3GPP TSG-RAN WG2 Meeting #131 draft R2-2506202

Bangalore, India Aug 25th – 29th, 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

* [AT131][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))

R2-2505013 LS on maximum transmission power for STxMP (R1-2504839; contact: Huawei) RAN1 LS in Rel-18 NR\_MIMO\_evo\_DL\_UL-Core To:RAN4 Cc:RAN2

* Noted

R2-2505019 Reply LS on differentiation of sDCI based mTRP and sTRP (R1-2504885; contact: CATT) RAN1 LS in Rel-18 NR\_MIMO\_evo\_DL\_UL-Core To:RAN2

Discusison

- OPPO wonders whether R1 will discuss alternatives further. CATT think R1 will not discuss and we in R2 can decide.

* Noted

R2-2505462 Correction on simultaneousU-TCI-UpdateListx for Unified TCI State Update CATT, Samsung CR Rel-18 38.331 18.6.0 5418 - F NR\_MIMO\_evo\_DL\_UL-Core

* The CR is not pursed

Discussion

- Ericsson think the first sentence in the field description is sufficient, so no need to the CR.

- HW think the added texts seem to be generally correct to any MAC CE, so not sure why we need to specifically highlight here.

* RAN2 understand NW implementation can ensure the valid configuration in the serving cell(s) of the *simultaneousU-TCI-UpdateListx* for which the unified TCI state update MAC CE(s) can be applied*.*

R2-2506160 Correction to reportQuantity Ericsson CR Rel-18 38.331 18.6.0 5462 - F NR\_MIMO\_evo\_DL\_UL-Core

* The intention is agreeable, will be merged in the RRC mega CR.

Discussion

- OPPO think this is correct. Nokia agree.

- Nokia think this is editorial and can go to the CR from the RRC spec Rapp.

# 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-251200)

Time budget: 1 TU

Tdoc Limitation: 3 tdocs

### 8.4.1 Organizational

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

LS

R2-2505020 Reply LS on LP-WUS in RRC\_CONNECTED (R1-2504888; contact: NTT DOCOMO) RAN1 LS in Rel-19 NR\_LPWUS To:RAN2

* Noted

Discussion

- Ericsson think R1 mention MR and LR cannot operate simultaneously, but not sure what is the impact to R2 procedures. Apple think this was discussed in MAC running CR, and think this related to dual DRX group.

R2-2505025 Reply LS on LP-WUS UE RF (R1-2504943; contact: vivo) RAN1 LS in Rel-19 NR\_LPWUS-Core To:RAN4 Cc:RAN2

* Noted

R2-2505028 LS on TP to TS38.300 for Rel-19 LP-WUS/WUR (R1-2505070; contact: vivo) RAN1 LS in Rel-19 NR\_LPWUS-Core To:RAN2

* Noted

Discussion

- Ericsson think there may some texts that we can simply to avoid overlapping, and think we can take into account R1’s texts.

R2-2505035 Reply LS on LP-WUS subgrouping progress (R3-253846; contact: NEC) RAN3 LS in Rel-19 NR\_LPWUS-Core To:RAN2

* Noted

CRs

R2-2505234 Introduction of LP-WUS in TS 38.304 CATT CR Rel-19 38.304 18.4.0 0440 - B NR\_LPWUS-Core

R2-2505392 Introduction of LP-WUS/WUR in RRC vivo (Rapporteur) CR Rel-19 38.331 18.6.0 5416 - B NR\_LPWUS-Core

R2-2505469 Introduction of LP-WUS in TS 37.340 ZTE Corporation, Sanechips CR Rel-19 37.340 18.6.0 0420 - B NR\_LPWUS-Core

R2-2505476 Running MAC CR for LP-WUS Apple (Rapporteur) CR Rel-19 38.321 18.6.0 2103 - B NR\_LPWUS-Core

R2-2505863 Introduction of Low-Power Wake-Up Signal and Receiver for NR Ericsson CR Rel-19 38.300 18.6.0 1015 - B NR\_LPWUS-Core

* The above 5 CRs are endorsed, and they will be taken as baseline for further updates and review

R2-2505670 Introduction of R19 LP-WUS UE Capabilities Huawei, HiSilicon draftCR Rel-19 38.306 18.6.0 B NR\_LPWUS-Core

* Endorsed

R2-2505380 Introduction of R19 LP-WUS UE Capabilities Huawei, HiSilicon CR Rel-19 38.306 18.6.0 1325 - B NR\_LPWUS-Core Withdrawn

Email discussion summary

R2-2505235 Discussion of [Post130][211][LPWUS] Running CR for 38.304 (CATT) CATT discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 1(11/2): In the running CR, UE supporting LP-WUS is used instead of LP-WUS UE.*

*Proposal 2(11/0): Nothing is needed on high priority frequency for serving cell measurement offloading or measurement relaxation with LP-WUS in 38.304 running CR if the corresponding higher priority frequency relaxation has been captured in RAN4 specification.*

*Proposal 3 (13/0): Same as LP-WUS monitoring, it is up to UE implementation to choose whether SSB measurement based or OOK LP-SS measurement based are used for RRM relaxation/offloading conditions if UE supports both measurement types.*

*Proposal 4: RAN2 discuss whether not to redefine aspects in TS 38.304 which are already defined in TS 38.213, i.e. the details regarding the locations, offsets, and UE behaviors related to LO (LP-WUS Occasion) monitoring.*

* In the running CR, ‘UE supporting LP-WUS’ is used instead of ‘LP-WUS UE’.
* Nothing is needed on high priority frequency for serving cell measurement offloading or measurement relaxation with LP-WUS in 38.304 running CR if the corresponding higher priority frequency relaxation has been captured in RAN4 specification.

Discussions

P3

- Nokia not sure why it is based on UE implementation, since these two types have different performance.

* Same as LP-WUS monitoring, it is up to UE implementation to choose whether SSB measurement based or OOK LP-SS measurement based are used for RRM relaxation/offloading conditions if UE supports both measurement types.

P4

- Ericsson think in general we should not repeat the same thing btw R1 and R2 specs.

- CATT and vivo think for PEI we have similar texts so it is fine to keep them, even though there may be some similar texts also in R1 spec. Qualcomm, OPPO, Xiaomi agree and think this way it is clearer.

R2-2505393 Discussion summary and list of RRC open issue for LP-WUS WUR vivo discussion Rel-19 NR\_LPWUS-Core

* Noted

*Open issue RRC-6 (essential): the value range of ThresholdPLP and ThresholdQLP for LR measurement based threshold*

*Proposal 1: [8/13] RAN2 assumes the value range of ThresholdPLP and ThresholdQLP for LR measurement based threshold for entry/exit condition for LP-WUS monitoring and RRM relaxation/offloading is captured as below in RRC. It could be revised based on inputs from RAN1/RAN4, if any.*

*The IE ThresholdLP is used to indicate a measured RSRP threshold for LP-WUS. Actual value of threshold = field value \* 2 [dBm].*

*ThresholdP-LP ::= INTEGER (-80..0)*

*The IE ThresholdQ-LP is used to indicate a measured RSRQ threshold for LP-WUS. Actual value of threshold = field value [dB].*

*ThresholdQ-LP ::= INTEGER (-34..0)*

*Open issue RRC-13 (essential): how to determine the cell quality for LR based measurement.*

*Proposal 2: [11/14] LR measurement based RX level and cell quality value should be derived by UE implementation in multi-beam operations.*

*Proposal 3: RAN2 will keep the current terminologies in RAN2 specification, i.e. LP-WUS, LP-SS, LO (LP-WUS Occasion), LR, and MR.*

*- 11/14 companies voted to keep the terminology: LP-WUS, LP-SS, LO (LP-WUS Occasion), and LR.*

*- 12/13 companies voted to keep the terminology: MR.*

* RAN2 assumes the following value range of ThresholdPLP and ThresholdQLP for LR measurement based threshold for entry/exit condition for LP-WUS monitoring and RRM relaxation/offloading
* The IE ThresholdLP is used to indicate a measured RSRP threshold for LP-WUS. Actual value of threshold = field value \* 2 [dBm].

ThresholdP-LP ::= INTEGER (-80..0)

* The IE ThresholdQ-LP is used to indicate a measured RSRQ threshold for LP-WUS. Actual value of threshold = field value [dB].

ThresholdQ-LP ::= INTEGER (-34..0)

Discussions

P2

- Ericsson think there is no need to introduce configuration for this, but want to have predictable behaviour, such as ‘using the strongest beam’. Nokia agree. LG E slightly prefer this way, and think it is better for NW to properly configure the thresholds.

- QC want to leave this to UE implementation. Apple, CATT agree.

[CB]

Open issue RRC-13 (essential): how to determine the cell quality for LR based measurement.

Proposal 2: [11/14] LR measurement based RX level and cell quality value should be derived by UE implementation in multi-beam operations.

Discussions

P3

- Samsung agree if this is majority view in R2, but want to note that with this there is mis-alignment in R1/R2 wordings. Vivo think this is not critical issue.

- Qualcomm think LR/MR are just names but not necessarily mandate any specific implementation choices.

* RAN2 will keep the current terminologies in RAN2 specification, i.e. LP-WUS, LP-SS, LO (LP-WUS Occasion), LR, and MR.

R2-2505477 Report of [Post130][213][LPWUS] Running CR for TS 38.321 (Apple) Apple (Rapporteur) discussion Rel-19 NR\_LPWUS-Core

* Noted

*For open issue 1: Support of LP-WUS with dual DRX group*

*Proposal 1: Confirm the following working assumption to support LP-WUS with dual DRX group.*

*RAN2#130 progress*

* 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.*

*Proposal 2: If secondary DRX group is configured, UE monitors LP-WUS only when both DRX groups are not in DRX active time. (NOTE: One company has concern)*

*Proposal 2a: If secondary DRX group is configured, UE monitors LP-WUS only when both DRX groups are not in DRX active time. Regarding the RAN1 agreement on not supporting simultaneous LR and MR operation, further check with RAN1 whether the agreement is applicable to DC and CA, and whether it has any impact on per CG DRX operation.*

*Proposal 3: If secondary DRX group is configured, the lpwus-PDCCH-MonitoringTimer configuration for secondary DRX group is different from that for the default DRX group.*

*Proposal 3a: The lpwus-PDCCH-MonitoringTimer configuration for secondary DRX group is smaller than that for the default DRX group.*

*For open issue 2: UE operation for the potential collision*

*Proposal 4: Confirm the following RAN2#129bis working assumption for Option 1-1.*

*RAN2#129bis progress*

* Working assumption for the case of potential collision (if any): In Option 1-1, when the UE is not able to monitor the LP-WUS occasion(s) the UE should start the drx-OnDurationTimer (as if LP-WUS was detected). FFS for Option 1-2.*

*Proposal 5: Agree the proposed LP-WUS TP (with the addition MUSIM gap case) to capture the UE operation in Option 1-1 for the collision and timing issue.*

*Proposal 6: For Option 1-2, NW configures UE whether to start the lpwus-PDCCH-MonitoringTimer in collision cases, i.e. when the UE is not able to monitor the LP-WUS occasion(s).*

*For open issue 3: MAC spec impact to support the LP-WUS in Cell DTX operation*

*Proposal 7: There is no MAC spec impact to reflect the LP-WUS operation in Cell DTX operation.*

*Proposal 9: RAN2 confirm that the available UL occasions (e.g. SR occasion, RACH occasion, CG occasion) are MR-ready occasions.*

* Confirm the following working assumption to support LP-WUS with dual DRX group.

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.

* If secondary DRX group is configured, the lpwus-PDCCH-MonitoringTimer configuration for secondary DRX group is different from that for the default DRX group.

Discussions

P2

- Qualcomm think R1 conclusion is for single frequency band, and think typically we configure two DRX groups in FR1 and FR2, respectively. Qualcomm think the current P2 is not efficient in terms of power saving, and want to check with R1. Xiaomi have sympathy with Qualcomm view.

- Ericsson think we should stick to general principle that UE monitor LPWUS outside active time, and think we should allow different possible UE implementations and think that should base on UE capability.

[CB]

Proposal 2: If secondary DRX group is configured, UE monitors LP-WUS only when both DRX groups are not in DRX active time. (NOTE: One company has concern)

Proposal 2a: If secondary DRX group is configured, UE monitors LP-WUS only when both DRX groups are not in DRX active time. Regarding the RAN1 agreement on not supporting simultaneous LR and MR operation, further check with RAN1 whether the agreement is applicable to DC and CA, and whether it has any impact on per CG DRX operation.

[CB]

Proposal 3a: The lpwus-PDCCH-MonitoringTimer configuration for secondary DRX group is smaller than that for the default DRX group.

[CB]

*For open issue 2: UE operation for the potential collision*

*Proposal 4: Confirm the following RAN2#129bis working assumption for Option 1-1.*

*RAN2#129bis progress*

* Working assumption for the case of potential collision (if any): In Option 1-1, when the UE is not able to monitor the LP-WUS occasion(s) the UE should start the drx-OnDurationTimer (as if LP-WUS was detected). FFS for Option 1-2.*

*Proposal 5: Agree the proposed LP-WUS TP (with the addition MUSIM gap case) to capture the UE operation in Option 1-1 for the collision and timing issue.*

*Proposal 6: For Option 1-2, NW configures UE whether to start the lpwus-PDCCH-MonitoringTimer in collision cases, i.e. when the UE is not able to monitor the LP-WUS occasion(s).*

*For open issue 3: MAC spec impact to support the LP-WUS in Cell DTX operation*

*Proposal 7: There is no MAC spec impact to reflect the LP-WUS operation in Cell DTX operation.*

*Proposal 9: RAN2 confirm that the available UL occasions (e.g. SR occasion, RACH occasion, CG occasion) are MR-ready occasions.*

Others

R2-2505478 Draft Reply LS on LP-WUS in RRC\_CONNECTED Apple LS out Rel-19 NR\_LPWUS-Core RAN1

* Not treated

### 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-12, whether/how to enable/disable LP-WUS

R2-2505381 Summary of [Post130][222][LPWUS] Potential solution to support enabling/disabling LP-WUS monitoring in IDLEI/NACTVE per UE (Huawei) Huawei, HiSilicon discussion Rel-19

* Noted

*Proposal: (RRC-12) RAN2 to down-select from NAS signalling or RRC signalling to support enabling/disabling LP-WUS per UE.*

R2-2506038 IDLE/Inactive LP-WUS disabling and enabling Qualcomm Incorporated discussion NR\_LPWUS-Core

* Noted

*Proposal 1 RAN2 selects one of the following solutions to disable or enable LP-WUS.*

*Option 4a: gNB sets proper offset between an LO and a reference PO/PF, UE determines whether to disable LP-WUS monitoring via comparing the offset and supported wake up delay.*

*Option 2a: The gNB can disable or enable LP-WUS using dedicated RRC message, e.g. RRC release message, and the enabling and disabling indication is only valid in current cell.*

Discussion

- Ericsson think there is majority support for the NAS base way. Vivo, IDT share this view. ZTE ok to go this way if there is majority. Apple think we do not need new NAS based solution.

- Rapporteur think this feature is beneficial for deployment in the future.

- CATT want to avoid the impact to the other WGs/TSGs. DCM share this view.

- HW think both RRC and NAS based solution may have impact to other WG.

- HW, Ericsson, InterDigital, vivo, NEC, OPPO, ZTE think NAS signalling based way has majority’s support. QC, CATT think not.

- Xiaomi want to avoid impact to other WG. ZTE think the impact is not much.

- WI Rapp think if we go with NAS signalling based way, it does not impact WI completion.

* RAN2 assumes NAS signalling is introduced to support enabling/disabling LP-WUS per UE. Inform SA2, CT1 and RAN3 about this conclusion.
* [AT131][203][LPWUS] Proposals for NAS signalling to support enabling/disabling LP-WUS per UE (Huawei)

Intended outcome: Summary with proposals in R2-2506245, draft LS in R2-2506246

Deadline: before Thursday CB.

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

R2-2505605 Discussion on LP-WUS procedure and configuration OPPO discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 3 LP-WUS can be used in any cell, i.e., don’t introduce lastUsedCellOnly for LP-WUS.*

R2-2505856 LP-WUS in Idle and Inactive Ericsson discussion Rel-19 NR\_LPWUS-Core R2-2504288

* Noted

*Proposal 1 Similar as with PEI LP-WUS can be configured to be used in lastUsedCellOnly or in any cell where LP-WUS is configured.*

Discussions

- ZTE support Ericsson proposal. Vodafone agree and think false alarm is a real issue. LG E agree.

- Vivo think the false alarm issue is less serious for LPWUS since we now have more subgroups. Nokia agree. Nokia want to avoid also RAN3 impact. CATT agree.

- Xiaomi think with the mechanism of enable/disabling this feature is not so critical. Vivo share this view.

- LG E think we can just copy paste PEI mechanism.

- Ericsson think impact to R3 is acceptable level.

- vivo think we can close the WI even we do not have any conclusion.

[CB] 38304-8, aim at a conclusion at Thursday CB

38304-9, Subgroup ID for LP-WUS outside CN PTW

R2-2505605 Discussion on LP-WUS procedure and configuration OPPO discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 1 In RRC\_INACTIVE state, for LP-WUS, when the UE uses the same i\_s as for RRC\_IDLE state, the UE shall use the same iPO LP-WUS as for RRC\_IDLE state. Otherwise, the UE determines the iPO for LP-WUS for based on the i\_s for RRC\_INACTIVE state.*

*Proposal 2 In RRC\_INACTIVE state with CN configured PTW, the SubgroupID for LP-WUS used outside CN PTW is the same as the SubgroupID used inside CN PTW.*

Discussions

- ZTE, Xiaomi, Ericsson support both proposals.

* In RRC\_INACTIVE state, for LP-WUS, when the UE uses the same i\_s as for RRC\_IDLE state, the UE shall use the same iPO LP-WUS as for RRC\_IDLE state. Otherwise, the UE determines the iPO for LP-WUS for based on the i\_s for RRC\_INACTIVE state.
* In RRC\_INACTIVE state with CN configured PTW, the SubgroupID for LP-WUS used outside CN PTW is the same as the SubgroupID used inside CN PTW.

38304-10: FFS whether/how LP-WUS with SDT is supported

R2-2505479 Remaining issues of LP-WUS in RRC\_IDLE/INACTIVE Apple discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 6: Introduce the new UE capability to indicate whether UE supports the LPWUS when SDT is enabled.*

*Proposal 7: Introduce the new configuration in RRCRelease message to enable/disable LP-WUS when SDT is enabled.*

R2-2505976 Remaining issues on LP-WUS in RRC IDLE or INACTIVE LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 7 [OI 38304-10] Confirm that UE can initiate MO/MT-SDT while monitoring LP-WUS. No CR change is needed.*

Discussions

- ZTE, InterDigital, Xiaomi share the view from LG E.

- Ericsson wonders in this case whether UE is transmitting small data and monitor LPWUS simultaneously.

- Nokia think if SDT is triggered, MR is in operation. Nokia think one issue is when UE is monitoring LPWUS there is no RSRP measurement. Xiaomi agree with this issue.

- InterDigital think we already excluded the P7 from Apple.

- Xiaomi think if there is real concern about extra delay for UE measurement then one way is to disable the LPWUS.

- vivo think intention of LG E proposal is fine, and suggest to update the wording ‘there is no impact to the SDT procedure’. Lenovo, QC agree.

- Nokia think there is impact to the latency. LG E think it is not critical issue for delay tolerant services.

- Ericsson think we need to specify that SDT is initiated then UE stops monitoring LP-WUS.

* Confirm that SDT can be initiated while UE is monitoring LP-WUS, and there is no impact to the SDT procedure. Can check if any spec change is needed.

Other issues

R2-2505856 LP-WUS in Idle and Inactive Ericsson discussion Rel-19 NR\_LPWUS-Core R2-2504288

* Noted

*Proposal 11 If the UE is not able to monitor the LP-WUS then the UE is required to monitor the following PO.*

Discussions

- LG E, Nokia, CATT support the proposal.

- Xiaomi agree with the intention, and think we should consider the care when UE is doing cell reselection. CATT think the proposal covers different cases.

* For the RRC-IDLE and RRC-INACTIVE, if the UE is not able to monitor the LP-WUS in all MO then the UE is required to monitor the following PEI and/or PO. Detailed changes to the spec can be further checked.

R2-2505394 Discussion on LP-WUS WUR in RRC\_IDLE INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

* Noted

*Entry/exit condition for LP-WUS monitoring*

*Proposal 2: The conclusion on the entry/exit conditions for RRM relaxation/offloading for different LR types is applicable for the entry/exit conditions for LP-WUS monitoring, which is already captured in RRC and 38.304 running CR:*

*- RAN2 assumes the entry/exit thresholds for LP-WUS monitoring for OFDM-based WUR measuring LP-SS only are the same as that for OOK-based WUR measuring LP-SS. It can be revisited based on RAN1/RAN4 process, if any. Network is allowed to provide either OOK based threshold or OFDM based WUR measuring SSB threshold or both.*

*- RAN2 assumes for the entry/ exit conditions of LP-WUS monitoring: separate MR thresholds (according to RAN1 agreement)/LR thresholds can be configured for different types of LP WUR if a cell supports both types of LRs (can revisit based on RAN1 and RAN 4 progress, if any).*

Discussions

- HW think these needs RAN4 confirmation.

[CB] remaining issues with *entry/exit condition for LP-WUS monitoring*

*Proposal 2: The conclusion on the entry/exit conditions for RRM relaxation/offloading for different LR types is applicable for the entry/exit conditions for LP-WUS monitoring, which is already captured in RRC and 38.304 running CR:*

*- RAN2 assumes the entry/exit thresholds for LP-WUS monitoring for OFDM-based WUR measuring LP-SS only are the same as that for OOK-based WUR measuring LP-SS. It can be revisited based on RAN1/RAN4 process, if any. Network is allowed to provide either OOK based threshold or OFDM based WUR measuring SSB threshold or both.*

*- RAN2 assumes for the entry/ exit conditions of LP-WUS monitoring: separate MR thresholds (according to RAN1 agreement)/LR thresholds can be configured for different types of LP WUR if a cell supports both types of LRs (can revisit based on RAN1 and RAN 4 progress, if any).*

R2-2505629 Discussion on prioritizing the frequencies supporting LP-WUS Huawei, HiSilicon, vivo, Nokia, Samsung, LG Electronics Inc., Apple, Ericsson, OPPO, Sharp, NEC discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 1: Support 1-bit flag for each inter-frequency in SIB. If the flag is set to true for a frequency and UE supports LP-WUS on this frequency, UE can consider this frequency to be the highest priority.*

Discussions

- Vodafone think we should not introduce this.

- vivo think we need to conclude on this issue, and think it impact UE capability discussion.

- QC think this has been discussed and would like not to reopen.

- LG E think similar mechanism exists for many features so think this is important.

- Nokia think there is no overload issue with the proposed solution.

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

R2-2505236 Open issues on LP-WUS in IDLE and INACTIVE CATT discussion Rel-19 NR\_LPWUS-Core

R2-2505280 Remaining issues on LP-WUS paging monitoring Xiaomi Communications, Huawei, HiSilicon, ZTE Corporation, Sanechips, Apple, Ericsson discussion

R2-2505336 Discussion on LP-WUS in RRC\_IDLE INACTIVE NEC discussion NR\_LPWUS-Core

R2-2505379 Further discussion on LP-WUS in RRC\_IDLE/INACTIVE Huawei, HiSilicon discussion Rel-19

R2-2505381 Summary of [Post130][222][LPWUS] Potential solution to support enabling/disabling LP-WUS monitoring in IDLEI/NACTVE per UE (Huawei) Huawei, HiSilicon discussion Rel-19

R2-2505394 Discussion on LP-WUS WUR in RRC\_IDLE INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

R2-2505479 Remaining issues of LP-WUS in RRC\_IDLE/INACTIVE Apple discussion Rel-19 NR\_LPWUS-Core

R2-2505529 Procedure and Configuration of LP-WUS in RRC Idle Inactive Mode Samsung discussion Rel-19

R2-2505588 Remaining issues on LP-WUS in IDLE and INACTIVE NTT DOCOMO INC. discussion Rel-19 NR\_LPWUS-Core

R2-2505605 Discussion on LP-WUS procedure and configuration OPPO discussion Rel-19 NR\_LPWUS-Core

R2-2505629 Discussion on prioritizing the frequencies supporting LP-WUS Huawei, HiSilicon, vivo, Nokia, Samsung, LG Electronics Inc., Apple, Ericsson, OPPO, Sharp, NEC discussion Rel-19 NR\_LPWUS-Core

R2-2505655 Disabling/enabling LP-WUS in RRC Idle/Inactive mode Sony discussion Rel-19 NR\_LPWUS-Core

R2-2505682 Open issues on LP-WUS in RRC\_IDLE/INACTIVE mode Lenovo discussion Rel-19

R2-2505752 LP-WUS in IDLE and INACTIVE Nokia discussion Rel-19 NR\_LPWUS-Core

R2-2505779 Remaining issues in IDLE/INACTIVE procedure for LP-WUS Tejas Network Limited discussion Rel-19

R2-2505856 LP-WUS in Idle and Inactive Ericsson discussion Rel-19 NR\_LPWUS-Core R2-2504288

R2-2505906 Remaining issues on LP-WUS operation in RRC\_IDLE/INACTIVE modes InterDigital, Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2505968 Remaining issues of LP-WUS operation in IDLE/INACTIVE CMCC discussion Rel-19 NR\_LPWUS-Core

R2-2505976 Remaining issues on LP-WUS in RRC IDLE or INACTIVE LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2505992 Procedure and configuration of LP-WUS for IDLE and INACTIVE mode ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

R2-2506038 IDLE/Inactive LP-WUS disabling and enabling Qualcomm Incorporated discussion NR\_LPWUS-Core

### 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 Whether separate exit condition is needed for Rel-19 RRM relaxation

R2-2505967 Remaining issues of RRM measurement relaxation and offloading in RRC\_IDLE INACTIVE CMCC discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 1: No separate exit condition is needed for serving cell RRM relaxation, and the exit condition can be defined as failing to meet the entry condition, i.e., MR or LR is below the configured threshold.*

R2-2505907 Remaining issues on RRM measurement relaxation and offloading InterDigital, Inc. discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 3: For relaxed case, support the exit condition based on LR measurement.*

Discussions

- Ericsson not sure what is the issue if the exit condition is based on LR.

- LG E think if we go with CMCC proposal there is no issue. QC think there would be ping-pong issue. vivo do not see any ping-pong issue. OPPO, ZTE, Xiaomi, Lenovo agree with vivo.

- CATT think if network only configure MR based condition then due to relaxed measurement the latency to quit the relaxation status is larger. HW, Apple agree with CATT. Vivo think this can be handled by NW implementation.

- Xiaomi think even if we do relaxation the accuracy is not changed, so think there is no issue.

- Samsung support the InterDigital proposal.

- Ericsson think for full offloading we rely on LR.

- Sony think the entry condition should be higher.

- HW think there is no technical issue with separate condition. Ericsson think we should have separate entry and exist conditions.

* The exit condition for RRM relaxation is defined as ‘not fulfilling the entry condition’.

RRC-10/38304-6, Whether UE low mobility criterion or stationary criterion should be considered for RRM relaxation/offloading.

R2-2506040 Open issues on LP-WUS RRM measurement relaxation and offloading Qualcomm Incorporated discussion NR\_LPWUS-Core

* Noted

*Proposal 5 RAN2 does not consider low mobility or stationary status to evaluate whether to enter or exit from Rel-19 RRM relaxation/offloading mode.*

R2-2505530 RRM measurement relaxation and offloading in RRC Idle Inactive Mode Samsung discussion Rel-19

* Noted

*Proposal 2: (RRC-10, 38304-6) For Rel19 MR serving/neighbour cell measurement relaxation for UEs capable of LP-WUS, UE not at cell edge and UE with low mobility are reused.*

*Proposal 3: (RRC-10, 38304-6) For Rel19 serving cell measurement (full) offloading for UEs capable of LP-WUS, UE not at cell edge and UE with low mobility are reused.*

Discussions

- Ericsson think we should avoid the case that a moving UE not measuring the serving cell for a very long time. Ericsson agree with P2 from Samsung but think the issue is only for neighbour cell measurement.

- HW support QC proposal. vivo also agree. Vivo think UE implementation can handle the low/high mobility. LG E share vivo’s understanding.

- Lenovo support Samsung proposal and think we could reuse similar mechanism as Rel-16. OPPO agree and think the effort to extend to LR is limited. Ericsson, ZTE, DCM, Nokia, InterDigital also support.

- ZTE think turning on and off the MR consume high power so especially for offloading case the low mob condition is meaningful.

- Apple think we can consider mobility status is needed and let R4 decide whether any requirement is needed for that.

- CATT think the case is different than legacy, and think NW can configure proper thresholds already.

- Xiaomi do not want to extend the condition of low mob to LR.

- Qulacomm think this is not considered in RAN4 so far, and think it is not clear how to handle different conditions if we now introduce more conditions.

RRC-15/38304-2, FFS (if needed) on enhancements based on R16 criteria (e.g., based on the LR measurements) for the case when MR serving cell measurement results are not available.

R2-2505395 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 8: (RRC-15/38304-2) There is no impact on R16/R17 criterion of neighboring cell RRM relaxation regardless whether MR serving cell RRM measurement results are available or not, i.e., LR measurement won’t be used for R16/R17 RRM relaxation condition.*

38304-12: FFS the impact on legacy low-mobility criteria for MR with LP-WUS.

R2-2505289 Remaining issues on RRM measurement relaxation for RRC\_IDLE\_INACTIVE Xiaomi Communications discussion

* Noted

*Proposal 4 [38304-12] When UE exits fully offload state, UE will reset the reference RSRP for “low mobility” criterion evaluation for MR if configured*

R2-2505237 Open issues on RRM Relaxation and Offloading in IDLE and INACTIVE CATT discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 5: RAN2 confirm the case that the UE (re)-starts the evaluation of R16 low mobility criterion after the UE exits fully offloading case is similar to the case that the UE (re)-starts the evaluation of R16 low mobility criterion after camping on a cell for a period. There is no specification impact for R16 low mobility criterion when UE exits using fully offloading.*

* [AT131][204][LPWUS] Proposals for RRC-10/38304-6, RRC-15/38304-2, 38304-12 (CATT)

Intended outcome: Proposals in R2-2506247 for RRC-10/38304-6, RRC-15/38304-2, 38304-12.

Deadline: Before CB

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

R2-2505237 Open issues on RRM Relaxation and Offloading in IDLE and INACTIVE CATT discussion Rel-19 NR\_LPWUS-Core

R2-2505289 Remaining issues on RRM measurement relaxation for RRC\_IDLE\_INACTIVE Xiaomi Communications discussion

R2-2505395 Discussion on RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE vivo discussion Rel-19 NR\_LPWUS-Core

R2-2505480 Remaining issues of LP-WUS RRM Measurement Apple discussion Rel-19 NR\_LPWUS-Core

R2-2505530 RRM measurement relaxation and offloading in RRC Idle Inactive Mode Samsung discussion Rel-19

R2-2505596 Remaining issues on RRM measurement relaxation and offloading NTT DOCOMO INC. discussion Rel-19 NR\_LPWUS-Core

R2-2505606 Discussion on the remaining issues on RRM measurement OPPO discussion Rel-19 NR\_LPWUS-Core

R2-2505683 Open issues on RRM measurement relaxation and offloading in RRC\_IDLE/INACTIVE Lenovo discussion Rel-19

R2-2505737 Further discussion on the criteria for RRM measurement relaxation and offloading Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

R2-2505753 RRM measurement relaxation in RRC\_IDLE/INACTIVE Nokia discussion Rel-19 NR\_LPWUS-Core

R2-2505780 Remaining issues in LP-WUS based RRM relaxation and offloading Tejas Network Limited discussion Rel-19

R2-2505803 Remaining issues for LP-WUS RRM ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

R2-2505857 LP-WUS and RRM measurements Ericsson discussion Rel-19 NR\_LPWUS-Core R2-2504289

R2-2505907 Remaining issues on RRM measurement relaxation and offloading InterDigital, Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2505967 Remaining issues of RRM measurement relaxation and offloading in RRC\_IDLE INACTIVE CMCC discussion Rel-19 NR\_LPWUS-Core

R2-2505977 Remaining issues on measurement offloading and relaxation LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2506040 Open issues on 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.

MAC-X1 The impact to the BWP switching mechanism

R2-2505630 Further discussion on LP-WUS for RRC\_CONNECTED mode Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 6: (MAC-X1) The bwp-InactivityTimer can be stopped when UE monitors LP-WUS, in this case, the UE needs to (re)start the bwp-InactivityTimer when it receives the LP-WUS for PDCCH monitoring. Otherwise, there is no impact on bwp-InactivityTimer.*

R2-2505684 Open issues on LP-WUS in RRC Connected mode Lenovo discussion Rel-19

* Noted

*Proposal 6: (MAC-X1) UE does not start or re-start the bwp-InactivityTimer when receiving the LP-WUS.*

Discussion

- HW think R1 is discussing and think we can wait.

- Xiaomi think we should avoid UE impact in BWP handling behaviour unless R1 decided so. Apple agree, and think from R2 point of view there is no special handling.

- Ericsson wonders what the issue is if we do not specify anything. HW think it is possible that UE can only use LPWUS in some BWPs but not all.

- Nokia, LG E, QC, InterDigial, CATT, Ericsson support Lenovo proposal.

- vivo support HW proposal, and think if UE receives LPWUS then there may be data transmission following.

* RAN2 assume UE does not start or re-start the bwp-InactivityTimer when receiving the LP-WUS.

MAC-X2 Whether to consider the multiple LP-WUS cycles

R2-2505396 Discussion on LP-WUS WUR in RRC\_Connected vivo discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 4: (MAC-X2) For Option 1-2, two LP-WUS cycles will be configured. RAN2 assumes the design of switching between long LP-WUS cycle and short LP-WUS cycle is same as the C-DRX mechanism, including the MAC CE control, time control.*

R2-2505993 Procedure for LP-WUS in RRC\_Connected state ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

* Noted

*Proposal 3(RRC-3): For Option 1-2, RAN2 confirms that one single LP-WUS cycle is defined to determine the LP-WUS monitoring occasion.*

Chair：will continue with MAC-X2 in CB

MAC-X3 UAI of the LP-WUS preference

R2-2505630 Further discussion on LP-WUS for RRC\_CONNECTED mode Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

* ?? Noted

*Proposal 1: (MAC-X3) UE can send assistance information to the network indicating to disable the LP-WUS functionality or whether the LP-WUS can be enabled again.*

*Proposal 2: (MAC-X3) When to send the assistance information is up to UE implementation, without additional configuration to the UE.*

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

R2-2505108 Discussing on LP-WUS monitoring in Connected mode Xiaomi discussion Rel-19 NR\_LPWUS-Core

R2-2505238 Analysis on LP-WUS for RRC\_CONNECTED CATT discussion Rel-19 NR\_LPWUS-Core

R2-2505396 Discussion on LP-WUS WUR in RRC\_Connected vivo discussion Rel-19 NR\_LPWUS-Core

R2-2505463 Remaining issues on LP-WUS in RRC\_CONNECTED LG Electronics Inc. discussion Rel-19 NR\_LPWUS-Core

R2-2505481 Remaining issues of LP-WUS in RRC\_CONNECTED Apple discussion Rel-19 NR\_LPWUS-Core

R2-2505531 Procedures for LP-WUS in RRC Connected Mode Samsung discussion Rel-19

R2-2505581 LP-WUS in RRC\_CONNECTED Nokia, Nokia Shanghai Bell discussion NR\_LPWUS-Core

R2-2505597 Remaining issues on LP-WUS in RRC\_CONNECTED NTT DOCOMO INC. discussion Rel-19 NR\_LPWUS-Core

R2-2505607 Discussion on LP-WUS in RRC\_CONNECTED OPPO discussion Rel-19 NR\_LPWUS-Core

R2-2505630 Further discussion on LP-WUS for RRC\_CONNECTED mode Huawei, HiSilicon discussion Rel-19 NR\_LPWUS-Core

R2-2505645 LP-WUS in CONNECTED mode InterDigital discussion Rel-19 NR\_LPWUS-Core

R2-2505684 Open issues on LP-WUS in RRC Connected mode Lenovo discussion Rel-19

R2-2505782 Remaining issues in CONNECTED procedure for LP-WUS Tejas Network Limited discussion Rel-19

R2-2505858 LP-WUS in Connected Ericsson discussion Rel-19 NR\_LPWUS-Core R2-2504290

R2-2505942 Discussion on LP-WUS operation in CONNECTED mode CMCC discussion Rel-19 NR\_LPWUS-Core

R2-2505993 Procedure for LP-WUS in RRC\_Connected state ZTE Corporation, Sanechips discussion Rel-19 NR\_LPWUS-Core

R2-2506039 Open issues on LP-WUS operation in CONNECTED state Qualcomm Incorporated 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-251874)

Time budget: 0.5 TU

Tdoc Limitation: 2 tdocs

### 8.11.1 Organizational

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

LSin

R2-2505015 Reply LS on simultaneous configuration of SBFD and DC (R1-2504858; contact: Xiaomi) RAN1 LS in Rel-19 NR\_duplex\_evo-Core To:RAN2 Cc:RAN3, RAN4

* Noted

R2-2505030 LS on TP for TS38.300 on Rel-19 SBFD (R1-2505081; contact: Huawei) RAN1 LS in Rel-19 NR\_duplex\_evo-Core To:RAN2 Cc:RAN3

* Noted

CRs

R2-2505088 Introduction of SBFD in TS 38300 CATT CR Rel-19 38.300 18.6.0 1008 - B NR\_duplex\_evo-Core R2-2503422

R2-2505363 Introduction of Rel-19 Evolution of NR duplex operation (SBFD) Huawei, HiSilicon CR Rel-19 38.331 18.6.0 5414 - B NR\_duplex\_evo-Core

R2-2505575 Introduction of Rel-19 Evolution of NR duplex operation (SBFD) for MAC spec Samsung CR Rel-19 38.321 18.6.0 2106 - B NR\_duplex\_evo-Core

* The above 3 CRs are endorsed, and they will be taken as baseline for further updates and review

R2-2505549 Introduction of Rel-19 Evolution of NR duplex operation (SBFD) for MAC spec Samsung CR Rel-19 38.321 18.6.0 2105 - B NR\_duplex\_evo-Core Withdrawn

Email discussion summary

R2-2505364 Summary of [Post130][216][SBFD] Running CR for 38.331 Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*[Proposals for easy agreement]:*

*[Proposal for RRC-2] Not to support that a further different SSB RSRP threshold is indicated/configured for an SSB or a group of SSBs. [13/13]*

*[Proposal for RRC-3] Not to pursue the further optimization of parameter signalling of SBFD RACH configuration. [11/12]*

*[Proposal for RRC-6] (Only) support RACH-based LTM cell change in SBFD symbols [10/11]. Add RO type indication in LTM cell switch command MAC CE.*

*[Proposals for discussion]:*

*[Proposal for RRC-1] For the network indicating RO type, use 1 bit signalling (as in the current RRC running CR) [9/13].*

* Not to support that a further different SSB RSRP threshold is indicated/configured for an SSB or a group of SSBs.
* Not to pursue the further optimization of parameter signalling of SBFD RACH configuration.

Discussions

RRC-6

- Samsung object this proposal. Samsung think this should be discussed in LTM session.

- InterDigital think there is majority so we can agree, think we can discuss in SBFD because it is co-existence with Rel-18 LTM. Nokia, LG E, ZTE, CATT agree.

- ZTE think at least for intra-DU case we should be able to agree. QC agree with ZTE, think if we cannot conclude here it is not easy to agree in LTM session either. Ericsson, CATT agree.

- Samsung also has concern because there is RAN3 impact, and it is the last meeting for the WI. ZTE think if we focus on intra-DU, then there is not additional R3 impact.

- Samsung wonder if we agree which WI should handle the necessary MAC spec change.

* Support co-existence of SBFD with intra-DU LTM. Whether to support the co-existence between SBFD and other LTM cases is not discussed in the Rel-19 SBFD WI.

Discussions

RRC-1

- Nokia think we do not need the proposal, and think 1 bit is not sufficient to handle the load balancing well.

- HW think we do not need to re-open because we already agree. Ericsson, CATT, Xiaomi, InterDigital, Sharp, ZTE, Samsung, LG E agree.

- Sony think it is open issue, and agree with Nokia load balancing need to be considered.

- CATT think other solutions are not discussed and there is no time for that.

- Apple, Nokia think we either remove this 1 bit or we use 2 bits. HW think NW can configure the bit when necessary. ZTE agree with HW.

- InterDigital think if we have more bits we need more time to discuss what is the UE behaviour.

- Sony think RSRP based threshold is not sufficient because all UEs see the same threshold.

- LG E want to avoid additional UE complexity.

- Charter think we need to capture the agreement clearly.

* For the network indicating RO type, use 1 bit signalling (as in the current RRC running CR)

R2-2505560 Summary of the SBFD open issues in MAC Samsung discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*[Proposals for easy agreement without contributions]*

*[Proposal 1 for MAC-1] In RO type switching, for the other RO type, UE can select the set of Random Access resources associated with the same feature or feature combination, and with higher Msg1 repetition number, if the set with the same Msg1 repetition number is not available.*

*If [Proposal 1 for MAC-1] is agreed:*

*[Proposal 2 for MAC-1] In RO type switching, when UE has to select a set of Random Access resources with higher Msg1 repetition number for the other RO type, if there are multiple sets with multiple higher Msg1 repetition numbers available, UE selects the set with next higher Msg1 repetition number.*

Discussions

MAC-1

- Nokia think UE does not have to go to higher repetition number, and think it can check the RSRP to determine which number is selected.

- LG E, Ericsson, ZTE agree with the proposal.

- ZTE additional RSRP checking might leave to other issues.

* In RO type switching, for the other RO type, UE can select the set of Random Access resources associated with the same feature or feature combination, and with higher Msg1 repetition number, if the set with the same Msg1 repetition number is not available.
* In RO type switching, when UE has to select a set of Random Access resources with higher Msg1 repetition number for the other RO type, if there are multiple sets with multiple higher Msg1 repetition numbers available, UE selects the set with next higher Msg1 repetition number.

### 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.

Open issue MAC 2-1 and MAC 2-2

R2-2505365 Discussion on MAC open issues for random access in SBFD Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*[Proposal for MAC-2-1 and MAC-2-2]: The condition of “when the RACH resources for the same RO type is provided for CBRA” is always satisfied, hence no need to make any additional MAC specification changes (from the current MAC running CR).*

R2-2505590 Discussion on random access procedure in SBFD ZTE Corporation discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 1: Support the case that CFRA indicates SBFD RO, but the corresponding common RACH resource on the same BWP does not indicate any SBFD RACH resource.*

*Proposal 2: If a CFRA case indicates to use SBFD RO, when selecting set for the CFRA, UE should:*

* If common RACH resource of the same BWP provides SBFD ROs, UE selects set within SBFD RACH resources;*

* If common RACH resource of the same BWP does not provide SBFD ROs, UE selects set within the legacy RACH resources.*

Discussions

- ZTE is ok to go with majority view.

- OPPO wonder whether this proposal applies to both RACH config option 1 and option 2. ZTE and LG E think this is obvious.

* RAN2 assume that when CFRA indicates SBFD RO, the RACH resources for the same RO type is provided for CBRA. FFS if any spec changes is needed.

Open issue MAC 3-1 and MAC 3-2

R2-2505459 Remaining issues on Random Access procedure for SBFD LG Electronics Inc. discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 3. [MAC-3-1] No need to clarify on how to derive the SBFD RO locations for CFRA.*

R2-2505559 Discussions on the open issues for Random Access Samsung discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*[MAC-3] Proposal 2: To resolve the ambiguity on SBFD RO location derivation for CFRA, RAN2 to consider one of the following two workable options, where Option 1 is more preferable from the spec impact perspective:*

*- Option 1: Introduce a restriction that network can indicate RO type as SBFD RO for CFRA, only if an SBFD RACH configuration is configured for CBRA, and apply the same configuration for CFRA SBFD RO location derivation.*

*- Option 2: Introduce new RRC signalling to indicate which SBFD RACH configuration should be applied for SBFD RO location derivation for CFRA.*

Discussions

- ZTE think that with the previous agreement we do not need to capture more agreements for MAC 3-1/3-2. Ericsson agree.

Open issue MAC 4-1 and MAC 4-2

R2-2505495 Open issues for RACH in SBFD Apple discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 5: For RACH Configuration Option 2, all related parameters should be re-initialized as RAN1 intention is to have independent configurations for SBFD and non-SBFD RACH. For RACH Configuration Option 1, at least sbfd-RACHSingleConfig-preambleReceivedTargetPower is re-initialized.*

R2-2505559 Discussions on the open issues for Random Access Samsung discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*[MAC-4] Proposal 3: Parameter initialization should be performed after RO type switching.*

*[MAC-4] Proposal 4: preambleTransMax should be excluded from the parameter initialization.*

R2-2505141 Discussion on RACH in SBFD Xiaomi discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 3: (MAC-4) Parameter initialization is needed after RO type switching in the case of RACH configuration Option 2. At least PREAMBLE\_POWER\_RAMPING\_STEP and SCALING\_FACTOR\_BI are initialized. PREAMBLE\_POWER\_RAMPING\_COUNTER should be excluded from the initialization.*

Discussions

- Sharp think it is reasonable to initialize the configured parameters, and agree with Xiaomi the UE variables should be excluded. Charter agree.

On preambleTransMax

- ZTE agree with Samsung that this should be excluded.

- Apple, OPPO, Nokia think it should be re-initialized after RO type switching.

- ZTE and Ericsson have concern for the case when the ‘2nd’ preambleTransMax could be smaller than the ‘1st’ value. LG E think NW implemention can handle it.

UE variables

- ZTE and Apple think the UE variables for power ramping are initialized.

* For RACH configuration Option 2, all the RRC configured parameters are re-initialized after RO type switching.
* For RACH Configuration Option 1, sbfd-RACHSingleConfig-preambleReceivedTargetPower is re-initialized after RO type switching.
* Can discuss in the RRC CR review the configuration restriction (if needed) for *preambleTransMax*
* For RACH configuration Option 2, PREAMBLE\_POWER\_RAMPING\_STEP and SCALING\_FACTOR\_BI are re-initialized after RO type switching.
* For both RACH configuration Option 1 and RACH configuration Option 2, PREAMBLE\_POWER\_RAMPING\_COUNTER is not re-initialized after RO type switching.
* Can further check the other UE variables in the CR review.

Open issue MAC 5

R2-2505243 Power ramping issue on the RO type fallback OPPO, ZTE Corporation, Sharp, NEC, NTT DOCOMO INC., Qualcomm Incorporated, CATT discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal: For the RO type fallback between legacy RO and additional RO, a power offset given by the difference between the two quantities of preamble power ramping steps is added.*

R2-2505666 SBFD RA remaining aspects Ericsson discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 4 Not support introducing a power offset to compensate the power ramping difference between the two RO types (in SBFD RACH configuration Option 2) for RO type switching.*

Discussions

- Samsung, Xiaomi, ZTE support OPPO proposal.

- Xiaomi think there is similar mechanism for 2step and 4step fallback. DCM, CATT, Apple agree.

- Nokia support Ericsson proposal, and think for SBFD it is obvious UE use different power for different RO types, which is different than the case of 2s/4s RACH.

* [AT131][208][SBFD] Proposals for Power ramping issue on the RO type fallback (OPPO)

Intended outcome: Summary with proposals in R2-2506255

Deadline: before CB.

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

R2-2505089 Leftover Issues on Random Access in SBFD CATT discussion Rel-19 NR\_duplex\_evo-Core

R2-2505126 Remaining issues of RA for SBFD NEC discussion Rel-19 NR\_duplex\_evo-Core

R2-2505141 Discussion on RACH in SBFD Xiaomi discussion Rel-19 NR\_duplex\_evo-Core

R2-2505243 Power ramping issue on the RO type fallback OPPO, ZTE Corporation, Sharp, NEC, NTT DOCOMO INC., Qualcomm Incorporated, CATT discussion Rel-19 NR\_duplex\_evo-Core

R2-2505244 Clarification on the CFRA for SBFD RO OPPO discussion Rel-19 NR\_duplex\_evo-Core

R2-2505365 Discussion on MAC open issues for random access in SBFD Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

R2-2505459 Remaining issues on Random Access procedure for SBFD LG Electronics Inc. discussion Rel-19 NR\_duplex\_evo-Core

R2-2505495 Open issues for RACH in SBFD Apple discussion Rel-19 NR\_duplex\_evo-Core

R2-2505559 Discussions on the open issues for Random Access Samsung discussion Rel-19 NR\_duplex\_evo-Core

R2-2505590 Discussion on random access procedure in SBFD ZTE Corporation discussion Rel-19 NR\_duplex\_evo-Core

R2-2505591 Discussion on the co-existence of SBFD and LTM ZTE Corporation, OPPO, Interdigital, LG, Apple, Charter, Nokia discussion Rel-19 NR\_duplex\_evo-Core

R2-2505661 Remaining issues for Random Access in SBFD Operation Sony discussion Rel-19 NR\_duplex\_evo-Core

R2-2505666 SBFD RA remaining aspects Ericsson discussion Rel-19 NR\_duplex\_evo-Core

R2-2505751 Random Access Operation of SBFD Nokia discussion Rel-19 NR\_duplex\_evo-Core

R2-2505820 Views on random access for SBFD Qualcomm Incorporated discussion NR\_duplex\_evo-Core

R2-2505904 Remaining issues on RACH aspect in SBFD InterDigital, Inc. discussion Rel-19 NR\_duplex\_evo-Core

R2-2505929 Discussion on SBFD RA open issues Sharp discussion Rel-19 NR\_duplex\_evo-Core

R2-2505952 Discussion on random access in SBFD CMCC discussion Rel-19 NR\_duplex\_evo-Core

R2-2505982 Remaining issues on RACH procedure for SBFD vivo discussion Rel-19 NR\_duplex\_evo-Core

### 8.11.3 Other aspects

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

RRC-7

R2-2505667 DC and CSI-RS measurements in SBFD Ericsson discussion Rel-19 NR\_duplex\_evo-Core

* Noted

*Proposal 1 RAN2 to conclude that*

*a. Whether SBFD and DC can be supported is up to RAN4 decision*

*b. The issue doesn’t block the completion of the WI in RAN2*

*c. Further spec changes in RAN2 can be triggered based on RAN4 decision.*

Discussions

- InterDigital think from R2 point of view we can support SBFD + DC. QC agree.

- Samsung, CATT, Xiaomi agree with the proposal.

- QC think we can send LS to RAN4. LG E, Xiaomi agree.

- CATT, HW think R4 is discussing so no need to send LS.

[CB] SBFD and DC, what is the R2 conclusion, whether there is any spec change, stage 2 or stage 3?

*RAN2 to conclude that*

*?? From RAN2 point of view, we can support SBFD with NR DC, with the restriction that SBFD is only configured in one TDD carrier.*

*?? a. Whether SBFD and DC can be supported is up to RAN4 decision*

*?? b. The issue doesn’t block the completion of the WI in RAN2*

*?? c. Further spec changes in RAN2 can be triggered based on RAN4 decision.*

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

R2-2505090 Leftover Issues on other aspects in SBFD CATT discussion Rel-19 NR\_duplex\_evo-Core

R2-2505142 Other aspects of SBFD Xiaomi discussion Rel-19 NR\_duplex\_evo-Core

R2-2505366 Discussion on other aspects of SBFD Huawei, HiSilicon discussion Rel-19 NR\_duplex\_evo-Core

R2-2505592 Discussion on multi-carrier and measurements in SBFD ZTE Corporation discussion Rel-19 NR\_duplex\_evo-Core

R2-2505667 DC and CSI-RS measurements in SBFD Ericsson discussion Rel-19 NR\_duplex\_evo-Core

R2-2505821 Other aspects of SBFD Qualcomm Incorporated discussion NR\_duplex\_evo-Core

R2-2505905 Discussion on other aspect in SBFD InterDigital, Inc. discussion Rel-19 NR\_duplex\_evo-Core

R2-2505930 Discussion on SBFD other open issue Sharp discussion Rel-19 NR\_duplex\_evo-Core

R2-2505983 SBFD other aspects vivo discussion Rel-19 NR\_duplex\_evo-Core

R2-2506092 Other aspects of SBFD Nokia discussion Rel-19 NR\_duplex\_evo-Core Withdrawn

R2-2506131 Other Aspects of SBFD Nokia discussion Rel-19 NR\_duplex\_evo-Core

=> Revised in R2-2506166

R2-2506166 Other Aspects of SBFD Nokia discussion Rel-19 NR\_duplex\_evo-Core R2-2506131

## 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: 0.5 TU

Tdoc Limitation: 2 tdocs

### 8.12.1 Organizational

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

LSin

R2-2505027 LS on Draft CR on TS38.300 for Rel-19 MIMO (R1-2505008; contact: Samsung) RAN1 LS in Rel-19 NR\_MIMO\_Ph5 To:RAN2

* Noted

CRs

R2-2505423 Introduction of MIMO Samsung (Rapporteur) CR Rel-19 38.321 18.6.0 2100 - B NR\_MIMO\_Ph5-Core

R2-2505806 Introduction of MIMO Phase 5 Ericsson CR Rel-19 38.331 18.6.0 5441 - B NR\_MIMO\_Ph5-Core

* The above 2 CRs are endorsed, and they will be taken as baseline for further updates and review

R2-2505949 Running CR for Rel-19 MIMO Phase 5 CMCC CR Rel-19 38.300 18.6.0 1021 - B NR\_MIMO\_Ph5-Core

=> Revised in R2-2506244

Discussion

- ZTE think the new texts on pathloss reference is the existing behaviour and no need to capture in spec, and think if we capture it, the right place should be stage 3.

- OPPO think they are not reflected in stage 3 and think it is ok to put it in stage 2. LG E, CMCC agree.

- Samsung think 6.x should be merged to mTRP section, no need for separate section.

Chair: we will revise the CR and try to endorse in the CB session.

[CB] revised stage 2 CR

R2-2506244

Work plan

R2-2505948 Work Plan for Rel-19 on NR MIMO Phase 5 CMCC, Samsung, MediaTek Work Plan Rel-19 NR\_MIMO\_Ph5-Core

* Noted

Email discussion summary

R2-2505424 Report of MAC open issues for MIMO Samsung discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

Proposal for easy agreement:

*Proposal 1 (12/12): If the PUCCH of a UEI report configuration is pointed to a SCell whose TAT of the single sTAG is expired, this PUCCH for the SCell is released by RRC. If the type-1 CG of a UEI report configuration is pointed to a SCell whose TAT of the single sTAG is expired, this type-1 CG for the SCell is cleared as a configured UL grant. There is no MAC specification impact.*

*Proposal 4 (12/12): Regardless of whether the MAC entity is monitoring PDCCH or not on the Serving Cells in a DRX group, the MAC entity transmits mode-A UE-initiated CSI reporting on PUCCH and PUSCH on the Serving Cells in the DRX group when such is expected.*

*Proposal 5 (8/11): UE does not transmit PUCCH/PUSCH for mode-B if either PUCCH or PUSCH (first valid type-1 CG occasion) is outside DRX Active Time.*

*Proposal 6 (11/12): For mode-A UEI report, regarding monitoring PDCCH for DG in cell DTX, no enhancement is needed.*

*Proposal 7 (12/12): Regarding UEI report in cell DRX:*

*- If the PUSCH for mode-A UEI report is scheduled by NW, UE shall transmit regardless of cell DRX, no MAC spec. impact.*

*- UE does not transmit mode-A UEI report PUCCH outside cell DRX Active Period.*

*- UE does not transmit PUCCH/PUSCH for mode-B UEI report if either the PUCCH or PUSCH (first valid type-1 CG occasion) for a report is outside cell DRX Active Period.*

*Proposal 8 (12/12): sDCI mTRP 2TA (in case of no PL offset) is supported for legacy Rel-18 LTM cell switch with no MAC specification impact*.

* If the PUCCH of a UEI report configuration is pointed to a SCell whose TAT of the single sTAG is expired, this PUCCH for the SCell is released by RRC. If the type-1 CG of a UEI report configuration is pointed to a SCell whose TAT of the single sTAG is expired, this type-1 CG for the SCell is cleared as a configured UL grant. There is no MAC specification impact
* Regardless of whether the MAC entity is monitoring PDCCH or not on the Serving Cells in a DRX group, the MAC entity transmits mode-A UE-initiated CSI reporting on PUCCH and PUSCH on the Serving Cells in the DRX group when such report is expected.

Discussions

P5

- Apple has concern since UE does not know whether the next PUSCH opportunity is in or outside of DRX active time. CATT share this concern. Ofinno think this is up to UE implementation.

- LG E think the current P5 aligns with the existing behaviour for semi-persistent CSI, so no issue. Nokia agree.

* UE does not transmit PUCCH and PUSCH for mode-B if either PUCCH or PUSCH (first valid type-1 CG occasion) is outside DRX Active Time.

[CB] UEI report in cell DRX

R2-2505424 (P6)

Proposal 6 (11/12): For mode-A UEI report, regarding monitoring PDCCH for DG in cell DTX, no enhancement is needed.

R2-2505268 (P4)

Proposal 4: Regardless of cell DTX Active Period, the UE monitors PDCCH if PDCCH scheduling mode-A PUSCH has not been received after transmitting PUCCH for mode-A UEI beam report.

R2-2505807 Open issues for MIMO on 38.331 Ericsson discussion

* Noted

### 8.12.2 Asymmetric DL sTRP/UL mTRP

Remaining issues for asymmetric DL sTRP/UL mTRP

On RRC parameter for Rel-19 2TA

R2-2505425 RRC parameters for two-TA operation Samsung discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: RAN2 clarifies that the parameter that enables Rel-19 two-TA configuration (singleDCI-MultiTRP-2TA) is applied for both Rel-19 intra-cell 2TA and inter-cell 2TA for which mDCI mTRP is not configured. Update the field description to capture this and informs RAN1 by LS.*

Discussion

- Nokia think it is useful to inform R1.

[CB]

*Proposal 1: RAN2 clarifies that the parameter that enables Rel-19 two-TA configuration (singleDCI-MultiTRP-2TA) is applied for both Rel-19 intra-cell 2TA and inter-cell 2TA for which mDCI mTRP is not configured. Update the field description to capture this and informs RAN1 by LS.*

?? RAN2 clarifies that the parameter that enables Rel-19 two-TA configuration (singleDCI-MultiTRP-2TA) is applied for both Rel-19 intra-cell 2TA and inter-cell 2TA for which mDCI mTRP is not configured.

The corresponding parameter name and its field description will be updated to capture this agreement, and the agreement will be informed to RAN1 by LS.

R2-2505361 Discussion on Asymmetric DL sTRP UL mTRP CATT discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1a (RRC, Issue-4): RAN2 to confirm the current RRC parameter singleDCI-MultiTRP-2TA can enable UE to configure either intra-cell or inter-cell sDCI mTRP with two-TA. No further RRC spec impact.*

*Proposal 1b (RRC, Issue-4): LS to RAN1 that RAN2 introduced a new RRC parameter singleDCI-MultiTRP-2TA per UL BWP to enable the UE configured with intra-cell or inter-cell sDCI mTRP with two-TA. Adopt Annex 1 for the draft LS.*

R2-2505585 Discussion on open issues for asymmetric DL sTRPUL mTRP vivo discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: (RRC-x) Two RRC parameter for Rel-19 sDCI-mTRP 2TA, e.g. singleDCI-MultiTRP-IntraCell2TA, and singleDCI-MultiTRP-InterCell2TA, are introduced in RAN2 to enable intra-cell and inter-cell 2TA, respectively.*

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

R2-2505242 Clarification on the coexistence between LTM and UL-only TRP OPPO discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505267 Enhancements for Asymmetric DL sTRP and UL mTRP Ofinno discussion Rel-19

R2-2505361 Discussion on Asymmetric DL sTRP UL mTRP CATT discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505425 RRC parameters for two-TA operation Samsung discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505585 Discussion on open issues for asymmetric DL sTRPUL mTRP vivo discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505862 Asymmetric DL/UL mTRP impact from MIMO ph. 5 Ericsson discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505891 Remaining issues on Asymmetric DL sTRP/UL mTRP Huawei, HiSilicon discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505901 Remaining issues on asymmetric DL sTRP/UL mTRP Nokia discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505946 Discussion on Asymmetric DL sTRP/UL mTRP CMCC discussion Rel-19 NR\_MIMO\_Ph5-Core

### 8.12.3Others

Remaining issues for UE-initiated reporting, and other issues if not covered by the previous agenda items.

Open issue for UE-initiated beam report related to TAT expiry

R2-2505464 Discussion on UEI beam reporting impact LG Electronics Inc. discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1. When UEIBR is initiated but TAT expires, UE does not initiate RACH as in legacy.*

*Proposal 2. When UEIBR is initiated but TAT expires, MAC indicates to cancel the triggered UEIBR to PHY layer.*

R2-2506035 Discussion on MAC open issues for MIMO phase 5 ASUSTeK discussion Rel-19 38.321 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: RAN2 to confirm that based on the current MAC spec, the UE releases PUCCH resources and clears type-1 CG PUSCH resources configured in a UEI report configuration of a SCell if the TAT of the sTAG of the SCell is expired, regardless of the Cell on which the PUCCH and PUSCH resources are configured.*

*Proposal 2: The UE initiates RACH when a UEI report is triggered but there is no PUCCH or type-1 CG for the triggered UEI report due to the associated TAT being expired, and UE indicates the cause of RACH via at least one of the following options:*

*- Option 1: explicit indication via a MAC CE in Msg3*

*- Option 2: implicit indication via a dedicated preamble configured for UEI report-initiated RACH.*

R2-2505850 Discussion on remaining issues for UE initiated beam report Qualcomm Incorporated discussion

* Noted

*Proposal 2. For mode-A UEI report, if TAT is expired after transmitting PUCCH and before PUSCH for a triggered report, no enhancement is needed..*

Discussions

- Ericsson think no need for further enhancement.

- Ofinno think we could use LCID to indicate so the impact to R2 is limited.

- Nokia agree with P2 from AsusTek and think O1 is better. Nokia fine with P2 from Qualcomm.

- LG E has concern on sending outdated CSI report to the network.

- Nokia wonders with LG E P1, what is the UE behaviour from L1 point of view.

**For both mode-A and mode-B UEI beam report,**

* When UEIBR is initiated but TAT expires, UE does not initiate RACH.
* If TAT is expired after transmitting PUCCH and before PUSCH for a triggered report, no enhancement is needed.

Other proposals

R2-2505268 Enhancements for UE-initiated Beam Reporting Ofinno discussion Rel-19

* Noted

*Proposal 1: Explicitly specify the RAN2 agreement: 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.*

Discussions

P1

- ZTE do not agree with P1.

- Qualcomm think R15 does not consider aperiodic CSI, and think we do not need to revisit.

- CATT think P1 is acceptable.

R2-2505998 Consideration on the Remaining MAC Issues of UEIBM ZTE Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

* Noted

*Proposal 1: RAN2 to confirm whether to further specify the broken R15 UL skipping function for the UEIBM.*

*Proposal 1a: No need to further specify the broken R15 UL skipping function for the UEIBM.*

[CB] on Rel-15 UL skipping, R2-2505268 (P1) and R2-2505998 (P1, P1a)

R2-2505808 Remaining aspects from other NR MIMO Ph.5 objectives Ericsson discussion

* Noted

*Proposal 2 Keep UEI report parameters within CSI-ReportConfig. No specification impact.*

*Proposal 3 referenceAntennaPort is defined with values 1, 2 and 4.*

Discussions

P1

- CATT, Samsung agree, and think this align with R1 understanding.

- ZTE has concern on signalling efficiency. Ericsson think this is not critical issue to enhance.

* Keep UEI report parameters within CSI-ReportConfig. No specification impact.

P3

- Samsung think we should include 8.

- ZTE think all values from 1 to 8 are possible.

* referenceAntennaPort is introduced in RRC.

[CB] further issue on the case of TAT expiry, R2-2506035 (P1)

R2-2506035 Discussion on MAC open issues for MIMO phase 5 ASUSTeK discussion Rel-19 38.321 NR\_MIMO\_Ph5-Core

Proposal 1: RAN2 to confirm that based on the current MAC spec, the UE releases PUCCH resources and clears type-1 CG PUSCH resources configured in a UEI report configuration of a SCell if the TAT of the sTAG of the SCell is expired, regardless of the Cell on which the PUCCH and PUSCH resources are configured.

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

R2-2505241 Discussion on the remaining issues of UE-initiated beam report OPPO discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505268 Enhancements for UE-initiated Beam Reporting Ofinno discussion Rel-19

R2-2505362 Discussion on UE initiated beam reporting CATT discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505407 Discussion on MAC and RRC open issues for UEI BMR vivo discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505426 Open issues on UE-initiated CSI Reporting Samsung discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505464 Discussion on UEI beam reporting impact LG Electronics Inc. discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505484 Remaining issues of UE initiated beam reporting Apple discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505694 Remaining issues on UEI report Lenovo discussion Rel-19

R2-2505808 Remaining aspects from other NR MIMO Ph.5 objectives Ericsson discussion

R2-2505850 Discussion on remaining issues for UE initiated beam report Qualcomm Incorporated discussion

R2-2505892 UE-initiated/event-driven beam management Huawei, HiSilicon discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505902 Other MIMO issues Nokia discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505947 Discussion on other issues of NR MIMO Phase 5 CMCC discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505998 Consideration on the Remaining MAC Issues of UEIBM ZTE Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2505999 Consideration on the Remaining Asn.1 Issues ZTE Corporation discussion Rel-19 NR\_MIMO\_Ph5-Core

R2-2506034 Discussion on RRC impacts for MIMO phase 5 ASUSTeK discussion Rel-19 38.331 NR\_MIMO\_Ph5-Core

R2-2506035 Discussion on MAC open issues for MIMO phase 5 ASUSTeK discussion Rel-19 38.321 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

Signallig for 7Mhz Ch BW

R2-2505046 Reply LS to RAN2 on Signalling for 7 MHz Channel Bandwidth (R4-2508088; contact: T-Mobile) RAN4 LS in Rel-19 NR\_FR1\_7MHz\_BW-Core To:RAN2 Cc:RAN3

* Noted

R2-2505903 Discussion on 7 MHz channel bandwidth capabilities Nokia discussion Rel-19 NR\_FR1\_7MHz\_BW-Core

* Noted

R2-2506000 Consideration on the 7M Channel Bandwidth Reporting ZTE Corporation discussion Rel-19 NR\_FR1\_7MHz\_BW-Core

* Noted

Discussions

- Qualcomm think this is from Rel-19.

* Allocate fifth leftmost bit in channelBWs-DL-v1590 / channelBWs-UL-v1590 to 7 MHz.
* Support 7 MHz maximum/minimum channel bandwidth capabilities based on supportedBandwidthDL/UL and supportedMinBandwidthDL/UL from Rel-18
* The changes are from R18 and allow early implementation from the R15.
* [AT131][202][NR\_Others] CRs for Signallig for 7Mhz Ch BW (T-Mobile USA, Ericsson)

Intended outcome: agreeable CR in R2-2506242/ R2-2506243 for Signallig for 7Mhz Ch BW

Deadline: before Friday CB.

R2-2505384 Introduction of 7MHz channel bandwidth T-Mobile USA, Ericsson CR Rel-18 38.331 18.6.0 5308 1 A TEI18, NR\_FR1\_7MHz\_BW-Core R2-2502572

R2-2505386 Introduction of 7MHz channel bandwidth Ericsson, T-Mobile CR Rel-17 38.331 17.13.0 5307 1 B TEI17, NR\_FR1\_7MHz\_BW-Core R2-2502571

R2-2505387 Introduction of 7MHz channel bandwidth Ericsson, T-Mobile CR Rel-18 38.306 18.6.0 1258 1 A TEI18, NR\_FR1\_7MHz\_BW-Core R2-2502570

R2-2505388 Introduction of 7MHz channel bandwidth Ericsson, T-Mobile CR Rel-17 38.306 17.13.0 1257 1 B TEI17, NR\_FR1\_7MHz\_BW-Core R2-2502569

UE Signaling design for NR ATG enh

R2-2505048 LS on UE signaling design for NR ATG enh (R4-2508329; contact: CMCC) RAN4 LS in Rel-19 NR\_ATG\_enh To:RAN2

* Noted

R2-2505761 Discussion on ATG LS Ericsson discussion Rel-19 NR\_ATG\_enh-Core

* Noted

*Proposal 1 RAN2 to discuss whether to place the new parameter in servingcellConfig or measObjectNR.*

R2-2505961 Discussion on RAN4 LS on UE signaling design for NR ATG enh CMCC discussion Rel-19 NR\_ATG\_enh

* Noted

*Proposal 1: It is proposed to introduce one bit indication (e.g. neighCellMeasofScc) in MeasObjectNR IE, and if it is configured as disabled, it indicates not to allow the UE to perform the neighbour cell measurements on the frequency configured by servingcellMO for SCC.*

*Proposal 2: If P1 is supported, suggest RAN2 to agree the TP in annex.*

Discussions

- Qualcomm wonders whether the ‘disabled’ configuration is needed or not.

* RRC signaling is introduced to indicate whether an ATG UE supporting *antennaArrayType-r18* on the SCC shall perform the neighbour cell measurements or not on the frequency configured by *servingcellMO* for SCC.
* [AT131][201][NR\_Others] CR for UE Signaling design for NR ATG enh (CMCC)

Intended outcome: agreeable CR in R2-2506241 for UE Signaling design for NR ATG enh.

Deadline: before Friday CB.

On Rx BSF opt.

R2-2505205 Introduction of Rx BSF optimization for NR RRM Ph5 CATT, Ericsson, Apple, ZTE Corporation draftCR Rel-19 38.331 18.6.0 B NR\_RRM\_Ph5-Core

[CB] Friday

R2-2506093 Fast Beam Sweeping Factor Nokia discussion Rel-19 NR\_RRM\_Ph5-Core

* Noted

Discussions

- CATT explains we expect more parameters from R4, so suggest we endorse for now and update based on further R4 input.

- Nokia point out that R4 already have some agreement on Timer/UAI, and think we can already capture. HW fine with Nokia proposal.

- HW think in CATT CR, the new procedure text can be reflected in the field description. LG E agree.

- CATT think we may get more input from R4 during the meeting week, so we can discuss using post meeting email to take into account everything.

On CSSF optimization

R2-2505485 Introduction of CSSF optimization for NR RRM Ph5 (Alt1) Apple CR Rel-19 38.331 18.6.0 5419 - B NR\_RRM\_Ph5-Core

R2-2505486 Introduction of CSSF optimization for NR RRM Ph5 (Alt2) Apple CR Rel-19 38.331 18.6.0 5420 - B NR\_RRM\_Ph5-Core

[CB] Friday

UE capability on 6 DL MIMO layers

R2-2505303 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 R2-2503446

* Noted

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

*Observation 1: 8 DL MIMO layer can only be supported via 8 Rx receiver, which is only applicable for FWA. Generic signaling design in RAN2 specifications is used to indicate 8 DL MIMO layer in maxNumberMIMO-LayersPDSCH without differentiating FWA and handheld UE.*

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

R2-2505610 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 18.6.0 B NR\_ENDC\_RF\_Ph4 R2-2503447

R2-2505611 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 18.6.0 B NR\_ENDC\_RF\_Ph4 R2-2503448

R2-2506187 Introduction of UE capability on 6 DL MIMO layers Huawei, HiSilicon, Samsung, MediaTek Inc., Apple draftCR Rel-19 38.331 18.6.0 B NR\_ENDC\_RF\_Ph4

R2-2506188 Introduction of UE capability on 6 DL MIMO layers Huawei, HiSilicon, Samsung, MediaTek Inc., Apple draftCR Rel-19 38.306 18.6.0 B NR\_ENDC\_RF\_Ph4

Discussions

- HW think R4 does not specify that ‘6 DL MIMO layer is only applicable for FWA. Xiaomi think R4 is still discussing.

- T-mobile think the signalling design should be independent from the device type.

- T-mobile suggest we technically endorse both set of CRs and it is up to the plenary to decide.

[CB] Friday

Chair: we will try to endorse two set of CRs in the Friday CB session.

R2-2505304 Introduction of 6 DL MIMO layer Xiaomi CR Rel-19 38.306 18.6.0 1320 - B NR\_ENDC\_RF\_Ph4 R2-2503447 Withdrawn

R2-2505305 Introduction of 6 DL MIMO layer Xiaomi CR Rel-19 38.331 18.6.0 5402 - B NR\_ENDC\_RF\_Ph4 R2-2503448 Withdrawn

R2-2506110 Introduction of UE capability on 6 DL MIMO layers Huawei, HiSilicon, Samsung, MediaTek Inc., Apple CR Rel-19 38.331 18.6.0 5458 - B NR\_ENDC\_RF\_Ph4 Withdrawn

R2-2506111 Introduction of UE capability on 6 DL MIMO layers Huawei, HiSilicon, Samsung, MediaTek Inc., Apple CR Rel-19 38.306 18.6.0 1341 - B NR\_ENDC\_RF\_Ph4 Withdrawn

Simultaneous Rx-Tx capability for TDD-SDL band combination

R2-2505622 Corrections on simultaneous Rx-Tx capability for TDD-SDL band combination Huawei, HiSilicon, Ericsson CR Rel-15 38.306 15.28.0 1310 1 F LTE\_NR\_R19\_Simult\_RxTx R2-2504734

R2-2505623 Corrections on simultaneous Rx-Tx capability for TDD-SDL band combination Huawei, HiSilicon, Ericsson CR Rel-16 38.306 16.21.0 1311 1 A LTE\_NR\_R19\_Simult\_RxTx R2-2504735

R2-2505624 Corrections on simultaneous Rx-Tx capability for TDD-SDL band combination Huawei, HiSilicon, Ericsson CR Rel-17 38.306 17.13.0 1312 1 A LTE\_NR\_R19\_Simult\_RxTx R2-2504736

R2-2505625 Corrections on simultaneous Rx-Tx capability for TDD-SDL band combination Huawei, HiSilicon, Ericsson CR Rel-18 38.306 18.6.0 1313 1 A LTE\_NR\_R19\_Simult\_RxTx R2-2504737

* The 4 CRs above are agreed.

Signaling support for intra-band non-collocated EN-DC/NR-CA

R2-2506002 Introduction of signaling support for intra-band non-collocated EN-DC/NR-CA deployment Phase 2: new receiver type(s) KDDI, OPPO, Apple, Ericsson, Huawei, HiSilicon, ZTE, Qualcomm Incorporated, Samsung draftCR Rel-19 38.331 18.6.0 NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core

R2-2506003 Introduction of signaling support for intra-band non-collocated EN-DC/NR-CA deployment Phase 2: new receiver type(s) KDDI, OPPO, Apple, Ericsson, Huawei, HiSilicon, ZTE, Qualcomm Incorporated, Samsung draftCR Rel-19 38.306 18.6.0 NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core

R2-2506009 Introduction of signaling support for intra-band non-collocated EN-DC/NR-CA deployment Phase 2: new receiver type(s) KDDI, OPPO, Apple, Ericsson, Huawei, HiSilicon, ZTE, Qualcomm Incorporated, Samsung draftCR Rel-19 38.331 18.6.0 NonCol\_intraB\_ENDC\_NR\_CA\_Ph2-Core

Discussions

- KDDI explains the need to send LS to RAN4, regarding reporting the capability for the super BC. HW not sure about the benefit for reporting the super BC, but fine to send LS.

- QC think it should be allowed to report for super BC, and not sure if RAN4 can decide on this. Ericsson share the view from QC, think we should decide in RAN2.

- MediaTek think super BC should be clearly specified in RAN4 spec. And, MediaTek think for intraBandNR-CA-non-collocated-r19 we should refer to the corresponding R4 spec in the 306 description part.

- Nokia think the concept of ‘super BC’ is not so clear.

- QC fine to send LS, and think the issue with super BC is for both type 2 and type 4.

- Apple wonders what is our question to RAN4, e.g., is it about whether we allow UE reporting the super BC or the exact BC.

* The 3 draft CRs above are endorsed.
* [AT131][205][NR\_Others] Draft LS to RAN4 about Signaling support for intra-band non-collocated EN-DC/NR-CA (KDDI)

Intended outcome: draft LS to include questions on capability report for super BC in R2-2506248.

Deadline: before CB.

R2-2506254

### 8.20.2 Other WGs

On low NR band CA via switching

R2-2505017 LS on Low NR band carrier aggregation via switching (R1-2504869; conact: Apple) RAN1 LS in Rel-19 NR\_LBCA\_Sw To:RAN2, RAN4

* Noted

R2-2505487 Introduction of low NR band carrier aggregation via switching Apple, Telus, Nokia CR Rel-19 38.331 18.6.0 5421 - B NR\_LBCA\_Sw

* Revised in R2-2506249

R2-2505488 Introduction of low NR band carrier aggregation via switching Apple, Telus, Nokia (Rapporteur) CR Rel-19 38.300 18.6.0 1012 - B NR\_LBCA\_Sw

* Revised in R2-2506250

Discussions

On scenario

- Nokia think we start from CA.

- QC think this is only for CA, and wonders whether this does not include other band/band pairs since it is switching btw bands. QC think we may check with R1/R4. ZTE think this is stilling being discussed in RAN4.

- Apple, ZTE and HW think we focus on 2CC cases for now. Nokia think the R4 spec has the band combinations and it is clear.

Stage 2

- ZTE think we do not need ‘RF chain’ in the text, want to change to ‘switching of patterns’.

- Nokia

RRC

- MediaTek should we should capture the R1 agreement for the Pcell to Scell case in the filed description.

- ZTE think we should drop ‘It is expected that at maximum there is [X] switches within [Y] slots.’ Because R1 is still discussing.

- Nokia think we use SetupRelease to include the new parameters.

* [AT131][206][NR\_Others] CRs for low NR band CA, discussion on capability (Apple)

Intended outcome: Updated CRs for low NR band CA in R2-2506249 and R2-2506250, proposals on UE capability R2-2506251.

Deadline: before CB.

Multi-carrier enh.

R2-2505016 LS on TS38.300 TP for Multi-carrier enhancements in Rel-19 (R1-2504861; contact: Lenovo) RAN1 LS in Rel-19 NR\_MC\_enh2 To:RAN2

* Noted

R2-2505251 Stage 2 CR for Rel-19 Multi-carrier enhancements Lenovo CR Rel-19 38.300 18.6.0 1005 - B NR\_MC\_enh2

* Revised in R2-2506252

R2-2505252 Introduction of Rel-19 Multi-carrier enhancements Lenovo CR Rel-19 38.331 18.6.0 5400 - B NR\_MC\_enh2

* Revised in R2-2506253
* [AT131][207][NR\_Others] CRs for MC enh (Lenovo)

Intended outcome: Updated CRs for MC enh in R2-2506252, R2-2506253.

Deadline: before CB.

Number of UEs in RRC\_INACTIVE state with data transmission

R2-2505292 Introduction of number of UEs in RRC\_INACTIVE state with data transmission China Telecom, Huawei, HiSilicon, ZTE Corporation, Sanechips, CATT, Ericsson, Nokia CR Rel-19 38.314 18.0.0 0034 4 B PM\_KPI\_5G\_Ph4 R2-2504742

* The CR is agreed.

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

R2-2505068 LS on the RAN simulation assumptions for ULBC (S4-251584; contact: Qualcomm) SA4 LS in Rel-20 FS\_ULBC To:RAN1, RAN2, RAN4, SA2, CT1 Cc:SA1

R2-2505077 Discussion on SA4 LS regarding RAN Simulation Assumptions for ULBC vivo discussion Rel-20 FS\_ULBC

R2-2505428 Reply LS on the RAN simulation assumptions for ULBC Qualcomm Technologies Ireland LS out Rel-20 FS\_ULBC SA4 SA2, CT1, RAN1

R2-2505601 Response to SA4 LS on the RAN simulation assumptions for ULBC ZTE Corporation, Sanechips discussion Rel-20 FS\_ULBC

R2-2506125 Draft Reply LS on the RAN Simulation Assumptions for ULBC vivo LS out Rel-20 FS\_ULBC SA4, SA2 RAN1, CT1

## List of post meeting email discussions

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

* [AT131][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

* [Post131][20x][MIMOevo/LPWUS/SBFD/MIMO\_Ph5/NR\_Others] xxxxx (xxxx)

Scope: xxx

Intended outcome: Summary/Proposals for xxxx, agreeable CR

Deadline: xxx