmission (China Telecom)

Intended outcome: review and update the CR in R2-2504742 for endorsement (if needed)

Deadline: Before Friday CB

*The following contributions will be handled in other BO session.*

R2-2503341 LS on RTP retransmission (S4-250739; contact: Nokia) SA4 LS in Rel-19 5G\_RTP\_Ph2 To:SA2, RAN2

R2-2503567 RTP Retransmissions for XR Nokia, Nokia Shanghai Bell discussion Rel-19 NR\_XR\_Ph3-Core

R2-2503578 Views on LS on RTP retransmission (S4-250739) CATT discussion Rel-19 5G\_RTP\_Ph2

R2-2504117 Discussion on LS S4-250739 for RTP retransmission Huawei, HiSilicon discussion Rel-19 5G\_RTP\_Ph2

## List of post meeting email discussions

*Template (will be deleted in the final report)*

* [AT130][20x][MIMOevo/LPWUS/SBFD/MIMO\_Ph5/NR\_Others] Proposals for xxxxx (xxxx)

Scope: xxx

Intended outcome: Summary/Proposals in R2-25xxxxx for xxxx.

Deadline: xxx

* [Post130][20x][MIMOevo/LPWUS/SBFD/MIMO\_Ph5/NR\_Others] xxxxx (xxxx)

Scope: xxx

Intended outcome: Summary/Proposals for xxxx

Deadline: xxx