3GPP TSG-RAN WG2 Meeting #116-e R2-21xxxxx

Online, 1-12 November 2021

Source: Session chair (MediaTek)

Title: Report from session on positioning and sidelink relay

# 4 EUTRA corrections Rel-15 and earlier

Only essential corrections. No documents should be submitted to 4. Please submit to 4.x

## 4.4 Positioning corrections Rel-15 and earlier

Documents in this agenda item will be handled by email. No web conference is planned for this agenda item.

# 5 Rel-15 WI: New Radio (NR) Access Technology

(NR\_newRAT-Core; leading WG: RAN1; REL-15; started: Mar. 17; closed: Jun. 19: WID: RP-191971)

Only essential corrections. Please submit CRs marked “NR\_newRAT-Core, TEI16” under one of the below clauses.

##  5.5 Positioning corrections

Corrections to both the stage 2 and stage 3 aspects related to positioning. Stage 2 CRs shall be discussed with the specification rapporteur (Sven Fischer sfischer@qti.qualcomm.com) before submission. Stage 2 CRs not discussed with the specification rapporteur will not be treated.

Documents in this agenda item will be handled by email. No web conference is planned for this agenda item.

[R2-2111126](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111126%20Correction%20on%20LPP%20message%20delivery-R15.doc) Correction on LPP message delivery vivo CR Rel-15 37.355 15.2.0 0324 - F NR\_pos-Core

* Not pursued (conclusion of email discussion [AT116-e][614])

[R2-2111127](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111127%20Correction%20on%20LPP%20message%20delivery-R16.doc) Correction on LPP message delivery vivo CR Rel-16 37.355 16.6.0 0325 - A NR\_pos-Core

* Not pursued (conclusion of email discussion [AT116-e][614])
* [AT116-e][614][POS] AI 5.5 CRs (vivo)

 Scope: Evaluate and conclude on the CRs in R2-2111126 and R2-2111127.

 Intended outcome: Agreed CRs and report in R2-2111548

 Deadline: Thursday 2021-11-11 0200 UTC

R2-2111548 Summary of [AT116-e][614][POS] AI 5.5 CRs vivo discussion NR\_pos-Core

* Noted without presentation

# 6 Rel-16 NR Work Items

Essential corrections only.

Tdoc Limitation: 18 tdocs in total for all sub agenda items, or the restriction for each sub-AI, whichever is more restrictive.

## 6.3 NR Positioning Support

(NR\_pos-Core; leading WG: RAN1; REL-16; started: Mar 19; target; Jun 20; WID: RP-200218).

(NR TEI16 Positioning)

Documents in this agenda item will be handled in a break out session

Tdoc Limitation: See tdoc limitation for Agenda Item 6

### 6.3.1 General and Stage 2 corrections

Including incoming LSs, Including impact to 36.305 and 38.305. Stage 2 corrections shall be discussed with the specification rapporteur (Sven Fischer sfischer@qti.qualcomm.com) before submission. Stage 2 CRs not discussed with the specification rapporteur will not be treated.

This agenda item may use a summary document (decision to be made based on submitted tdocs).

Incoming LS

[R2-2109333](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109333_R3-212802.docx) Reply LS on E-CID LTE measurement in Rel-15 measurements (R3-212802; contact: Huawei) RAN3 LS in Rel-15 NR\_pos-Core To:RAN2

Huawei clarify the issue was resolved last meeting.

* Noted

Feature list

[R2-2109313](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2109313.zip) LS on updated Rel-16 RAN1 UE features lists for NR after RAN1#105-e (R1-2108427; contact: NTT DoCoMo, AT&T) RAN1 LS in Rel-16 NR\_2step\_RACH-Core, NR\_unlic-Core, NR\_IAB-Core, 5G\_V2X\_NRSL-Core, NR\_L1enh\_URLLC-Core, NR\_IIOT-Core, NR\_eMIMO-Core, NR\_UE\_pow\_sav-Core, NR\_pos-Core, NR\_Mob\_enh-Core, LTE\_NR\_DC\_CA\_enh-Core, TEI16, NR\_CLI\_RIM-Core To:RAN2 Cc:RAN4

Discussion:

Intel indicate there is a mistake in the LS that changes the wrong component (should be component 3 instead of component 1 of FG13-2b/3b/4b), and this is corrected in the CRs. Also regarding the secondary change to the note on the PRS-only TP, there are related CRs to this meeting.

Nokia ask if the mistake is only in the LS or if an update is needed within RAN1. Intel clarify there is only RAN2 impact in the specs, but we may want to send feedback to RAN1 documenting the mistake and the correction in the changes.

[R2-2109679](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109679%20Updates%20based%20on%20RAN1%20NR%20positioning%20features%20list.docx) Updates based on RAN1 NR positioning features list Intel Corporation CR Rel-16 38.822 16.1.0 0006 - F NR\_pos-Core

* Revised in R2-2111383

[R2-2111383](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111383%20Updates%20based%20on%20RAN1%20NR%20positioning%20features%20list%20%28TS38.822%29.docx) Updates based on RAN1 NR positioning features list Intel Corporation CR Rel-16 38.822 16.1.0 0006 1 F NR\_pos-Core

* Agreed

[R2-2109680](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109680%20Updates%20based%20on%20RAN1%20NR%20positioning%20features%20list.docx) Updates based on RAN1 NR positioning features list Intel Corporation CR Rel-16 37.355 16.6.0 0321 - F NR\_pos-Core

* Revised in R2-2111384

[R2-2111384](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111384%20Updates%20based%20on%20RAN1%20NR%20positioning%20features%20list%20%28TS37.355%29.docx) Updates based on RAN1 NR positioning features list Intel Corporation CR Rel-16 37.355 16.6.0 0321 1 F NR\_pos-Core

* Agreed

[R2-2109681](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109681%20Updates%20based%20on%20RAN1%20NR%20positioning%20features%20list.docx) Updates based on RAN1 NR positioning features list Intel Corporation CR Rel-16 38.306 16.6.0 0645 - F NR\_pos-Core

* Revised in R2-2111385

[R2-2111385](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111385%20Updates%20based%20on%20RAN1%20NR%20positioning%20features%20list%20%28TS38.306%29.docx) Updates based on RAN1 NR positioning features list Intel Corporation CR Rel-16 38.306 16.6.0 0645 - F NR\_pos-Core

* Agreed
* [AT116-e][616][POS] Updates for RAN1 positioning feature list (Intel)

 Scope: Review the CRs in R2-2109679, R2-2109680, R2-2109681, R2-2110172, and R2-2110173, and draft a response to RAN1 indicating where we have corrected the implementation of the changes.

 Intended outcome: Agreed CRs and approved LS

 Deadline: Tuesday 2021-11-09 0900 UTCs

[R2-2111387](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111387%20Summary%20of%20offline%20616%20v09_Summary.docx) [AT116-e][616][POS] Updates for RAN1 positioning feature list (Intel) Intel Corporation discussion NR\_pos-Core

Proposal 0: to discuss online whether “non-serving cell” or “neighbor cell”should be used in the Note;

Proposal 1: to agree the TS38.822, 38.306 and 37.355 CRs with following changes:

- TS38.822, “rev” to 1; Update note as A PRS from a PRS-only TP is treated as PRS from a non-serving cell

- TS37.355, “rev” to 1; remove the description on “n96” from Coversheet, Update Note as A PRS from a PRS-only TP is treated as PRS from a non-serving cell’

- TS38.306, “rev” to 1; Update note as A PRS from a PRS-only TP is treated as PRS from a non-serving cell

Proposal 2: to agree the LS to RAN1 with following changes:

- RAN2 also agreed to capture a Note for PRS-only TRP as “Note: A PRS from a PRS-only TP is treated as PRS from a non-serving cell”.

* CRs are agreed

[R2-2111386](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111386%20Draft%20response%20LS%20on%20UE%20features%20list.docx) Draft response LS on updated Rel-16 RAN1 UE features lists for NR after RAN1#105-e Intel Corporation LS out To:RAN1

* Approved as R2-2111483

Stage 2 CRs checked with rapporteur

[R2-2110169](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110169%20Correction%20to%20the%20alignement%20between%20stage2%20and%20stage3.docx) Correction to the alignement between stage2 and stage3 Huawei, HiSilicon CR Rel-16 38.305 16.6.0 0081 - F NR\_pos-Core

Discussion:

vivo are generally fine with the corrections, but want to clarify that the periodical SRS should be treated as released rather than deactivated in section 8.10.2.4. Huawei understand that the message from the LMF is a deactivation request and the real release is from the gNB.

Nokia are unsure if the activation/deactivation applies to the periodic case and think the alignment might need to change stage 3 to align with stage 2.

Intel wonder how much stage 3 detail should be reflected in stage 2, and think we could just provide general information.

* Check by email
* Revised in R2-2111388 (in email discussion [AT116-e][619])

[R2-2111388](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111388%20Correction%20to%20the%20alignement%20between%20stage2%20and%20stage3.docx) Correction to the alignement between stage2 and stage3 Huawei, HiSilicon CR Rel-16 38.305 16.6.0 0081 1 F NR\_pos-Core

* Further checking by email in extension of [AT116-e][619]
* Revised in R2-2111486

[R2-2111486](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111486%20Correction%20to%20the%20alignement%20between%20stage2%20and%20stage3.docx) Correction to the alignement between stage2 and stage3 Huawei, HiSilicon CR Rel-16 38.305 16.6.0 0081 2 F NR\_pos-Core

* Agreed (conclusion of email discussion [AT116-e][619])

[R2-2110170](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110170%20Correciton%20to%20Event%20Reporting%20in%20RRC_IDLE.doc) Correciton to Event Reporting in RRC\_IDLE Huawei, HiSilicon CR Rel-16 38.305 16.6.0 0076 - F NR\_pos-Core R2-2107333

Discussion:

Huawei think this alignment is needed with respect to the SA2 spec.

Nokia think we concluded last meeting not to pursue this, and they do not see it as an essential correction.

Ericsson agree with Nokia; the description is well captured in SA2 and we don’t need it here as well.

Qualcomm think we captured the equivalent procedure for RRC\_CONNECTED and it makes sense to align.

Intel and ZTE agree this does not need to be captured.

vivo wonder if the proposed CR implies that the event report is the only message supported to be transmitted via EDT. They are concerned that if we capture this procedure in stage 2, we should capture others such as Request Assistance Data.

Huawei think vivo have a fair question, and according to the SA2 spec EDT is only used to transmit LCS messages. They understand that it might conceivably be used for LPP messages as well but this is not captured in the current spec.

CATT have the same understanding as Qualcomm that it makes sense to capture this; on the point of LCS and LPP messages, they have the same understanding as Huawei. They see this as an alignment change.

ZTE see no consensus on the detailed procedure for RRC\_INACTIVE, and think this case should be the same (the only difference is the transmission mode), so they do not think it needs to be captured.

* Check by email whether to capture anything (content appears to be OK if we want to have a CR)
* Not agreed (conclusion of email discussion [AT116-e][619])
* [AT116-e][619][POS] Stage 2 Rel-16 positioning CRs (Huawei)

 Scope: Check the CRs in R2-2110169 and R2-2110170.

 Intended outcome: Agreed CRs

 Deadline: Tuesday 2021-11-09 0800 UTC– extended to Friday 2021-11-12 1000 UTC for checking of R2-2111388

[R2-2111389](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111389%20%5BAT116-e%5D%5B619%5D%5BPOS%5D%20Stage%202%20Rel-16%20positioning%20CRs%20%28Huawei%EF%BC%89.docx) Summary of [AT116-e][619][POS] Stage 2 Rel-16 positioning CRs (Huawei) Huawei, HiSilicon discussion NR\_pos-Core

Discussion:

Ericsson think this could be postponed to next meeting.

Huawei think the alignment CR is felt to be needed.

* To be resolved in the email discussion
* Noted

[R2-2110728](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110728%20ST2%20corrections.docx) Corrections on defintions and scope of information transfer Ericsson CR Rel-16 38.305 16.6.0 0083 - F NR\_pos-Core

Discussion:

Ericsson consider that the update of definitions is important; there is also a small correction in section 8.9.2.

Nokia think this is a repeat of a discussion from last meeting and they do not see the differentiation in the definitions as essential. If anything needs to be qualified it can be described as LTE or NR. The change to section 8.9.2 looks editorial and could be merged.

Ericsson think we made a parallel correction already in stage 3 to introduce the DL-PRS terminology, and it would be good to align.

Intel agree we made this change in stage 3, so they agree with the DL-PRS change, but they are not sure about the change to “UL-SRS” since SRS is always in UL.

Qualcomm agree with Intel, but think we use the term “UL-SRS” consistently in other places.

Nokia acknowledge the change is not harmful.

Apple support the change.

* Agreed

### 6.3.2 RRC corrections

Including impact to 36.331, 38.331, and 38.306.

This agenda item may use a summary document (decision to be made based on submitted tdocs).

[R2-2110172](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110172%20Correction%20to%20posSRS%20capability%20associated%20with%20PRS-only%20TP.doc) Correction to posSRS capability associated with PRS-only TP Huawei, HiSilicon CR Rel-16 38.306 16.6.0 0648 - F NR\_pos-Core

=> Handled in email discussion [AT116-e][616]

### 6.3.3 LPP corrections

This agenda item may use a summary document (decision to be made based on submitted tdocs).

[R2-2110173](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110173%20Correction%20to%20posSRS%20and%20PRS%20capability%20associated%20with%20PRS-only%20TP.doc) Correction to posSRS and PRS capability associated with PRS-only TP Huawei, HiSilicon CR Rel-16 37.355 16.6.0 0322 - F NR\_pos-Core

=> Handled in email discussion [AT116-e][616]

[R2-2111072](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111072%20-%20Correction%20on%20BDS%20B2I.docx) Correction on BDS B2I clock model Swift Navigation, Ericsson CR Rel-16 37.355 16.6.0 0323 - F NR\_pos

Discussion:

CATT want to explain three points. (1) From a requirement perspective, only B1i and B1c were proposed in 3GPP and there is no strong requirement on B2I signal from the BDS ecosystem in China from their understanding. (2) From metadata perspective, they are concerned that the metadata for this clock model may not be provided to the server. (3) However, if there is a strong requirement from some market for B2I, they can accept the change.

Nokia are OK with the CR if it matches the ICD, but have some editorial comments (WI code, impact analysis). Qualcomm agree with Nokia, and they think it makes technical sense to have the change similar to what was captured for other GNSSs.

Swift think LPP should faithfully represent the ICD and we should not make judgements on the priority of the different signals.

Intel point out another editorial issue: -r17 should be -r16.

* Revised in R2-2111366 to address the issues above [CB Tuesday 2021-11-09]
* [AT116-e][617][POS] Correction on BDS B2I clock model (Swift)

 Scope: Check and update the CR in R2-2111072.

 Intended outcome: Agreeable CR

 Deadline: Tuesday 2021-11-09 0800 UTC

[R2-2111366](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111366%20Corrections%20on%20BDS%20B2I%20clock%20model.docx) Correction on BDS B2I clock model Swift Navigation, Ericsson CR Rel-16 37.355 16.6.0 0323 1 F NR\_pos

* Agreed with revision to remove changes on changes, as R2-2111484

Discussion:

Nokia wonder about the category. Swift confirm it is Cat F.

[R2-2111198](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111198%20Discussion%20on%20LPP%20segmentation%20in%20LCS%20message.docx) Discussion on LPP segmentation in LCS message vivo discussion Rel-16 NR\_pos-Core

Discussion:

Chair wonders if this can be driven by contributions in SA2. vivo think this would be acceptable but in discussion last meeting, the majority wanted to send an LS to SA2.

Nokia think this should be handled by contributions in SA2.

Qualcomm think this is a Rel-17 issue that does not exist in Rel-16, because EDT is one-shot and segmentation cannot apply. They think it should be discussed in Rel-17 in the context of SDT and subsequent UL data transmission only.

Intel understand that LPP segmentation has existed for a long time, so this is not a new issue and not specific to EDT, but they agree it could be started in SA2.

Ericsson indicate that the SA2 spec does not allow multiple LCS messages to be sent, so LPP segmentation would require carrying multiple LPP segments in one LCS message; they agree that this should be discussed directly in SA2.

* Noted (can be originated in SA2)

### 6.3.4 MAC corrections

[R2-2110171](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110171%20Discussion%20on%20impacts%20of%20TA%20expiry%20and%20SR%20failure%20on%20uplink%20positoning.docx) Discussion on impacts of TA expiry and SR failure on uplink positoning Huawei, HiSilicon discussion NR\_pos-Core

=> Revised in R2-2111272

[R2-2111272](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111272%20Discussion%20on%20impacts%20of%20TA%20expiry%20and%20SR%20failure%20on%20uplink%20positoning.docx) Discussion on impacts of TA expiry and SR failure on uplink positoning Huawei, HiSilicon discussion NR\_pos-Core

Proposal1: RAN 2 should downselect from the following two options for posSRS at TA expiry or SR failure

 Option1: UE releases posSRS configuration

 Option2: UE keeps the posSRS configuration

Proposal2: If posSRS configuration is kept at TA expiry and SR failure, add to the list of triggers for RACH procedure in the stage2 spec TS 38.300 that random access procedure can be triggered when UL is non-synchronized when the UE is transmitting positioning SRS for uplink positioning. Adopt the TP in Section 6.1

Proposal3: If posSRS configuration is released at TA expiry or SR failure, clarify in the MAC spec that the SRS in the spec includes both mimoSRS and posSRS. Adopt the TP in section 6.2.

Discussion:

vivo think posSRS should be treated the same as normal SRS, i.e. the gNB will update the TA and if the TA timer expires the UE shall consider itself no longer required to send posSRS (option 1).

Qualcomm think this issue is not specific to TA expiry and SR failure; the real question is whether regular SRS rules apply to posSRS. They understand that the same rules do apply because there is no exception written into the MAC spec; in the past we have asked RAN4 about the applicability of DRX-related conditions, and they indicated that the same rules apply but we did not update our spec. Where there is a divergence in PHR handling, we documented the difference, and they think this is the only such case. They also think it is too late to change this in Rel-16.

Ericsson agree with Qualcomm.

Intel agree with the argument from vivo and Qualcomm, and point out that normal SRS can also be used for positioning measurements, which argues for consistency.

Samsung think there is no need to handle posSRS differently.

CATT agree with other companies that we should go with option 1.

Huawei think option 1 is OK, but they have one caveat: SR failure just means the UE cannot send SR to the gNB, which impacts scheduling but has no obvious relation to positioning. So they understand that SR failure is not a good motivation to release posSRS. However, they also understand Qualcomm’s point that it is late, and they can accept option 1. They think a CR may still be needed to add a note for clarification (section 6.2 of the contribution).

Ericsson think we discussed previously if any spec text was needed and there was a majority view to have no impact. They think it is clear that posSRS follows the behaviour of normal SRS.

Nokia see some value in the clarification, but think it could be more specific about its relation to the MAC procedure. They think a NOTE is sufficient.

Qualcomm also think a NOTE could be helpful, and would suggest to add “unless explicitly stated otherwise” (as we do for other notes, and this would account for the PHR case).

Agreements:

Capture a NOTE in TS 38.321 indicating that posSRS is treated the same as SRS unless specified otherwise. CR to be seen in CB session.

* [AT116-e][618][POS] CR to 38.321 on posSRS handling (Huawei)

 Scope: Draft a CR to 38.321 capturing the NOTE agreed under agenda item 6.3.4.

 Intended outcome: Agreeable CR in R2-2111369

 Deadline: Tuesday 2021-11-09 0800 UTC

[R2-2111369](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111369%20Clarificaton%20on%20posSRS%20in%20MAC%20spec.docx) Clarification on posSRS in MAC spec Huawei, HiSilicon CR Rel-16 38.321 16.6.0 1179 - F NR\_pos-Core

* Agreed

# 7 Rel-16 EUTRA Work Items

Only essential corrections. No documents should be submitted to 7. Please submit to 7.x

## 7.5 LTE Positioning

(NavIC, LTE TEI16 Positioning)

Documents in this agenda item will be handled by email. No web conference is planned for this agenda item.

# 8 Rel-17 NR Work Items

## 8.7 NR Sidelink relay

(NR\_SL\_Relay-Core; leading WG: RAN2; REL-17; WID: RP-212601)

Time budget: 2 TU

Tdoc Limitation: 7 tdocs

Email max expectation: 7 threads

### 8.7.1 Organizational

Incoming LSs, TS updates, rapporteur inputs. This AI is reserved for rapporteur and organizational inputs. Documents in this AI do not count towards the tdoc limitation.

Incoming LSs and related documents

[R2-2109303](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109303_C1-214795.doc) Reply LS on establishment/resume cause value and UAC on L2 SL Relay (C1-214795; contact: OPPO= CT1 LS in Rel-17 5G\_ProSe, NR\_SL\_relay-Core To:RAN2 Cc:SA2, RAN3

* Noted

[R2-2111236](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2111236.zip) Reply LS on discovery and relay (re)selection (S2-2107972; contact: CATT) SA2 LS in Rel-17 5G\_ProSe, NR\_SL\_relay-Core To:RAN2

Discussion:

Ericsson think there are related proposals for Q1 in the CP AI. They understand that we need to decide whether RAN sharing is supported before drafting the LS (they would prefer no, but see that some discussion is needed).

OPPO think we can try to address this issue in discussion of the LS response. Qualcomm agree with OPPO.

* Noted
* [AT116-e][620][Relay] Reply LS to SA2 on discovery and relay (re)selection (CATT)

 Scope: Discuss the questions in R2-2111236 and draft a reply, taking into account decisions of this meeting.

 Intended outcome: Approvable LS in R2-2111370 and report in R2-2111371

 Deadline: Thursday 2021-11-11 0100 UTC

[R2-2111371](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111371.docx) Summary [AT116-e][620][Relay] Reply LS to SA2 on discovery and relay (re)selection (CATT) CATT discussion Rel-17

Proposal 1: [11/17] For L2 U2N relay, RAN2 further discuss whether RAN sharing can be supported for the NG-RAN node.

Proposal 2: If RAN sharing is supported for the NG-RAN node, the non-serving PLMN IDs can be delivered to the remote UE in discovery message (10/12). RAN2 further discuss whether to include it in a RRC container of discovery message (9/12) or not (5/12).

Agreements:

Proposal 3: RAN2 replies SA2 that after PC5 connection establishment, TAI can be forwarded by Relay UE to the Remote UE via PC5-RRC message.

Proposal 4: [18/18] During the Layer-2 link establishment procedure the Relay UE and Remote UE do not interact with the PC5 QoS Flows Info.

Proposal 5: [16/18] Whether the Layer-2 link modification procedure is used can be decided by SA2 itself.

Proposal 6: [16/18] Whether authorization information for L3 remote UE is needed for NG-RAN can be decided by RAN3.

[R2-2111370](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111370.docx) Reply LS on discovery and relay (re)selection CATT LS out To:SA2, RAN3

Discussion:

Ericsson think this LS has not been reviewed enough yet, considering the time zones. They have concerns with the highlighted portions and think we should not give the information on majority views of discussions in progress. For the agreements on Q4, they are not sure why they should be included.

OPPO think the statements of majority view are accurate and it would be disappointing just to say “no progress”. They think RAN sharing is an important scenario, but can agree to say no consensus now, provided we give the additional information.

Qualcomm think on Q1, RAN sharing is important especially in China, and they agree with OPPO; they think we could take a WA to support RAN sharing. For Q4, they agree with Ericsson and think the agreements were not discussed in stage 1 of the email discussion, so they would prefer to remove them for progress.

Huawei agree with OPPO and Qualcomm on Q1 and think we could reflect the majority view; they do not see extra RAN2 work to support RAN sharing apart from broadcasting the PLMN list. On Q4, they think the question from SA2 relates to the dedicated discovery configuration, and if we want RAN3 to decide the question we should include the agreements.

Chair suggests we could keep the LS as it is. Apple agrees with this suggestion and thinks it is reasonable on Q4 that we send agreements that we did in fact agree.

Nokia can accept this text, but would like to add a sentence saying that other aspects of RAN sharing have not been investigated by RAN2; they think there are other issues like mobility that need to be discussed.

Qualcomm think the agreements in Q4 are selected from the discovery agreements; they think we should include the other discovery agreements as well if we include anything.

Ericsson still think we need to remove the “majority view” sentence from Q1.

Nokia think the majority view is not a good way of expressing a WG view. They agree with Ericsson that this aspect should not be included.

* Remove “The majority view is it can be supported” and keep the rest of the highlighted text, adding “Other aspects of RAN sharing have not been discussed”
* Include the full set of relay discovery agreements (including from this meeting) for Q4
* Approved as R2-2111487 (but later rescinded; see below]

[R2-2111487](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111487.docx) Reply LS on discovery and relay (re)selection CATT LS out To:SA2, RAN3

* Revised in R2-2111583 due to typo in source

[R2-2111583](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111583.docx) Reply LS on discovery and relay (re)selection CATT LS out To:SA2, RAN3

* Approved

[R2-2111123](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111123%20-%20Discussion%20on%20LS%20on%20discovery%20and%20relay%20%28re%29selection.docx) Discussion on LS on discovery and relay (re)selection OPPO discussion Rel-17 NR\_SL\_relay-Core

[R2-2111253](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111253_Discussion%20on%20LS%20on%20discovery%20and%20relay%20%28re%29selection.docx) Discussion on LS on discovery and relay (re)selection CATT discussion Late

Organisational documents

[R2-2109399](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109399%20-%20Work%20planning%20for%20R17%20SL%20relay.docx) Work planning for R17 SL relay OPPO, CMCC Work Plan Rel-17 NR\_SL\_relay-Core

* Noted

[R2-2109401](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109401%20-%20Remaining%20open%20issues%20for%20R17%20SL%20relay_V5.docx) Remaining open issues for R17 SL relay OPPO discussion Rel-17 NR\_SL\_relay-Core Late

* Noted

Discussion:

Ericsson want to clarify that this is not a normative document, i.e. we can discuss other issues. OPPO confirm it is for information.

vivo want to clarify the intention of the document and whether we would have to address all issues.

Running CRs

[R2-2109400](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2109400.zip) Running CR for TS 38.351 OPPO draft TS Rel-17 38.351 0.0.0 NR\_SL\_relay-Core

* Revised in R2-2111485
* [AT116-e][621][Relay] 38.351 skeleton (OPPO)

 Scope: Collect comments on the skeleton of 38.351.

 Intended outcome: Report to CB session in R2-2111372, and revised skeleton in R2-2111485

 Deadline: Thursday 2021-11-11 0100 UTC

[R2-2111372](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111372%20-%20Summary%20of%20Phase-2%20%5B621%5D.doc) Summary of [621] OPPO discussion Rel-17 NR\_SL\_relay-Core

* Noted

[R2-2111485](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2111485.zip) Running CR for TS 38.351 OPPO draft TS Rel-17 38.351 0.0.1 NR\_SL\_relay-Core

* Endorsed

[R2-2109543](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2109543.zip) Stage 2 Running CR on Introduction of R17 SL Relay MediaTek Inc. discussion Rel-17

[R2-2110054](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110054%20Running%20CR%20for%2038.321%20%28SL%20Relay%29.doc) MAC running CR for SL relay Apple (rapporteur) draftCR Rel-17 38.321 16.6.0 B NR\_SL\_relay-Core Late

[R2-2110447](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110447%20Running%20CR%20of%2038.323%20for%20SL%20relay.docx) Running CR of 38.323 for SL Relay Samsung draftCR Rel-17 38.323 16.5.0 B NR\_SL\_relay-Core

[R2-2110490](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110490%20RRC%20running%20CR%20for%20SL%20relay.docx) RRC running CR for SL relay Huawei, HiSilicon draftCR Rel-17 38.331 16.6.0 B NR\_SL\_relay-Core

* Endorsed

Discussion:

Ericsson and Huawei think we could endorse the CRs that have already been reviewed (38.331/38.304).

[R2-2110687](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110687-%20Running%20CR%20of%2038.304%20for%20SL%20relay.docx) Running CR of 38.304 for SL relay Ericsson draftCR Rel-17 38.304 16.6.0 B NR\_SL\_relay-Core

* Endorsed

=> Running CRs to be updated and endorsed by short discussions post-meeting.

### 8.7.2 L2 relay specific topics

No documents should be submitted to 8.7.2. Please submit to 8.7.2.x.

#### 8.7.2.1 Control plane procedures

Including connection management, SI delivery, paging, access control for remote UE. This agenda item will utilise a summary document.

Including outcome of [Post115-e][610][Relay] Control plane procedures (InterDigital)

Email discussion summary

[R2-2109928](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109928%20-%20summary%20of%20%5B610%5D_phase2_v3_Rapp.docx) Summary of [POST115-e][610][Relay] Control Plane Procedures (InterDigital) InterDigital discussion Rel-17 FS\_NR\_SL\_relay

Easy agreements:

Paging monitoring:

Proposal 1: Relay UE in RRC\_CONNECTED can determine whether to monitor POs for a remote UE based on PC5-RRC signalling received from the remote UE. FFS on the signalling contents. [18/23]

Proposal 2: Remote UE paging occasions are derived by the relay UE from the formula in 38.304 (for PF/PO calculation). [23/23]

Proposal 3: Relay UE determines all parameters except for the UE specific DRX cycle and the UE ID, from the relay’s own acquisition of SIB1. FFS details of what the remote UE provides to the relay UE for the remote UE’s UE specific DRX cycle. [20/23]

Proposal 4: UE ID and information on UE specific DRX cycle is provided by the remote UE to the relay UE using PC5-RRC signalling. [23/23]

Proposal 5: The dedicated RRC message for delivering remote UE paging to the RRC\_CONNECTED relay UE may contain one or more remote UE IDs (5G-S-TMSI or I-RNTI). [23/23]

Discussion:

CATT are OK with the intention of P1 but want to understand the intended contents of the signalling, and specifically whether it indicates the remote UE’s RRC state. InterDigital understood that this was an area of disagreement and the contents are FFS.

OPPO think P1 should not be limited to RRC\_CONNECTED relay UE based on the wording of the question.

vivo think P4 should clarify what the “information” is and if it is related to the FFS in P3.

Huawei understand we agreed that the paging ID of the remote UE is needed for the relay UE monitoring the PO, and the proposal seems to imply that something else would be needed. On P3/P4, Huawei understand that the current wording does not exclude the remote UE sending DRX parameters for the default DRX cycle e.g. the T value. InterDigital indicate there were three companies preferring that the remote UE take the minimum DRX cycle and send T, but a majority preferred not to have it and the proposal excludes it.

Ericsson wonder about the signalling in P1: If the relay UE is in RRC\_CONNECTED, and configured with paging CSS, it should be monitoring the POs. InterDigital understand that the signalling is to avoid the case that the relay UE monitors paging when the remote UE is in RRC\_CONNECTED.

Lenovo think it is wrong that the relay UE in idle/inactive would always monitor the POs; it should only do it when the remote UE needs it. OPPO and Ericsson agree with Lenovo. Lenovo also think the relay UE only monitors paging if in a BWP with paging CSS and otherwise relies on the network.

Qualcomm think idle/inactive are not the intention of P1. MediaTek agree. Also Ericsson and Apple.

Agreements:

Proposal 1 (modified): Relay UE in RRC\_CONNECTED, if configured with paging CSS, can determine whether to monitor POs for a remote UE based on PC5-RRC signalling received from the remote UE. FFS on the signalling contents and for the case of idle/inactive relay UE. [18/23]

Proposal 2: Remote UE paging occasions are derived by the relay UE from the formula in 38.304 (for PF/PO calculation). [23/23]

Proposal 3: Relay UE determines all parameters except for the UE specific DRX cycle and the UE ID, from the relay’s own acquisition of SIB1. FFS details of what the remote UE provides to the relay UE for the remote UE’s UE specific DRX cycle. [20/23]

Proposal 4 (modified): UE ID and information on UE specific DRX cycle (as provided by the remote UE in accordance with P3) is provided by the remote UE to the relay UE using PC5-RRC signalling. [23/23]

Proposal 5: The dedicated RRC message for delivering remote UE paging to the RRC\_CONNECTED relay UE may contain one or more remote UE IDs (5G-S-TMSI or I-RNTI). [23/23]

TAU/RNAU:

Proposal 12: RAN2 confirms that the IC or OOC remote UE performs TAU/RNAU based on the relay UE serving cell when PC5-RRC connected to the relay UE [23/23].

Proposal 14: TAU/RNAU performed by the relay UE on behalf of the remote UE is not supported in this release [19/23]

Proposal 13 (modified): WA: A remote UE in RRC\_IDLE/RRC\_INACTIVE initiates RNAU/TAU procedure if the serving cell of the relay UE changes (due to HO or reselection of the relay UE) and the new serving cell is outside of the remote UE’s configured RNA/TA, as legacy procedure. [23/23]

Discussion:

Apple have some concern about P14, but can accept the majority view.

Ericsson think in P13, the last part of the proposal describes the legacy procedure. InterDigital confirm this is the intention, that the remote UE does not trigger TAU/RNAU if it remains in the same area. Ericsson also think the relay UE will do its own TAU/RNAU and this results in context fetch.

InterDigital clarify the point of RNAU/TAU is to inform the serving cell that will page the UE. Ericsson understand that the remote UE could have a separate serving cell and monitor paging there instead of through the relay UE. InterDigital understand we excluded this case in the SI.

UAC and timers:

Proposal 16: Relay UE does not perform UAC check for the remote UE’s data. [20/23]

Proposal 17: Remote UE uses different timers (FFS: value and/or name) for access (T300-like), resume (T319-like) and re-establishment (T301-like) compared to those for legacy Uu procedures [23/23]

Proposal 18: Basing RRC timers (T300-like, etc) on the RRC state of the relay UE is not supported in this release. [19/23]

More difficult agreements and aspects to be discussed with higher priority:

Proposal 9: For the remote UE in RRC\_IDLE/RRC\_INACTIVE, short message is not forwarded by the relay UE to the remote UE [15/23]

Proposal 10: When short message forwarding is not performed by the relay UE, the relay UE forwards the PWS SIBs being broadcast after receiving the PWS notification [19/23].

Proposal 11: For a remote UE in RRC\_IDLE/RRC\_INACTIVE, for SIs other than PWS, the relay UE forwards the SI that has changed and that the remote UE is interested in receiving. [15/23].

Proposal 8: RAN2 further discusses whether, for an RRC\_CONNECTED remote UE, a) the relay UE forwards short message to the remote UE for the remote UE to perform dedicatedSIBRequest [12/23] b) the network forwards SIB to each remote UE when the SIB changes; [5/23] or c) the relay UE, following reception of the short message, forwards only the SI that the remote UE requires (based on prior knowledge) [6/23]

Proposal 7: RAN2 further discusses whether the PC5-RRC message delivering paging to the remote UE contains a) the entire paging record; b) the UE ID of the UE being paged only; c) the paging type only.

Agreements/aspects that can be down-prioritized:

Proposal 6: RRCReconfiguration is used to deliver remote UE paging to the RRC\_CONNECTED relay UE in dedicated fashion. [16/23]

Proposal 15: RAN2 further discusses whether to support the relay UE informing the remote UE of a failed connection establishment/resume by the relay UE.

* [AT116-e][622][Relay] Remaining proposals from relay control plane (InterDigital)

 Scope: Attempt to converge the proposals for discussion from R2-2109928 and the proposals from R2-2111368.

 Intended outcome: Report to CB session in R2-2111373

 Deadline: Tuesday 2021-11-09 0800 UTC (can be extended to Thursday if needed)

[R2-2111373](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2111373.zip) Summary of [AT116-e][622][Relay] Remaining proposals from relay control plane (InterDigital) InterDigital discussion Rel-17 FS\_NR\_SL\_relay

The following proposals have significant majority and are suggested for agreement:

Agreements:

UAC and Timers

Proposal 1: Relay UE does not perform UAC check for the remote UE’s data [23/23]

Proposal 2: Remote UE uses different timers (FFS: value and/or name) for access (T300-like), resume (T319-like) and re-establishment (T301-like) compared to those for legacy Uu procedures [22/23]

Proposal 3: Basing RRC timers (T300-like, etc) on the RRC state of the relay UE is not supported in this release. [23/23]

System Information

Proposal 4: For the remote UE in RRC\_IDLE/RRC\_INACTIVE, short message is not forwarded by the relay UE to the remote UE. [19/23]

Proposal 6: Assuming short message forwarding is not performed, relay UE can forward PWS SIBs to the remote UE [22/23]

Proposal 9: As a baseline, in-coverage Remote UE is allowed to acquire some necessary SIB over Uu irrespective of its PC5 connection to Relay UE. [23/23]

Proposal 10: Agree that Remote UE needs to know the PCI of Relay UE’s serving cell. FFS how Remote UE obtains the PCI of relay UE’s serving cell. [23/23]

Proposal 12: Any SIB required by the remote UE’s operation can be requested by the remote UE (from the relay UE). [20/23]

Proposal 14: A new PC5-RRC message is used by the remote UE to request SI from the relay UE [23/23]

Proposal 15: A new PC5-RRC message is used by the relay UE to send SI to the remote UE [22/23]

Proposal 16: Voluntary SIB forwarding by the relay UE, aside from SIB update and SIB request, is left to relay UE implementation

Proposal 18: Use of groupcast/broadcast for forwarding SIB from the relay UE to the remote UE after PC5-RRC connection establishment is down-prioritized.

Discussion:

Ericsson still have a concern about P12; they think we already have an agreement that the remote UE can request SIBs on demand from the relay UE, and they think we need more discussion about which SIBs can be requested. They think P12 is misleading.

Xiaomi think if we agree P4, the relay UE has to provide updated SI to remote UE, which requires the relay UE to know the remote UE’s interest, and they think this is infeasible in the current design. They think we should add a condition that the relay UE is aware of the remote UE’s interest in SIBs. InterDigital clarify that P4 is not intended to exclude any solution for how the relay UE sends the SIB to the remote UE, it just says that we will not forward the short message; there are further proposals on this. Nokia have a similar view to Xiaomi. CATT agree with InterDigital.

Ericsson suggest we could say “any SIB required for SL relay operation” for the remote UE in P12. Chair finds it strange if we would have a requirement for remote operation to have a specific SIB but not be able to request it. Intel are OK with Ericsson’s wording suggestion.

vivo agree with Ericsson on P12 and think it would allow the remote UE to request any SIB. They can accept to leave to UE implementation, i.e. no spec impact to specify which SIBs.

Qualcomm and OPPO think P12 could be left to UE implementation. Huawei think “can” already implies implementation and suggest “(e.g. for relay purpose)” as an addition to P12.

ZTE can accept that the remote UE can request any SIB for which it has an actual requirement, but think we should not say “from the relay UE”.

Nokia think P16 may result in forwarding SIBs that were already acquired by the remote UE in accordance with P9. They also think the relay UE may not know which SIBs are needed by the remote. Ericsson agree with Nokia.

Intel are OK with P16, and think P6 implies that we need to be able to request or automatically forward PWS SIBs.

Agreements:

Proposal 4: For the remote UE in RRC\_IDLE/RRC\_INACTIVE, short message is not forwarded by the relay UE to the remote UE. [19/23]

Proposal 6: Assuming short message forwarding is not performed, relay UE can forward PWS SIBs to the remote UE [22/23]

Proposal 9: As a baseline, in-coverage Remote UE is allowed to acquire some necessary SIB over Uu irrespective of its PC5 connection to Relay UE. [23/23]

Proposal 10: Agree that Remote UE needs to know the PCI of Relay UE’s serving cell. FFS how Remote UE obtains the PCI of relay UE’s serving cell. [23/23]

Proposal 12 (modified): WA: Any SIB which the remote UE has a requirement to use (e.g. for relay purpose) can be requested by the remote UE (from the relay UE or the network). [20/23] FFS how to capture this in spec, but this agreement does not automatically imply signalling to request all SIBs.

Proposal 14: A new PC5-RRC message is used by the remote UE to request SI from the relay UE [23/23]

Proposal 15: A new PC5-RRC message is used by the relay UE to send SI to the remote UE [22/23]

Proposal 16: WA: Voluntary SIB forwarding by the relay UE, aside from SIB update and SIB request, is left to relay UE implementation

Proposal 18: Use of groupcast/broadcast for forwarding SIB from the relay UE to the remote UE after PC5-RRC connection establishment is down-prioritized.

Paging

Proposal 11: Agree that Relay UE can notify Remote UE ID (i.e. 5G-S-TMSI/I-RNTI) information to the gNB via dedicated RRC message for paging delivery purpose. [23/23]

Re-establishment/Resume

Proposal 20: RAN2 assume Inter-gNB RRC Re-establishment for the remote UE (directly to a different gNB, or to a relay UE served by a different gNB) can be supported with no specification impact [20/23]

Proposal 21: RAN2 assume Inter-gNB resume for the remote UE (directly to a different gNB, or to a relay UE served by a different gNB) can be supported with no specification impact [20/23]

RLF Indication

Proposal 23: A PC5-RRC message can be used for sending indication to the remote UE upon Uu RLF at the relay UE [20/23].

Discussion:

Ericsson think P20/P21 are not within the WID scope because we agreed that inter-gNB mobility is not supported. They think there is spec impact. Huawei understand that this is inter-gNB service continuity.

Qualcomm think we could clarify that P20/P21 do not imply service continuity.

Huawei think we could add that RAN2 will not further enhance the spec for this.

Agreements:

Proposal 11: Agree that Relay UE can notify Remote UE ID (i.e. 5G-S-TMSI/I-RNTI) information to the gNB via dedicated RRC message for paging delivery purpose. [23/23]

Proposal 23: A PC5-RRC message can be used for sending indication to the remote UE upon Uu RLF at the relay UE [20/23].

Proposal 20: RAN2 assume Inter-gNB RRC Re-establishment for the remote UE (directly to a different gNB, or to a relay UE served by a different gNB) can be supported with no specification impact [20/23]

Proposal 21: RAN2 assume Inter-gNB resume for the remote UE (directly to a different gNB, or to a relay UE served by a different gNB) can be supported with no specification impact [20/23]

RAN2 will not do further enhancements for P20/P21.

The following proposals require further discussion by RAN2.

UAC and Timers

Proposal 13: RAN2 discuss whether a new cause value for a relay UE entering RRC\_CONNECTED for relaying only is supported [9/23] or not [12/23].

System Information

Proposal 17: RAN2 discuss which other system information (aside from list of non-serving PLMN IDs) should be provided by the relay UE to the remote UE before PC5-RRC connection

a) cellBarred from MIB [14/23]

b) cellAccessRelatedInfo from SIB1 [16/23]

Discussion:

Ericsson wonder how 17b) would be done, in discovery or by forwarding SIB.

Agreement:

Proposal 17: WA: cellAccessRelatedInfo from SIB1 [16/23] is forwarded before PC5-RRC connection. FFS the exact signalling.

Proposal 5: For the remote UE in RRC\_CONNECTED, RAN2 discuss which (if any) of the following is performed by a relay UE when it receives short message a) the relay UE forwards short message to the remote UE for the remote UE to perform dedicatedSIBRequest [8/23] b) the relay UE, forwards SI that the remote UE without sending the short message. [9/23]

Proposal 7: Assuming short message forwarding is not performed, RAN2 discuss which non-PWS SIB the relay UE forwards to the remote UE upon SI update:

a) All updated SI [10/23]

b) A subset of the changed SI that is applicable to the remote UE [14/23]

c) Left to relay UE implementation [2/23]

Paging

Proposal 8: RAN2 discusses whether the paging message sent over PC5-RRC contains:

a) The entire paging record received by the relay UE [9/23]

b) Only information relevant to that remote UE (i.e. UE ID and/or paging type) [13/23]

Proposal 19: RAN2 discuss which RRC message is used to provide remote UE information (i.e. 5G-S-TMSI/I-RNTI)

a) UAI [5/23]

b) SUI [18/23]

RLC Configuration

Proposal 22: RAN2 discusses whether default configuration for Uu RLC carrying SRB0 is specified

Summary document

[R2-2111368](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111368.docx) Summary of Agenda item 8.7.2.1: Control plane procedures Intel Corporation discussion Rel-17 NR\_SL\_relay-Core

Proposals for potential agreement:

Proposal 12. As a baseline, in-coverage Remote UE is allowed to acquire some necessary SIB over Uu irrespective of its PC5 connection to Relay UE.

Proposal 22. Agree that Remote UE needs to know the PCI of Relay UE’s serving cell. FFS how Remote UE obtains the PCI of relay UE’s serving cell.

Proposal 24. Confirm previous agreement that for L2 relay UE in RRC\_CONNECTED and L2 remote UE(s) in RRC\_IDLE/RRC\_INACTIVE, we specify signalling for delivery of the remote UE’s paging through dedicated RRC message. [Network implementation decision whether to use it (or keep the relay UE on BWP with CSS). Can be revisited if a problem is found with network knowledge of which paging to forward.]

Proposal 25. Agree that Relay UE can notify Remote UE ID (i.e. 5G-S-TMSI/I-RNTI) information to the gNB via dedicated RRC message for paging delivery purpose.

Proposals with majority view:

Proposal 1. [Majority view, 6(any), 1(except SIB1), specific SIBs(2), updated SIB only (1)] The Remote UE could request any SIB to be forwarded from Relay UE in an on-demand manner. FFS whether request of any specific SIBs is not allowed.

Proposal 15. [Majority view, 8-1] Agree that the Relay UE reuses existing establishment/resume cause value when Relay UE enters RRC\_CONNECTED only for relaying purpose.

Proposals for further discussion:

SI and paging forwarding:

Proposal 9. Discuss which option is preferable for the PC5-RRC message when Relay UE forwards SIB to Remote UE after PC5 connection establishment for SI request and response:

- Option a) New PC5-RRC messages; FFS message content/details (3)

- Option b) Existing RRCReconfigurationSidelink message (1)

Proposal 5. Discuss which option is preferable for the Relay UE to voluntarily forward SIBs to the Remote UE:

Option a) Relay UE can voluntarily forward without a request any SIB (4)

Option b) Relay UE should voluntarily forward without a request only specific SIBs, such as SIB1, SIB6, SIB7, SIB8 (4) and updated SIB(s) considering Remote UE’s prior request (9)

Proposal 6. Discuss based on SA2 recent LS [R2-2111236], how to enable Remote UE to receive the list of non-serving PLMN IDs before PC5 connection establishment.

Proposal 7a. Discuss whether Relay UE could support forwarding of some essential bits of system information besides agreed PLMN ID and cell ID to Remote UE before PC5 connection establishment.

Proposal 7b. Discuss which options are preferable for the essential bits of system information besides list of non-serving PLMN IDs to be forwarded toward Remote UE before PC5 connection establishment:

a) cellBarred from MIB

b) intraFreqReselection from MIB

c) cellAccessRelatedInfo from SIB1 (includes PLMN ID list)

d) t300 (3bit), t319 (3bit), useFullResumeID (1bit) from SIB1

e) UAC configuration (~217bit), optionally.

Proposal 8. If proposal 7a is agreed, discuss which option is preferable to enable forwarding of system information before PC5 connection establishment:

Option a) PC5 broadcast (2 + 2(either option) or 4)

Option b) Relay discovery message (3+2 (either option) or 5)

Proposal 10. Further discuss if SIB forwarding using broadcast [and groupcast] from Relay UE is allowed after PC5 connection establishment.

Proposal 13. If P25 is agreed, discuss which one of the following options is preferable to be used by Relay UE to notify Remote UE ID (i.e. 5G-S-TMSI/I-RNTI) information to the gNB via dedicated RRC message for paging delivery purpose:

Option a) UE Assistance information (1)

Option b) SidelinkUEInformation (2)

Option c) New RRC message (1)

Proposal 14a. In case P9 is agreed to use new message for SI request/response, discuss whether the SI request/response and paging request/response use the same PC5-RRC message or separate PC5-RRC messages.

Establishment cause:

Proposal 16. If proposal 15 is agreed, discuss which one of the following options is preferable for Relay UE to use for establishment/resume cause value when Relay UE enters RRC\_CONNECTED only for relaying purpose:

Option a) Provided by its upper layer

Option b) Received from Remote UE

Inter-gNB re-establishment and resume:

Proposal 17. Discuss whether Inter-gNB RRC Re-establishment for the Remote UE is allowed.

Proposal 23. RAN2 discuss whether INACTIVE remote UE can Resume via Relay UE served by a different gNB or via a different gNB directly, i.e., inter-gNB resume is allowed.

SRB0 configuration:

Proposal 18. RAN2 discuss whether gNB should configure Relay UE’s Uu RLC carrying Remote UE’s SRB0 while sending Remote UE’s local/temporary ID towards the Relay UE i.e. default configuration is not needed for Uu RLC for SRB0.

Uu RLF handling:

Proposal 20. Upon Uu RLF, RAN2 discuss whether Relay UE sends new PC5-RRC message based indication to Remote UE.

The following documents will not be individually treated

[R2-2109414](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109414-%20Discussion%20on%20Control%20Plane%20Aspects%20for%20L2%20Relay.docx) Discussion on Control Plane Aspects for L2 Relay OPPO discussion Rel-17 NR\_SL\_relay-Core

[R2-2109419](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109419%20-%20Remaining%20issues%20on%20paging%20and%20SIB%20forwarding%20in%20L2%20U2N%20relay.doc) Remaining issues on paging and SIB forwarding in L2 U2N relay Qualcomm Incorporated discussion NR\_SL\_relay-Core

[R2-2109427](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109427%20-%20Remaining%20issues%20on%20RRC%20connection%20management%20of%20L2%20U2N%20relay.doc) Remaining issues on RRC connection management of L2 U2N relay Qualcomm Incorporated discussion NR\_SL\_relay-Core

[R2-2109507](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109507.docx) Control Plane Procedures of L2 Relay CATT discussion Rel-17 NR\_SL\_relay-Core

[R2-2109508](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109508.docx) Discussion on Remote UE's Paging via Dedicated RRC Message CATT discussion Rel-17 NR\_SL\_relay-Core

[R2-2109544](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109544%20Discussion%20on%20SI%20Modification%20and%20PWS%20Notification.docx) Discussion on SI Modification and PWS Notification MediaTek Inc. discussion Rel-17

[R2-2109545](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109545%20Remaining%20issue%20for%20RLF%20handling.docx) Remaining issue for RLF handling MediaTek Inc. discussion Rel-17

[R2-2109556](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109556%20Discussion%20on%20RRC%20connection%20management%20for%20L2%20sidelink%20relay.docx) Discussion on RRC connection management for L2 sidelink relay Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

[R2-2109557](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109557%20SI%20forwarding%20and%20paging%20for%20L2%20sidelink%20relay.docx) SI forwarding and paging for L2 sidelink relay Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

[R2-2109644](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109644.doc) Discussion on left issue for paging delivery SHARP Corporation discussion NR\_SL\_relay-Core

[R2-2109696](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109696%20SI%20forwarding.doc) SI forwarding NEC Corporation discussion Rel-17 NR\_SL\_relay-Core

[R2-2109729](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109729%20Monitoring%20Paging%20by%20a%20U2N%20Relay.doc) Monitoring Paging by a U2N Relay Lenovo, Motorola Mobility discussion NR\_SL\_relay-Core

[R2-2109763](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109763_Discussion%20on%20system%20information%20delivery%20open%20issues.docx) Discussion on system information delivery open issues China Telecom discussion Rel-17 NR\_SL\_relay-Core

[R2-2109811](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109811%20SIB%20Handling%20in%20Sidelink%20UE-to-Nwk%20Relay.docx) SIB handling in sidelink L2 U2N relay Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SL\_relay-Core R2-2105739

[R2-2109859](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109859%20Consideration%20on%20the%20connection%20management%20of%20SL%20relay.doc) Consideration on the connection management of SL relay ZTE, Sanechips discussion Rel-17

[R2-2109860](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109860%20Consideration%20on%20the%20system%20information%20acquisition%20and%20paging%20in%20SL%20relay.doc) Consideration on the system information acquisition and paging in SL relay ZTE, Sanechips discussion Rel-17

[R2-2109929](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109929%20%28R17%20SL%20Relay%20SI_AI8721%20Paging%29.doc) Open Issues on Paging Procedure for L2 UE to NW Relays InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2109930](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109930%20%28R17%20SL%20Relay%20SI_AI8721%20SI%29.doc) Open Issues on SI for L2 UE to NW Relays InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2109934](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109934%20%28R17%20SL%20Relay%20SI_AI8721%20ConnEst%20Procedure%29.doc) Connection Establishment Procedure for L2 UE to NW Relays InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2109959](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109959_SLRelay_SI_Intel.docx) Remaining issues of system information forwarding for L2 U2N Remote UE Intel Corporation discussion Rel-17 NR\_SL\_relay-Core

[R2-2109964](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109964_SL%20Relay%20Access%20Control_Intel.docx) Access control support for L2 U2N Relay Intel Corporation discussion Rel-17 NR\_SL\_relay-Core

[R2-2110064](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110064%20Discussion%20on%20SIB%20forwarding%20.doc) Remaining issues on SIB forwarding Apple discussion Rel-17 NR\_SL\_relay-Core

[R2-2110065](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110065%20Discussion%20on%20RNA%20Update%20procedures%20in%20L2%20UE-to-NW%20Relay.doc) RNA Update via L2 UE-to-NW Relay Apple discussion Rel-17 NR\_SL\_relay-Core

[R2-2110121](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110121.doc) Discussion on control plane procedures for L2 U2N relay Spreadtrum Communications discussion Rel-17

[R2-2110163](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2110163.zip) Control plane procedure - SIB delivery, and timer for remote UE LG Electronics France discussion Rel-17 NR\_SL\_relay

[R2-2110165](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110165_L2_control.doc) L2 relay control plane issues Kyocera discussion

[R2-2110213](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110213_%20Open%20issues%20on%20L2%20Control%20Plane%20Procedures.docx) Open issues on L2 Control Plane Procedures vivo discussion

[R2-2110215](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110215_Draft%20LS%20on%20L2%20U2N%20relay%20issues.docx) Draft LS on L2 U2N relay issues vivo LS out To:SA2, CT1

[R2-2110221](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110221%20Relay%20Discussion%20on%20SI%20and%20short%20message%20delivery.doc) Discussion on SI and short message delivery Xiaomi discussion

[R2-2110222](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110222%20Relay%20Connection%20control.doc) Discussion on connection control Xiaomi discussion

[R2-2110284](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110284%20Discussion%20on%20access%20control%20of%20L2%20relay.doc) Discussion on access control of L2 relay SHARP Corporation discussion

[R2-2110303](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110303%20Considerations%20on%20control%20plane%20issues%20v1.0.doc) Considerations on control plane issues Lenovo, Motorola Mobility discussion Rel-17

[R2-2110350](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110350.doc) Area specific SI issue in L2 relay Sony discussion Rel-17 NR\_SL\_relay-Core

[R2-2110363](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110363%20Discussion%20on%20establishment%20cause%20of%20relay%20UE.doc) Discussion on establishment cause of relay UE Xiaomi, Apple, Lenovo, Motorola Mobility discussion

[R2-2110448](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110448%20Connection%20management%20and%20RLC%20channel%20configuration.doc) Connection management and PC5/Uu RLC configurations Samsung discussion Rel-17 NR\_SL\_relay-Core

[R2-2110449](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110449%20Remaining%20issues%20for%20SI%20message%20forwarding.doc) Remaining issues for SI message forwarding Samsung discussion Rel-17 NR\_SL\_relay-Core

[R2-2110450](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110450%20Remaining%20issues%20for%20paging%20delivery.doc) Remaining issues for paging delivery Samsung discussion Rel-17 NR\_SL\_relay-Core

[R2-2110470](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110470.docx) Issue with Forwarding SIB9 to remote UE Nokia, Nokia Shanghai Bell discussion NR\_SL\_relay-Core

[R2-2110688](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110688-%20Remaining%20issues%20on%20control%20plane%20for%20L2%20sidelink%20relay.docx) Remaining issues on control plane for L2 sidelink relay Ericsson discussion Rel-17 NR\_SL\_relay-Core

[R2-2111003](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111003%20Discussion%20on%20paging%20procedure%20and%20information%20for%20U2N%20Relay.docx) Discussion on paging procedure and information for U2N Relay ASUSTeK discussion Rel-17 NR\_SL\_relay-Core

[R2-2111029](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111029%20SI%20modification.docx) Relayed System Information Acquisition Futurewei discussion Rel-17 NR\_SL\_relay-Core

[R2-2111190](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111190%20SI%20acquisition%2C%20CN%20Registration%20and%20RNAU.doc) SI acquisition, CN Registration and RNAU Lenovo, Motorola Mobility discussion Rel-17 NR\_SL\_relay-Core

#### 8.7.2.2 Service continuity

Service continuity between Uu and relay paths, limited to intra-gNB cases. This agenda item will utilise a summary document.

Summary document

[R2-2111365](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111365%20Summary%20of%20AI%208.7.2.2%20Service%20continuity.doc) Summary of Agenda item 8.7.2.2: Service continuity Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

* Revised in R2-2111276 (formatting changes only)

[R2-2111276](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111276%20Summary%20of%20AI%208.7.2.2%20Service%20continuity.doc) Summary of Agenda item 8.7.2.2: Service continuity Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

Easy proposals suggested to be treated first:

Measurement configuration and reporting

Proposal 1: Legacy Uu RRC measurement configuration and reporting signaling with extensions for relay case is used to configure Remote UE to perform Uu and SL measurements for direct-to-indirect and indirect-to-direct path switch.

Proposal 2: Legacy Uu measurement object (i.e. MeasObjectNR) is used to configure measurement on neighbor Uu cells for indirect-to-direct path switch, and legacy sidelink measurement object (i.e. SL-MeasObject) is used to configure measurement on candidate Relays for direct-to-indirect path switch.

Discussion:

Ericsson understand that MeasObjectNR is used also in direct-to-indirect for measurements on the Uu cells. I.e. we would still have the legacy operation on Uu cells.

Lenovo point out the MeasObjectNR is per frequency, not per cell.

Agreements:

Proposal 1: Legacy Uu RRC measurement configuration and reporting signaling with extensions for relay case is used to configure Remote UE to perform Uu and SL measurements for direct-to-indirect and indirect-to-direct path switch.

Proposal 2 (modified): Legacy Uu measurement object (i.e. MeasObjectNR) is used to configure measurement on neighbor Uu frequencies for indirect-to-direct path switch, and legacy sidelink measurement object (i.e. SL-MeasObject) is used to configure measurement on candidate Relays for direct-to-indirect path switch. Uu measurement operation according to legacy principles still applies for Uu frequencies.

Proposal 4: When SL-RSRP of the serving relay is not available, SD-RSRP is used as the SL measurement quantity.

Discussion:

vivo think how to measure SD-RSRP could be discussed: should it be up to network configuration, always measured by the UE, or up to UE implementation?

LG agree with vivo and wonder if this proposal applies to both direct-to-indirect and indirect-to-direct cases.

OPPO also have the same view as vivo, and think there may not be much impact from this proposal; we can rely on UE implementation.

Xiaomi understand that this RSRP is used for event evaluation, and so the threshold should be different for SL-RSRP and SD-RSRP. If there is only one threshold they doubt if we can directly replace one with the other. InterDigital have the same concern.

Intel point out this matches the behaviour in relay (re)selection.

Agreement:

Proposal 4 (modified): When SL-RSRP of the serving relay is not available, SD-RSRP is used as the SL measurement quantity. FFS how to measure SD-RSRP and if there would be a separate threshold for this case.

Proposal 5: The following new events are to be defined:

‐ Event-X for indirect-to-direct path switch: serving relay becomes worse than threshold-X1 and neighbor Uu cell becomes better than threshold-X2.

‐ Event-Y for direct-to-indirect path switch: serving Uu cell becomes worse than threshold-Y1 and candidate relay becomes better than threshold-Y2.

Discussion:

Ericsson recall that last meeting we agreed on two events and want to know if these are in addition or replacing the current agreement. Huawei clarify in the previous agreement we had events like B1 and B2, and now we confirm that at least the B2-like events can be supported, while B1 can be further discussed.

Qualcomm understand that we agreed two types of events at the last meeting, and “serving cell/relay worse than threshold” is supported as a legacy event while the B2-like event requires something new.

Agreement:

Proposal 5: The following new events are to be defined:

‐ Event-X for indirect-to-direct path switch: serving relay becomes worse than threshold-X1 and neighbor Uu cell becomes better than threshold-X2.

‐ Event-Y for direct-to-indirect path switch: serving Uu cell becomes worse than threshold-Y1 and candidate relay becomes better than threshold-Y2.

This does not exclude the use of the legacy S2 event.

Proposal 7-1: The Remote UE does not consider the AS criteria for measurement report when performing SL measurement for path switch.

Proposal 7-2: For event triggered measurement report, Remote UE shall report available measurement results when the event is fulfilled, same as Uu RRM.

Proposal 9-1: Relay UE ID in measurement report is the Relay UE’s Source L2 ID received in discovery message.

Proposal 9-2: Relay UE in RRC\_CONNECTED informs its Source L2 ID to network via SUI message.

Proposal 11: Relay (re)selection procedure is not performed by a L2 Remote UE in RRC\_CONNECTED, except for the case of RLF.

Left issues of indirect-to-direct path switch

Proposal 12: During indirect-to-direct path switch, Remote UE or Relay UE’s AS layer releases PC5-RRC connection and indicates upper layer to release PC5 unicast link after receiving RRC reconfiguration from gNB. LS can be sent to SA2/CT1 if needed.

Proposal 13: The existing T304 is used for indirect-to-direct path switch.

Discussion:

OPPO agree with the proposals but think no LS is needed. CATT have the same view.

Kyocera would like to understand if this excludes the case of a non-relay connection. Chair understands the connections are separate for relay and non-relay. Ericsson have the same understanding based on SA2 conclusion.

vivo think we could agree P18 at the same time.

Agreements:

Proposal 18: RAN2 does not consider the sharing of unicast link between relay service and non-relay service in L2 relay, and the related descriptions are to be removed from stage 2 running CR.

Proposal 12 (modified): During indirect-to-direct path switch, Remote UE or Relay UE’s AS layer releases PC5-RRC connection and indicates upper layer to release PC5 unicast link after receiving RRC reconfiguration from gNB.

Proposal 13: The existing T304 is used for indirect-to-direct path switch.

Left issues of direct-to-indirect path switch

Proposal 14-1: A new T304-like timer is introduced for direct-to-indirect path switch. The Remote UE starts the timer upon reception of the RRC reconfiguration message indicating direct-to-indirect path switch, and the Remote UE initiates RRC re-establishment upon timer expiry.

Proposal 15: RRC reconfiguration message towards the Remote UE should include the Relay UE ID to indicate the target Relay UE for direct-to-indirect path switch which is the same Relay UE ID agreed to be included in SL measurement report.

Proposal 16: RRC reconfiguration message towards the target Relay UE should include the Remote UE’s local ID/AL ID and L2 ID when preparing the direct-to-indirect path switch.

Issues common to both path switch directions

Proposal 18: RAN2 does not consider the sharing of unicast link between relay service and non-relay service in L2 relay, and the related descriptions are to be removed from stage 2 running CR.

Proposal 19: Remote UE can initiate RRC re-establishment towards an Relay UE irrespective whether the Relay UE’s serving gNB is the same as the Remote UE’s old serving gNB/old Relay UE’s serving gNB or not.

Proposal 20: Remote UE shall trigger RRC re-establishment after detecting path switch failure. [If proposal 13 and 14-1 are agreed, this proposal can be skipped.]

Handling of Relay UE’s HO

Proposal 21: The agreement of “when relay performs HO to another gNB, relay UE may send a PC5-S message (similar to LTE) to its connected remote UE(s) and this message may trigger relay reselection. FFS other indication/message can also be used for notification.” also applies to intra-gNB HO. The FFS point could be discussed in other agenda.

Proposal 22: The Remote UE in RRC\_CONNECTED may initiate RRC re-establishment procedure upon reception of the PC5-S message/other indication/message from Relay UE due to HO.

UP behaviour

Proposal 24: The legacy PDCP re-establishment or data recovery should be performed by the Remote UE during path switch if gNB configures it.

Proposal 25: No spec impact is required for DL lossless transmission during path switch.

Discussion:

Lenovo want to clarify if P24 applies to both UL and DL; if so, they understand the keys will be changing and we can’t use PDCP recovery.

MediaTek understand this is mainly for UL, because DL is base station implementation. Lenovo think the key will be changing in UL. Chair, Huawei, vivo, and Apple understand that for the intra-gNB case there would be no key change.

Qualcomm clarify P24 was intended only for UL, because we only specify UE behaviour; and it covers direct-to-indirect and indirect-to-direct. They understand that key change is up to network configuration. OPPO have the same understanding.

Agreements:

Proposal 24 (modified): The legacy PDCP re-establishment or data recovery in UL should be performed by the Remote UE during path switch if gNB configures it.

Proposal 25: No spec impact is required for DL lossless transmission during path switch.

Critical issues need to be decided:

Measurement configuration and reporting

Proposal 8-1: FFS if S-measure criteria based on RSRP of serving relay is used for indirect-to-direct path switch.

Left issues of direct-to-indirect path switch

Proposal 14-2: FFS which option is taken as stop condition of the new T304-like timer in Remote UE:

‐ Option1: Upon successfully sending RRCReconfigurationComplete (i.e., lower layer acknowledge is received from target relay);

‐ Option2: Upon the PC5 unicast link is successfully established with the target Relay UE;

‐ Option3: Upon reception of RRCReconfigurationCompleteSidelink message from target Relay UE;

‐ Option4: Upon reception of an explicit indication from the target Relay UE.

Proposal 17: FFS whether existing reconfigurationWithSync or new RRC signaling is used to indicate direct-to-indirect path switch to Remote UE.

Handling of Relay UE in IDLE/INACTIVE

Proposal 23: RAN2 to down select among the following options to handle the case of Relay UE in IDLE/INACTIVE during direct-to-indirect path switch:

‐ Option1: To take the path switch solution of Relay UE in RRC\_CONNECTED as baseline, and revisit the case of Relay UE in IDLE/INACTIVE after baseline solution is completed.

‐ Option2: To support such case by the Remote UE oriented solution, i.e. after receiving the path switch command, Remote UE establishes PC5 link with the Relay UE and sends HO complete message via the Relay UE which will trigger the Relay UE to enter CONNECTED sate.

‐ Option3: To support such case by the paging-based solution, i.e. the network sends paging message to the Relay UE which will trigger the Relay UE to enter CONNECTED sate before sending path switch command to the Remote UE.

* [AT116-e][626][Relay] Direct-to-indirect path switch (Huawei)

 Scope: Discuss P14-1/P15/P16/P14-2/P17/P23 of R2-2111276, and attempt to converge the options.

 Intended outcome: Report to CB session in R2-2111380

 Deadline: Thursday 2021-11-11 0100 UTC

UP behaviour

Proposal 26: RAN2 to down-select below two alternatives to ensure UL PDCP PDU lossless in indirect-to-direct path switch procedure:

‐ Alt-1: No spec impact is required (i.e., assume UL PDCP PDUs confirmed by lower layer but not successfully delivered to gNB is corner case or network implementation can address the case).

‐ Alt-2: Remote UE retransmits all the PDCP SDUs for which the successful delivery of the corresponding PDCP Data PDU has not been confirmed by PDCP status report in the target side after path switch.

Open Issues to be discussed only if time allows:

Measurement configuration and reporting

Proposal 3: FFS if allow-list and block-list can be configured, and if the list consists of Relay UEs or Uu cells behind Relay UEs.

Proposal 6: FFS on the following new events:

‐ For indirect-to-direct path switch,

1. serving relay is worse than a threshold,

2. neighbor Uu cell is offset better than serving relay.

‐ For direct-to-indirect path switch,

3. candidate relay is better than a threshold,

4. candidate relay is offset better than serving Uu cell.

5. events considering Relay UE’s Uu quality and CBR.

Proposal 8-2: If S-measure criteria is agreed to be used for indirect-to-direct path switch, FFS other AS criteria, e.g. CBR.

Proposal 10: RAN2 to discuss which cell ID to be in SL measurement report to indicate the serving cell of Relay UE, e.g. NCGI, CGI or PCI.

Handling of Relay UE in IDLE/INACTIVE

Proposal 27: FFS if Remote UE needs to report relay UE’s new serving cell upon relay UE changing serving cell, if remote UE had reported this relay UE with the old serving cell.

[R2-2111380](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111380%20Summary%20of%20%5BAT116-e%5D%5B626%5D%5BRelay%5D%20Direct-to-indirect%20path%20switch%20%28Huawei%29.doc) Summary of [AT116-e][626][Relay] Direct-to-indirect path switch (Huawei) Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

Agreements:

Proposal 14-1: [22/22] A new T304-like timer is introduced for direct-to-indirect path switch. The Remote UE starts the timer upon reception of the RRC reconfiguration message indicating direct-to-indirect path switch, and the Remote UE initiates RRC re-establishment upon timer expiry.

Original Proposal 15: [22/22] RRC reconfiguration message towards the Remote UE should include the Relay UE ID to indicate the target Relay UE for direct-to-indirect path switch which is the same Relay UE ID agreed to be included in SL measurement report.

Proposal 16: [21/22] RRC reconfiguration message towards the target Relay UE should include the Remote UE’s local ID/AL ID and L2 ID when preparing the direct-to-indirect path switch.

Proposals requiring further discussion:

Updated Proposal 14-2: [17/22] The stop condition of the new T304-like timer in Remote UE is: Upon successfully sending RRCReconfigurationComplete (i.e., lower layer acknowledge is received from target relay).

Discussion:

LG think it will take more time to send the connection complete message to the gNB and inform the remote UE, and that should be stop criterion when the remote UE receives the confirmation.

Apple think we should follow the principle of Uu and stop the timer when the connection is established. Lenovo agree with Apple.

vivo think we could postpone this proposal.

Agreement:

Updated Proposal 23: RAN2 to down select among the following options to handle the case of Relay UE in IDLE/INACTIVE during direct-to-indirect path switch:

‐ [8/22]Option1: The target Relay UE of direct-to-indirect path switch must be in RRC\_CONNECTED.

‐ [14/22]Option2: Relay UE in IDLE/INACTIVE can be indicated as target Relay, and to support such case by the Remote UE oriented solution, i.e. after receiving the path switch command, Remote UE establishes PC5 link with the Relay UE and sends HO complete message via the Relay UE which will trigger the Relay UE to enter CONNECTED sate.

Discussion:

Xiaomi think we can exclude option 3 (paging based) because of complexity. OPPO think some of the companies supporting option 1 said they could also agree option 2, and think we could take option 2 as a way forward.

OPPO think it is hard to downselect between 1 and 2 but we could eliminate option 3.

InterDigital support option 2 and think it includes option 1, since the network can always decide to ensure that the HO goes to a UE in RRC\_CONNECTED.

vivo support option 1.

MediaTek think there are lots of issues to conclude and we do not need to spend time on this one. This would mean that RRC\_CONNECTED is the baseline. vivo agree with MediaTek.

Updated Proposal 17: [20/22] The existing reconfigurationWithSync is used to indicate direct-to-indirect path switch to Remote UE.

Discussion:

Ericsson object because we have always used reconfigurationWithSync to trigger a RACH, and also because T304 is mandatory in reconfigurationWithSync in the ASN.1. Xiaomi think the UE could ignore the legacy T304.

Working assumption:

The existing reconfigurationWithSync is used to indicate direct-to-indirect path switch to Remote UE.

The following documents will not be individually treated

[R2-2109428](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109428%20-Remaining%20issues%20on%20service%20continuity%20of%20L2%20U2N%20relay.doc) Remaining issues on service continuity of L2 U2N relay Qualcomm Incorporated discussion NR\_SL\_relay-Core

[R2-2109509](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109509.docx) Service Continuity for L2 U2N Relay CATT discussion Rel-17 NR\_SL\_relay-Core

[R2-2109546](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109546%20Remaining%20open%20issues%20for%20Service%20Continuity.docx) Remaining open issues for Service Continuity MediaTek Inc. discussion Rel-17

[R2-2109705](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109705%20Remaining%20issues%20on%20service%20continuity.doc) remaining issues on service continuity NEC Corporation discussion Rel-17 NR\_SL\_relay-Core

[R2-2109780](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109780%20Discussion%20on%20remaining%20issues%20on%20service%20continuity.doc) Discussion on remaining issues on service continuity ZTE Corporation, Sanechips discussion Rel-17 NR\_SL\_relay-Core

[R2-2109933](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109933%20%28R17%20SL%20Relay%20SI_AI8722%20Service_Continuity%29.doc) Open Issues on Service Continuity for L2 UE to NW Relays InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2109962](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109962_SL_ServiceContinuity_Intel.docx) Service continuity left over issues for L2 U2N relaying Intel Corporation discussion Rel-17 NR\_SL\_relay-Core

[R2-2110059](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110059%20Discussion%20on%20Relay%20UE%20identifier.docx) Discussion on U2N Relay UE Identifier Apple discussion Rel-17 NR\_SL\_relay-Core

[R2-2110060](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110060%20LS%20on%20U2N%20relay%20UE%20Identifier.docx) [Draft]LS on U2N relay UE identifier Apple LS out Rel-17 NR\_SL\_relay-Core To:SA2

[R2-2110066](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110066%20Discussion%20on%20servie%20continuity.doc) Discussion on remaining issues of service continuity Apple discussion Rel-17 NR\_SL\_relay-Core

[R2-2110164](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2110164.zip) Service continuity – depending on relay state LG Electronics France discussion Rel-17 NR\_SL\_relay

[R2-2110214](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110214%20Remaining%20issues%20on%20service%20continuity%20in%20L2%20U2N%20relay.docx) Remaining issues on service continuity in L2 U2N relay vivo discussion

[R2-2110220](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110220%20Relay%20Discussion%20on%20service%20continuity.doc) Discussion on service continuity Xiaomi discussion

[R2-2110302](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110302%20Path%20switching%20in%20L2%20U2N%20relay%20v1.0.doc) Path switching in L2 U2N relay case Lenovo, Motorola Mobility discussion Rel-17

[R2-2110351](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110351.doc) Service continuity open issues in L2 NR sidelink rela Sony discussion Rel-17 NR\_SL\_relay-Core

[R2-2110371](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110371%20Relay%20UE%20RRC%20state%20in%20direct%20to%20indirect%20path%20switching.docx) Discussion on supported relay UE RRC states in direct to indirect path switch Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SL\_relay-Core

[R2-2110488](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110488%20Discussion%20on%20service%20continuity%20for%20L2%20UE%20to%20NW%20Relay.docx) Discussion on service continuity for L2 U2N Relay Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

[R2-2110499](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110499%20Discussion%20NR%20sidelink%20relay%20service%20continuity.docx) Discussion on NR sidelink relay service continuity OPPO discussion Rel-17 NR\_SL\_relay-Core

[R2-2110689](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110689-%20Discussion%20on%20selecting%20relay%20UE%20in%20RRC_IDLE%20or%20INACTIVE%20during%20path%20switch.docx) Discussion on selecting relay UE in RRC\_IDLE or INACTIVE during path switch Ericsson discussion Rel-17 NR\_SL\_relay-Core

[R2-2110690](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110690-%20Remaining%20Issues%20on%20service%20continuity%20for%20L2%20Sidelink%20relay.docx) Remaining Issues on service continuity for L2 Sidelink relay Ericsson discussion Rel-17 NR\_SL\_relay-Core

[R2-2111042](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111042%20Service%20continuity%20for%20L2%20relay.docx) Service continuity for L2 relay CMCC discussion Rel-17 NR\_SL\_relay-Core

#### 8.7.2.3 Adaptation layer design

Including bearer mapping, remote UE identification, security aspects if any. This agenda item will utilise a summary document.

Summary document

[R2-2111274](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111274%20-%20%5BOffline-603%5D%5BRelay%5D%20Summary%20of%20Agenda%20item%208.7.2.3%20Adaptation%20layer%20%28MediaTek%29%20v7.docx) Summary of Agenda item 8.7.2.3: Adaptation layer design MediaTek Inc. discussion Rel-17

“Easy” proposals (green in summary):

Proposal 4: Relay UE has a single PC5 adaptation layer entity shared for multiple remote UEs.

Proposal 6: For Uu hop, rely on LCID to differentiate relay and non-relay traffic, i.e., no impact to adaptation layer design.

Proposal 7: For PC5 hop, rely on L2-ID and LCID to differentiate relay and non-relay traffic, i.e., no impact to adaptation layer design.

Discussion:

Ericsson have a concern for P7, because SA2 already confirmed separate PC5 links for relay and non-relay traffic; thus they think that L2ID is enough. Nokia, vivo, and Qualcomm agree. Also LG.

Agreements:

Proposal 4: Relay UE has a single PC5 adaptation layer entity shared for multiple remote UEs.

Proposal 6: For Uu hop, rely on LCID to differentiate relay and non-relay traffic, i.e., no impact to adaptation layer design.

Proposal 7 (modified): For PC5 hop, rely on L2-ID to differentiate relay and non-relay traffic, i.e., no impact to adaptation layer design.

Proposal 9: header should be bytes alignments with additional R bits.

Proposal 9: header should be bytes alignments with additional R bits.

Proposal 15: Relay UE is configured by gNB with the local/temp remote UE ID to be used in adaptation layer by RRCReconfiguration message, after reporting the remote UE via SUI message to gNB and before forwarding the first SRB0 UL message of the remote UE.

Proposal 16: It is left to gNB implementation to avoid collision on the usage of local/temp remote UE ID.

Discussion:

Qualcomm think the second part of P15 can be clarified regarding what is reported.

Apple want to clarify that we are not changing the legacy SUI message with this agreement; today we only report the destination list. Xiaomi understand that the current proposal is fine and we don’t need to change the legacy behaviour.

Qualcomm think the SUI should indicate that the local UE ID is needed, so there should be some impact.

Ericsson have a concern about P16, and wonder if it relates to the discussion in SA2 about whether the CU or DU would allocate the ID.

Agreements:

Proposal 15 (modified): Relay UE is configured by gNB with the local/temp remote UE ID to be used in adaptation layer by RRCReconfiguration message, after reporting the remote UE’s L2ID via SUI message to gNB and before forwarding the first SRB0 UL message of the remote UE. FFS if impact to the SUI contents is needed to enable this.

Proposal 16: It is left to gNB implementation to avoid collision on the usage of local/temp remote UE ID.

Proposal 17: gNB can update the local remote UE ID based on its implementation, and sends the updated ID via RRCReconfiguration message.

Proposal 18: Serving gNB can perform local remote UE ID update independent of the PC5 unicast link L2 ID update procedure

Discussion:

MediaTek wonder if we should specify network implementation in P18. Xiaomi, Huawei, InterDigital agree this is implementation.

Agreements:

Proposal 17: gNB can update the local remote UE ID based on its implementation, and sends the updated ID via RRCReconfiguration message.

Proposal 18 (modified): Serving gNB can perform local remote UE ID update (based on its implementation) independent of the PC5 unicast link L2 ID update procedure. FFS if any spec impact.

“To discuss” proposals (blue in summary):

Proposal 1: RAN2 to decide naming of adaptation layer TS from following three options.

• Sidelink Adaptation Layer Protocol (SALP)

• Relay Adaptation Protocol (RAP)

• Sidelink Relay Adaptation Protocol (SRAP)

Discussion:

Huawei think we should not use “layer” in the protocol name, and “relay” is a crucial aspect.

Company comments indicate some preference for SRAP. OPPO and Qualcomm think RAP is better for forward compatibility. Qualcomm think the protocol spans Uu as well as sidelink, and there has been discussion of future extension to non-3GPP access.

Huawei do not accept the extension to non-3GPP access, and think if it is agreed in the future it would be a new spec. They think saying only “relay” invites confusion with other forms of relays. vivo agree.

* Left for discussion in offline discussion [AT116-e][621].

Proposal 12: For DL bearer mapping, RAN2 to down-select below two alternatives on how relay UE determines egress PC5 RLC bearer/LCID, whether remote UE ID is needed in the mapping is FFS.

• Alt-1: relay UE is configured by gNB with a mapping from Uu E2E bearer ID in Uu adaptation layer header to egress PC5 RLC bearer ID/LCID.

• Alt-2: relay UE is configured by gNB with a mapping from ingress Uu-RLC channel to egress PC5-RLC bearer ID/LCID.

Proposal 13: For UL bearer mapping, RAN2 to down-select below two alternatives on how relay UE determines egress Uu RLC bearer ID/LCID, whether remote UE ID is needed in the mapping is FFS.

• Alt-1: relay UE is configured by gNB with a mapping from Uu E2E bearer ID in PC5 adaptation layer header to egress Uu RLC bearer ID/LCID.

• Alt-2: relay UE is configured by gNB with a mapping from ingress PC5-RLC channel to egress Uu RLC bearer ID/LCID.

Proposal 14: For UL bearer mapping, remote UE is configured by gNB with a mapping from Uu E2E bearer ID to egress PC5 RLC bearer/LCID.

Proposal 3: RAN2 to discuss of RB ID confusion in the adaptation layer from below three options

- Alt-1: as in Uu, a Uu DRB and a Uu SRB are mapped to different RLC channels (i.e., PC5 RLC channel and Uu RLC channel).

- Alt-2: 1 bit Indication whether it is DRB or SRB.

Discussion:

Ericsson prefer Alt-1 for symmetry with Uu and to avoid additional standardisation effort. OPPO and Samsung, Sony, and Qualcomm agree.

Huawei think Alt-1 also has some spec impact to clarify the gNB implementation. Ericsson think on Uu we do not have such spec text.

Agreement:

As in Uu, a Uu DRB and a Uu SRB are mapped to different RLC channels (i.e., PC5 RLC channel and Uu RLC channel). FFS if there is any spec impact.

Proposal 10: RAN2 to discuss whether control PDU is needed and thus D/C field is needed or not? If D/C field is needed, further discuss PDU type field is needed or not.

Discussion:

ZTE think we already agreed the adaptation layer only supports bearer mapping, so no need for a control PDU. OPPO have the same understanding and think it follows that no D/C field is needed now (an R bit can be used later).

Samsung think this is linked to QoS discussion and a control PDU is needed; they also think we have not agreed that the Uu and PC5 headers are or are not identical, and we might need control PDU on Uu.

Huawei think the D/C bit is needed anyway, for forward compatibility; using an R bit may cause a legacy UE that receives the new format in a future release to interpret it wrongly as a data PDU.

Agreement:

D/C bit is defined in the adaptation layer header at least for future compatibility. FFS if we need a control PDU in this release.

Proposal 11: RAN2 to discuss detail PDU format, questions are listed below:

• Whether the remote UE ID field in PC5 adaptation layer header can be configured to be absent.

• Whether apply same PDU format for PC5 and Uu adaptation layer or not?

• Size of remote UE ID? [24, 10, 8, 5]

• Size of Radio Bearer ID? [5, 6]

• Whether include remote UE bearer ID in the Uu adaption layer header also for SRB0 (e.g. value “0”)?

Proposal 19: RAN2 to discuss whether remote UE needs to know its local ID configured by gNB to be used in PC5 adaptation layer header in this release

Proposal 20: If Proposal 19 concludes remote UE needs to know its local ID, RAN2 to discuss whether Remote UE can obtain UE ID to be used in PC5 adaptation layer from 1) RRCSetup message during setup procedure, 2) RRCReconfiguration message during handover procedure, 3) adaptation layer header of RRCResume for resume procedure, and 4) adaptation layer header of RRCReestablishment for reestablishment procedure.

“Low priority” proposals (grey in summary):

Proposal 2: The terminologies, including “PC5 SRAP entity at remote UE”, “PC5 SRAP entity at relay UE” and “Uu SRAP entity at relay UE”, can be used in the specification if SRAP can be agreed.

Proposal 5a: The functionalities of PC5 [SRAP] entity at remote UE includes:

• For UL or TX side, add the PC5 [SRAP] header and perform the bearer mapping, upon receiving data from upper layer;

• For DL or RX side, deliver the SDU to the corresponding Uu PDCP entity by removing the PC5 [SRAP] header, upon receiving data from lower layer.

Proposal 5b: The functionalities of PC5 [SRAP] entity at relay UE includes:

• For UL or RX side, deliver the packet to the collocated Uu [SRAP] entity and provide the remote UE ID related information, upon receiving data from lower layer;

• For DL or TX side, add the PC5 [SRAP] header, determine the egress PC5 connection and perform the bearer mapping, upon receiving packet from the collocated Uu [SRAP] entity.

Proposal 5c: The functionalities of Uu [SRAP] entity at relay UE includes:

• For UL or TX side, add the Uu [SRAP] header and perform the bearer mapping, upon receiving packet from the collocated PC5 [SRAP] entity;

• For DL or RX side, deliver the packet to the collocated PC5 [SRAP] entity and provide the remote UE ID related information, upon receiving data from lower layer.

Proposal 8: RAN2 to discuss the presence of adaptation layer header could be configurable or not.

* [AT116-e][627][Relay] Bearer mapping and PC5 PDU format in adaptation layer (MediaTek)

 Scope: Discuss P12/P13/P14 of R2-2111274, and the first two bullets of P11.

 Intended outcome: Report to CB session in R2-2111381

 Deadline: Wednesday 2021-11-10 1600 UTC

[R2-2111381](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111381%20Draft_Summary%20of%20%5BAT116-e%5D%5B627%5D%5BRelay%5D_Final.docx) Summary of [AT116-e][627][Relay] Bearer mapping and PC5 PDU format in adaptation layer (MediaTek) MediaTek Inc. discussion Rel-17

Proposal 1: For DL bearer mapping, relay UE is configured by gNB with a mapping from Uu E2E bearer ID and remote UE local ID in Uu adaptation layer header to egress PC5 LCID.

Proposal 2: For UL bearer mapping, relay UE is configured by gNB with a mapping from Uu E2E bearer ID used in PC5 adaptation layer header and remote UE local ID to egress Uu LCID.

Proposal 3: For UL bearer mapping, remote UE is configured by gNB with a mapping from Uu E2E bearer ID to egress PC5 LCID.

Discussion:

OPPO tend to agree with the intention but think P1 and P2 are somewhat stage 3 oriented and could be more generally worded.

ZTE have a concern with P1 and P2 and think the mapping from the RLC channel ID is better because it allows a reduction in signalling overhead.

MediaTek would like to understand if “for each remote UE” enables N:1 mapping. Chair understands there is no additional restriction.

Agreements:

Proposal 1: For DL bearer mapping, relay UE is configured by gNB, for each remote UE, with a mapping from Uu E2E bearer ID in Uu adaptation layer header to egress PC5 RLC channel ID/LCID.

Proposal 2: For UL bearer mapping, relay UE is configured by gNB, for each remote UE, with a mapping from Uu E2E bearer ID used in PC5 adaptation layer header to egress Uu RLC channel ID/LCID.

Proposal 3: For UL bearer mapping, remote UE is configured by gNB with a mapping from Uu E2E bearer ID to egress PC5 RLC channel ID/LCID.

FFS detailed signalling design.

Proposal 4: RAN2 to further down-select below options on remote UE local ID in PC5 adaptation layer header.

• Option 1: always absent in this release

• Option 2: always present in this release

• Option 3: always present but always remains to “00000000” in this release (i.e. remote/relay UE will never use this filed in R17)

Discussion:

Huawei wonder if option 1 can be used as a baseline for starting to draft the CR, and further enhancements can be done later.

The following documents will not be individually treated

[R2-2109398](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109398%20-%20Left%20issues%20for%20adaptation%20layer.docx) Left issues for adaptation layer OPPO discussion Rel-17 NR\_SL\_relay-Core

[R2-2109429](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109429%20-%20Further%20discussion%20adaptation%20layer%20of%20L2%20U2N%20relay.doc) Further discussion on adaptation layer of L2 U2N relay Qualcomm Incorporated discussion NR\_SL\_relay-Core

[R2-2109510](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109510.docx) Adaption Layer Design for L2 U2N Relay CATT discussion Rel-17 NR\_SL\_relay-Core

[R2-2109547](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109547%20Configurations%20for%20Bearer%20Mapping.docx) Configurations for Bearer Mapping MediaTek Inc. discussion Rel-17

[R2-2109558](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109558%20Adaptation%20layer%20functionalities%20for%20L2%20U2N%20relay_v01.docx) Adaptation layer functionalities for L2 U2N relay Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

[R2-2109693](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109693%20Remaining%20issues%20of%20Adaptation%20layer.docx) Remaining issues of Adaptation layer MediaTek Inc. discussion Rel-17

[R2-2109848](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109848%20adaptation%20layer.docx) Bearer Mapping Configuration of Adaptation Layer Futurewei discussion Rel-17 NR\_SL\_relay-Core

[R2-2109862](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109862%20Discussion%20on%20adaptation%20layer%20design.doc) Discussion on adaptation layer design ZTE, Sanechips discussion Rel-17

[R2-2109906](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109906%20-UP%20aspects%20on%20Layer%202%20SL%20relay.docx) UP aspects on Layer 2 SL relay Ericsson discussion Rel-17 NR\_SL\_relay-Core

[R2-2109935](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109935%20%28R17%20SL%20Relay%20WI_AI8723%20Protocol%20Architectures%29%20.doc) Adaptation Layer Design Remaining Issues InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2109963](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109963_SLRelay_adaptation_layer_Intel.docx) L2 U2N relaying Adaptation layer design open aspects Intel Corporation discussion Rel-17 NR\_SL\_relay-Core

[R2-2110216](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110216%20Adaptation%20Layer%20for%20Uu%20and%20PC5.docx) Adaptation Layer for Uu and PC5 vivo discussion

[R2-2110376](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110376%20Finalizing%20design%20of%20Adapt%20layer.doc) Finalizing design of Adapt layer Samsung Electronics GmbH discussion

[R2-2110385](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110385%20On%20multiplexing%20of%20relay%20UE%20and%20remote%20UE%20traffic.doc) On multiplexing of relay UE and remote UE traffic Samsung Electronics GmbH discussion

[R2-2110987](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110987-Discussion%20on%20Adaptation%20Layer%20for%20L2%20U2N%20Relay.doc) Discussion on Adaptation Layer for L2 U2N Relay ETRI discussion Rel-17 NR\_SL\_relay-Core

[R2-2111004](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111004%20Discussion%20on%20bearer%20mapping%20on%20PC5%20adaptation%20layer.docx) Discussion on bearer mapping on PC5 adaptation layer ASUSTeK discussion Rel-17 38.300 NR\_SL\_relay-Core

[R2-2111041](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111041%20Discussion%20on%20adaption%20layer%20for%20L2%20U2N%20relay.docx) Discussion on adaption layer for L2 U2N relay CMCC discussion Rel-17 NR\_SL\_relay-Core

#### 8.7.2.4 QoS

Mechanisms for E2E QoS management. This AI will be treated on a time-available basis. This agenda item will utilise a summary document.

Including outcome of [Post115-e][604][Relay] Relay QoS (Apple)

Email discussion summary

[R2-2110053](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110053%20%5BPost115-e%5D%5B604%5D%5BRelay%5D%20Relay%20QoS%20%28Apple%29_summary_final.docx) Summary of [Post115-e][604][Relay] Relay QoS (Apple) Apple discussion Rel-17 NR\_SL\_relay-Core

Proposal 1(20/21): [Easy] It is up to gNB implementation to perform PDB split between Uu and PC5 (non-standardized PDB values are not precluded). No specification impact is foreseen in RAN2.

Proposal 2(20/21): [Easy] gNB directly configures relay UE for PC5 QoS configuration via Uu RRC signalling. And gNB also directly configures remote UE for PC5 QoS configuration via Uu RRC signalling. FFS signaling details and when they are triggered.

Proposal 3(20/21): [Easy] When gNB configure remote UE and relay UE with PC5 RLC bearer, LCH priority shall reflect the PC5 priority for PC5 hop of relay traffic.

Proposal 4(21/21): [Easy] QoS configuration for remote UE for its operation on PC5 hop (UL) is configured per PC5 RLC bearer.

Proposal 5(21/21): [Easy] QoS configuration for relay UE for its operation on PC5 hop (DL) is configured per PC5 RLC bearer.

Proposal 7(21/21): [Easy] PC5 RLC channels with different end-to-end QoS can be mapped to the same Uu RLC channel, which is up to gNB implementation.

Proposal 8(21/21): [Easy] The existing SL measurement report and CBR measurement reports can be used by gNB to understand PC5 link conditions and determine QoS configuration.

Discussion:

CATT wonder if there is spec impact from P8. Apple indicate they understand there is not; the proposal is just that we can rely on the existing reports. Lenovo also think there is no impact.

Lenovo have a comment for the FFS part of P2; they wonder if we need to look at the gNB behaviour in this way. Apple think the signalling details can be FFS and agree we could remove the “when triggered” part.

MediaTek think P7 may have impact on the bearer mapping discussion.

Agreements:

Proposal 1(20/21): [Easy] It is up to gNB implementation to perform PDB split between Uu and PC5 (non-standardized PDB values are not precluded). No specification impact is foreseen in RAN2.

Proposal 2(20/21) (modified): [Easy] gNB directly configures relay UE for PC5 QoS configuration via Uu RRC signalling. And gNB also directly configures remote UE for PC5 QoS configuration via Uu RRC signalling. FFS signaling details.

Proposal 3(20/21): [Easy] When gNB configure remote UE and relay UE with PC5 RLC bearer, LCH priority shall reflect the PC5 priority for PC5 hop of relay traffic.

Proposal 4(21/21): [Easy] QoS configuration for remote UE for its operation on PC5 hop (UL) is configured per PC5 RLC bearer.

Proposal 5(21/21): [Easy] QoS configuration for relay UE for its operation on PC5 hop (DL) is configured per PC5 RLC bearer.

Proposal 7(21/21): [Easy] PC5 RLC channels with different end-to-end QoS can be mapped to the same Uu RLC channel, which is up to gNB implementation.

Proposal 8(21/21): [Easy] The existing SL measurement report and CBR measurement reports can be used by gNB to understand PC5 link conditions and determine QoS configuration.

Proposal 6(16/21): [Need Discuss]Remote UE traffic and Relay UE own traffic shall be separated in different Uu RLC bearers in Uu hop.

Discussion:

Apple think this is agreeable after the agreement yesterday to rely on LCID to distinguish non-relay traffic. Chair thinks maybe nothing needs to be agreed for this reason.

Agreement:

Proposal 6(16/21): [Need Discuss]Remote UE traffic and Relay UE own traffic shall be separated in different Uu RLC bearers in Uu hop.

Summary document

[R2-2111273](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111273%20-%20%5BOffline-604%5D%5BRelay%5D%20Summary%20of%20Agenda%20item%208.7.2.4%20QoS%20%28Qualcomm%29.doc) Summary of Agenda item 8.7.2.4: QoS Qualcomm Incorporated discussion NR\_SL\_relay-Core

[easy]

Proposal 1: In this release, for L2 U2N relay, remote UE can’t be configured to use CG type 1 of RA Mode 1 if relay connection has been setup

Discussion:

Huawei think this is acceptable. Apple support the proposal.

Proposal 2: Remote UE does not need to report PC5 QoS flow in SUI for relay service.

Proposal 3: Relay UE does not need to report PC5 QoS flow in SUI for relay service.

Discussion:

CATT think the wording may be a little bit confusing since the PC5 QoS flow is invisible to AS layer. They agree with the proposals and think we can clarify later. Qualcomm indicate that the idea from OPPO’s contribution is that there is no need to report PC5 QoS flow information to the network in the relaying case. OPPO think we could say “QoS parameters” instead of “QoS flow”.

Proposal 4: L2 remote UE can support RQI bit as in the legacy mechanism.

Proposal 5: L2 remote UE can support RDI bit along with potential reconfiguration for necessary PC5 related QoS parameters by the gNB (e.g., split PC5 PDB). The reconfiguration is done by NW implementation without extra Spec impact.

Discussion:

Ericsson think these proposals basically say we are going to reuse the legacy functionality for reflective QoS, and we could just say that. Huawei have a similar view.

Proposal 6: With the understanding that remote UE’s LCH priority of PC5 RLC bearer for relaying is for PC5 hop rather than E2E, no spec impact due to different priority range on Uu and SL is foreseen.

Discussion:

Xiaomi do not directly contest the proposal but think there are questions to be answered regarding whether there is signalling to the gNB about managing the different priorities on Uu and PC5. They think if it is left purely to gNB implementation there could be different behaviour for L2 and L3 relays, since we have specified combinations in the latter case.

MediaTek think we can live without P6 since it just says no spec impact is foreseen; there could be spec impact from future discussions anyway. Ericsson understood it was intended to say that RAN2 does not further discuss enhancements regarding prioritisation between Uu and SL. Qualcomm confirm this is the intention.

InterDigital agree with Ericsson that the proposal could be narrowed.

Agreements:

Proposal 1: In this release, for L2 U2N relay, remote UE can’t be configured to use CG type 1 of RA Mode 1 if relay connection has been setup

Proposal 2 (modified): Remote UE does not need to report PC5 QoS parameters in SUI for relay service.

Proposal 3 (modified): Relay UE does not need to report PC5 QoS parameters in SUI for relay service.

Legacy functionality is reused for reflective QoS; no spec impact is anticipated.

RAN2 do not further discuss enhancements regarding prioritisation between Uu and SL.

[For discussion]:

Proposal 7: RAN2 to discuss whether to support flow control for L2 relay UE, with below alternatives:

• Alt-1: No flow control: relay UE handles packet forwarding in legacy granular of Uu RLC channel

• Alt-2: Introduce flow control: relay UE handles packet forwarding in a more granular (e.g., on per PDU or group of PDU basis) with new congestion indication over PC5/Uu link sent to remote-UE/gNB.

Discussion:

Qualcomm indicate there was a split in the contributions and think it should be further discussed.

OPPO think P7/P8/P9 are optimisations and we could skip them and not treat QoS in the next meeting.

Proposal 8: RAN2 to discuss whether to support pre-emptive BSR for L2 relay UE.

Proposal 9: RAN2 to discuss whether to specify a new MAC CE for Sidelink SL-SCH to support the bit rate recommendation procedure between relay UE and remote UE

The following documents will not be individually treated

[R2-2109433](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109433%20-%20Remaining%20issues%20on%20E2E%20QoS%20enforcement%20in%20L2%20U2N%20relay.doc) Remaining issues on E2E QoS enforcement in L2 U2N relay Qualcomm Incorporated discussion NR\_SL\_relay-Core

[R2-2109511](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109511_QoS%20Management%20for%20L2%20Sidelink%20Relay.docx) QoS Management for L2 Sidelink Relay CATT discussion Rel-17 NR\_SL\_relay-Core

[R2-2109691](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109691.docx) Views on QoS for sidelink relay Continental Automotive GmbH other Rel-17

[R2-2109822](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109822_Considerations%20on%20voice%20and%20video%20support%20for%20Relays.docx) Considerations on voice and video support for Relays Philips International B.V., MediaTek, Vivo, FirstNet discussion Rel-17 NR\_SL\_relay-Core

[R2-2109853](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109853.docx) QoS measurement and reporting for path switch procedure Nokia, Nokia Shanghai Bell discussion NR\_SL\_relay-Core

[R2-2109863](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109863%20Discussion%20on%20QoS%20of%20Sidelink%20relay.doc) Discussion on QoS of SL relay ZTE, Sanechips discussion Rel-17

[R2-2109905](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109905%20-%20Aspects%20for%20QoS%20management%20with%20SL%20relay.docx) Aspects for QoS management with SL relay Ericsson discussion Rel-17 NR\_SL\_relay-Core

[R2-2109931](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109931%20%28R17%20SL%20Relay%20WI_AI8724%20QoS%29%20.doc) Discussion on QoS for L2 UE to NW Relays InterDigital, Philips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2110217](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110217_E2E%20QoS.docx) Left issues on E2E QoS management vivo discussion

[R2-2110272](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110272%20On%20recommended%20bit%20rate.docx) On recommended bit rate MediaTek Inc. discussion Rel-17 NR\_SL\_relay-Core

[R2-2110297](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110297-%20QoS%20for%20L2%20Sidelink%20Relay.docx) QoS for L2 Sidelink Relay Fraunhofer IIS, Fraunhofer HHI discussion Rel-17

[R2-2110451](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110451%20QoS%20flow%20control%20for%20L2%20U2N%20relay.doc) QoS flow control for L2 U2N Relay Samsung, Philips discussion Rel-17 NR\_SL\_relay-Core R2-2107712

[R2-2110498](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110498%20Discuss%20on%20QoS%20for%20layer%202%20relay.docx) Discussion on QoS for layer 2 relay OPPO discussion Rel-17 NR\_SL\_relay-Core

[R2-2110562](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110562%20Discussion%20on%20QoS%20management%20of%20L2%20U2N%20relay.docx) Discussion on QoS management of L2 U2N relay Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

[R2-2110750](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110750.docx) QoS priority mapping combinations Beijing Xiaomi Mobile Softwar discussion Rel-17

[R2-2111040](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111040%20Mechanisms%20for%20E2E%20QoS%20management.docx) Mechanisms for E2E QoS management CMCC discussion Rel-17 NR\_SL\_relay-Core

### 8.7.3 L2/L3 common topics

For any remaining stage 3 issues related to discovery and (re)selection. No documents should be submitted to 8.7.3. Please submit to 8.7.3.x.

#### 8.7.3.1 Discovery

Including 5G ProSe Direct Discovery for the non-relaying case. Re-using LTE discovery as baseline. This agenda item may utilise a summary document (decision to be made based on submitted tdocs).

Including outcome of [Post115-e][611][Relay] Discovery shared/dedicated pool issue (Qualcomm)

Email summary

[R2-2109430](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109430%20-%20Summary%20report%20of%20%5BPost115-e%5D%5B611%5D%5BRelay%5D%20Discovery%20shared%20and%20dedicated%20pool%20issue%20%28Qualcomm%29.doc) Summary report of [Post115-e][611][Relay] Discovery shared and dedicated pool issue (Qualcomm) Qualcomm Incorporated discussion NR\_SL\_relay-Core

[Easy]

[Easy] Proposal 1 (18/20): If only shared TX pools are configured in SIB/RRC/Pre-config, all the configured TX pools can be used for discovery and SL communication, without extra indication required.

[Easy] Proposal 2: Deprioritize the discussion on UE which is only interested in discovery rather than SL communication.

[Easy] Proposal 3 (19/20): For relay discovery, dedicated pools can be configured simultaneously with TX shared pool in SIB/RRC/Pre-configuration.

Discussion:

Huawei think P3 somewhat conflicts with P4. Chair understands that P3 says the two pool types can be configured at the same time, and P4 addresses how they are used when this happens. Qualcomm indicate that only one company opposed allowing simultaneous configuration, although there are different opinions about the P4 part.

Ericsson think we should clarify that P2 relates to relay discovery.

LG have the same understanding as Huawei on P3, and think there is not a strong technical motivation for it; they think P4 should be discussed first.

Agreements:

[Easy] Proposal 1 (18/20): If only shared TX pools are configured in SIB/RRC/Pre-config, all the configured TX pools can be used for discovery and SL communication, without extra indication required.

[Easy] Proposal 2 (modified): Deprioritize the discussion on UE which is only interested in relay discovery rather than SL communication.

[Easy] Proposal 3 (19/20): For relay discovery, dedicated pools can be configured simultaneously with TX shared pool in SIB/RRC/Pre-configuration.

[For discussion]

[For discussion] Proposal 4: For relay discovery, when dedicated pool is configured simultaneously with TX shared pool in SIB/RRC/Pre-configuration, RAN2 down-select below 2 options:

• Option a) (9/20): TX shared pool can only be used for SL communication

• Option b) (10/20): TX shared pool can be used for both discovery and SL communication.

Discussion:

Xiaomi think it’s well understood that the dedicated pool is optional, and the shared pool when configured on its own offers both discovery and communication; they understand that when you have both, the intention is to have the power saving, and the flexibility comes from having the configurability. Apple agree with Xiaomi. MediaTek, vivo, OPPO also support option a.

Huawei indicate they generally see no need to configure them simultaneously, but they can compromise and are OK with option a. LG agree with Huawei.

InterDigital think P4 suggests that the options are exclusive, and if we want the benefit of the shared and dedicated pool we should consider both. They think network control can ensure that the shared pool is used in an intelligent way.

Kyocera agree with InterDigital.

vivo support option a, and think the problem with option b is that we would need to further discuss issues like selection between the pools.

LG agree with InterDigital and think option a treats the shared and dedicated pool cases differently.

Huawei wonder what the benefit of option b is.

MediaTek understand that option b would require the UE to monitor both pools, at the cost of more complexity; they would prefer a simpler solution for Rel-17.

Kyocera think P5 should also be discussed together with P4, because if the network can control how the UE uses the pools, that might be beneficial.

Ericsson think companies are not going to change their position, and they prefer option b because of the flexibility and because dedicated pool may bring a resource fragmentation issue.

Agreements

[Easy] Proposal 3 (19/20): For relay discovery, dedicated pools can be configured simultaneously with TX shared pool in SIB/RRC/Pre-configuration.

As baseline, TX shared pool can only be used for SL communication in case dedicated and shared pools are configured simultaneously. FFS if network can also configure a setting where both shared and dedicated pools can be used for SL discovery.

[For discussion] Proposal 5 (9/12): For relay discovery, if dedicated pool is configured simultaneously with TX shared pool and TX shared pool can be used for both discovery and SL communication, it is up to UE implementation on selection between shared pool and dedicated pool to carry discovery message in Mode 2

Summary document

[R2-2111255](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111255.docx) Summary of AI 8.7.3.1 CATT discussion

Agreements:

Proposal 3: The discovery dedicated exceptional resource pool is not introduced.

Proposal 4: The exceptional pool usage condition for discovery can follow the legacy Rel-16 mechanism, i.e., UE can use the exceptional resource pool to transmit discovery message when T301, T304, T310 or T311 is running for mode 1, or when there is no available sensing result for mode 2.

Proposal 7: RLC UM mode is used for SL-SRB4.

Proposal 10: The transmitting PDCP/RLC entity establishment for SL-SRB4 is requested by upper layer, e.g., if the transmission of PC5 discovery message for a specific destination is requested by upper layers, establish the corresponding PDCP/RLC entity for PC5 discovery message.

Proposal 11: PDCP entity re-establishment for SL-SRB4 is not supported.

Proposal 12: The PDCP entity release for a SLRB of sidelink discovery can be requested by the upper layers.

Proposals can be further discussed:

Proposal 1: RAN2 to discuss whether sidelink discovery and sidelink communication data can be multiplexed into one MAC PDU.

Proposal 2: UE should report the destination L2 ID of discovery to gNB via SUI, which is used for gNB to associate between destination L2 ID and reported SL-BSR in case of mode-1 resource allocation.

Proposal 5: Reuse SIB12 to carry the relay/discovery related configuration.

Discussion:

Qualcomm can accept use of SIB12.

Huawei, OPPO, Apple, Samsung support P5.

Agreement:

Proposal 5: Reuse SIB12 to carry the relay/discovery related configuration.

Proposal 6: Introduce explicit indication in NR SIB to indicate whether the gNB supports L2 relay. FFS for L3 relay and FFS on the detailed signaling design.

Proposal 8: RAN2 to discuss whether there is any issue in RAN to support unicast and broadcast for SL-SRB4.

Proposal 13: The transmit operation in subclause 5.2.3 of TS 38.323[1] and the receive operation in subclause 5.2.4 of TS 38.323[1] can be reused for a SLRB of sidelink discovery message.

Proposal 14: The initial value of TX\_NEXT is set to 0 for sidelink discovery.

Proposal 15: The same principle for RX\_NEXT and RX\_DELIV in NR sidelink communication for broadcast and groupcast can be applied to sidelink discovery.

Proposal 16: PDCP reordering and in-order delivery is supported for sidelink discovery.

Proposal 17: For sidelink discovery, t-Reordering timer can be determined by receiving UE implementation.

Proposal 9: RAN2 to discuss whether to support the range requirement for sidelink discovery.

* [AT116-e][612][Relay] Non-relay discovery (OPPO)

 Scope: Evaluate the spec impact of non-relay discovery specific aspects and determine a way forward for handling this objective.

 Intended outcome: Report to CB session, in R2-2111363

 Deadline: Tuesday 2021-11-09 0800 UTC (report available)

[R2-2111363](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111363%20Summary%20on%20non-relay%20discovery.docx) Summary on non-relay discovery OPPO discussion Rel-17 NR\_SL\_relay-Core

[Easy]

Proposal 1: RAN2 confirm that the following relay-discovery related agreements are also applicable to non-relay discovery.

One new SL-SRB4 is used for all discovery messages. Its parameters will be fixed and defined as SCCH configuration in 38.331. (FFS on the LCH priority in Proposal 8b)

No ciphering and integrity protection in PDCP layer is needed for the discovery messages.

Shared resource pool shall be the baseline for discovery message transmission/reception.

Relay UE and remote UE (IC) in RRC CONNECTED can use the discovery configuration provided via dedicated signalling if available.

Relay UE and remote UE (IC) in RRC IDLE or RRC INACTIVE shall use the discovery configuration provided via SIB if available.

L2 relay UE will always use the discovery configuration provided by gNB (either via SIB or dedicated signalling).

RAN2 confirm the SI conclusion that for L2 remote UE which is out-of-coverage, and is neither in RRC\_CONNECTED nor RRC\_IDLE/INACTIVE, it can rely on pre-configuration.

RAN2 confirm the SI conclusion that for L3 remote UE which is out-of-coverage, and is neither in RRC\_CONNECTED nor RRC\_IDLE/INACTIVE, it should follow pre-configuration.

RAN2 agree that for L2 remote UE which is out-of-coverage, but connected to network via a relay UE (i.e., either in RRC CONNECTED or RRC IDLE/INACTIVE), it should follow network configuration, i.e., SIB or dedicated signalling, if available.

RAN2 agree that for relay/remote UE in RRC IDLE/INACTIVE state, in-coverage on the serving frequency, and the serving frequency is not shared with concerned frequency, if the configuration of concerned SL frequency is absent within the SIB of the serving frequency or if there is no discovery related SIB on the serving frequency

If there is Uu deployedcoverage at the concerned SL frequency, UE shall 1) rely on the discovery related SIB, if any broadcasted in the concerned SL frequency; Or 2) if there is no discovery related SIB on the concerned SL frequency, UE does not perform SL discovery transmission/reception on the concerned frequency.

If there is no Uu deployedcoverage at the concerned frequency, UE shall rely on pre-configuration.

RAN2 agree that for relay/remote UE in RRC IDLE/INACTIVE state, in-coverage on the serving frequency，if the serving frequency is shared with concerned SL frequency

If there is no discovery related SIB broadcasted on the serving carrier, UE does not perform SL discovery transmission/reception on the concerned frequency.

RAN2 agrees to reuse Rel-16 power control mechanism for transmission of discovery messages.

The same PDCP data PDU format as SL-SRB0 is used for sidelink discovery message (SL-SRB4), and the SDU type field is not used for SL-SRB4.

RAN2 rely on SA2 on the L2 ID design for discovery message. No LS is needed.

De-prioritize additional condition for discovery transmission/reception in Rel-17.

RAN2 agrees that for relay/remote UE in RRC IDLE/INACTIVE state, and in-coverage on the serving frequency, if there is discovery related SIB broadcasted on the serving frequency, and if the configuration of concerned SL frequency is included within the SIB of the serving frequency but the Tx resource pool configuration is absent, UE shall enter RRC CONNECTED state to acquire dedicated configuration on Tx resource pool.

RAN2 agree that RRC\_CONNECTED relay/remote UE which are in-coverage on the serving frequency, if there is discovery related SIB broadcasted on the serving frequency, and if the configuration of concerned SL frequency is included within the SIB of the serving frequency, it can only use the SL discovery Tx resource configuration provided by dedicated signalling if provided, or not transmit discovery if not provided.

RAN2 agree that RRC\_CONNECTED L3 relay/remote UE or layer 2 remote UE which are in-coverage on the serving frequency, and the serving frequency is not shared with concerned frequency, if the configuration of concerned SL frequency is absent within the SIB of the serving frequency or if there is no discovery related SIB on the serving frequency,

If there is Uu coverage at the concerned SL frequency, UE shall 1) rely on the discovery related SIB, if any broadcasted in the concerned SL frequency; Or 2) if there is no discovery related SIB on the concerned SL frequency, UE does not perform SL discovery transmission/reception on the concerned frequency.

RAN2 agree that for L2 remote UE which is out-of-coverage, but connected to network via a relay UE and in RRC IDLE/INACTIVE state, if the network configuration is not available, i.e., SIB, remote UE shall rely on pre-configuration to perform discovery.

RAN2 agrees to down-prioritize discovery specific resource allocation optimization in this release.

RAN2 agrees to down-prioritize the support of discovery gaps in this release.

RAN2 agree that for L2 remote UE which is out-of-coverage, but connected to network via a relay UE and in RRC CONNECTED state, if the network configuration is not available, i.e., SIB or dedicated signalling, remote UE shall rely on pre-configuration to perform discovery.

RAN2 agrees dedicated discovery resource pool is supported besides shared resource pool configuration, whether it is configured is based on network implementation. And PHY layer parameters and design shall reuse the Rel-16 legacy resource pool design (including resource allocation design).

RAN2 agrees to fix the priority value as 1 of sidelink discovery message in the specification.

No ciphering and integrity protection in PDCP layer is needed for the discovery messages.

Shared resource pool shall be the baseline for discovery message transmission/reception.

For mode 1, if agreed that both shared and dedicated resource pools can be configured, it is up to gNB which one the UE should use to transmit discovery message. For mode 2, if agreed that both shared and dedicated resource pools can be configured, downselect from the following options: a) Left to UE implementation; b) Dedicated pool should be prioritized; c) Shared pool should be prioritised

Proposal 2: RAN2 confirm that the following relay-discovery related agreements are not applicable to non-relay discovery.

As in LTE, the RRC\_IDLE/RRC\_INACTIVE relay UE is able to perform discovery message transmission, in case:

Uu RSRP is above a configured minimum threshold by a hysteresis and below a configured maximum threshold by a hysteresis, or

only minimum threshold is provided and Uu RSRP is above the minimum threshold by a hysteresis, or

only maximum threshold is provided and Uu RSRP is below the maximum threshold by a hysteresis

As in LTE, the RRC\_IDLE/RRC\_INACTIVE remote UE is able to perform discovery message transmission, if and only if Uu RSRP of serving cell is below a configured minimum threshold by a hysteresis.

Define threshHighRelay and threshLowRelay for relay UE and threshHighRemote for remote UE. The value range for the three thresholds can be half of RSRP-Range specified in TS 38.331.

For determining whether remote UE and/or relay UE in RRC CONNECTED can trigger discovery message transmission, i.e., the remote UE and relay UE in the RRC\_CONNECTED can use the threshold based methods as in IDLE/INACTIVE, to determine whether it is allowed to perform discovery message transmission.

Discussion:

No comments

* P1/P2 are agreed

Agreements:

Proposal 1: RAN2 confirm that the following relay-discovery related agreements are also applicable to non-relay discovery.

One new SL-SRB4 is used for all discovery messages. Its parameters will be fixed and defined as SCCH configuration in 38.331. (FFS on the LCH priority in Proposal 8b)

No ciphering and integrity protection in PDCP layer is needed for the discovery messages.

Shared resource pool shall be the baseline for discovery message transmission/reception.

Relay UE and remote UE (IC) in RRC CONNECTED can use the discovery configuration provided via dedicated signalling if available.

Relay UE and remote UE (IC) in RRC IDLE or RRC INACTIVE shall use the discovery configuration provided via SIB if available.

L2 relay UE will always use the discovery configuration provided by gNB (either via SIB or dedicated signalling).

RAN2 confirm the SI conclusion that for L2 remote UE which is out-of-coverage, and is neither in RRC\_CONNECTED nor RRC\_IDLE/INACTIVE, it can rely on pre-configuration.

RAN2 confirm the SI conclusion that for L3 remote UE which is out-of-coverage, and is neither in RRC\_CONNECTED nor RRC\_IDLE/INACTIVE, it should follow pre-configuration.

RAN2 agree that for L2 remote UE which is out-of-coverage, but connected to network via a relay UE (i.e., either in RRC CONNECTED or RRC IDLE/INACTIVE), it should follow network configuration, i.e., SIB or dedicated signalling, if available.

RAN2 agree that for relay/remote UE in RRC IDLE/INACTIVE state, in-coverage on the serving frequency, and the serving frequency is not shared with concerned frequency, if the configuration of concerned SL frequency is absent within the SIB of the serving frequency or if there is no discovery related SIB on the serving frequency

If there is Uu deployedcoverage at the concerned SL frequency, UE shall 1) rely on the discovery related SIB, if any broadcasted in the concerned SL frequency; Or 2) if there is no discovery related SIB on the concerned SL frequency, UE does not perform SL discovery transmission/reception on the concerned frequency.

If there is no Uu deployedcoverage at the concerned frequency, UE shall rely on pre-configuration.

RAN2 agree that for relay/remote UE in RRC IDLE/INACTIVE state, in-coverage on the serving frequency，if the serving frequency is shared with concerned SL frequency

If there is no discovery related SIB broadcasted on the serving carrier, UE does not perform SL discovery transmission/reception on the concerned frequency.

RAN2 agrees to reuse Rel-16 power control mechanism for transmission of discovery messages.

The same PDCP data PDU format as SL-SRB0 is used for sidelink discovery message (SL-SRB4), and the SDU type field is not used for SL-SRB4.

RAN2 rely on SA2 on the L2 ID design for discovery message. No LS is needed.

De-prioritize additional condition for discovery transmission/reception in Rel-17.

RAN2 agrees that for relay/remote UE in RRC IDLE/INACTIVE state, and in-coverage on the serving frequency, if there is discovery related SIB broadcasted on the serving frequency, and if the configuration of concerned SL frequency is included within the SIB of the serving frequency but the Tx resource pool configuration is absent, UE shall enter RRC CONNECTED state to acquire dedicated configuration on Tx resource pool.

RAN2 agree that RRC\_CONNECTED relay/remote UE which are in-coverage on the serving frequency, if there is discovery related SIB broadcasted on the serving frequency, and if the configuration of concerned SL frequency is included within the SIB of the serving frequency, it can only use the SL discovery Tx resource configuration provided by dedicated signalling if provided, or not transmit discovery if not provided.

RAN2 agree that RRC\_CONNECTED L3 relay/remote UE or layer 2 remote UE which are in-coverage on the serving frequency, and the serving frequency is not shared with concerned frequency, if the configuration of concerned SL frequency is absent within the SIB of the serving frequency or if there is no discovery related SIB on the serving frequency,

If there is Uu coverage at the concerned SL frequency, UE shall 1) rely on the discovery related SIB, if any broadcasted in the concerned SL frequency; Or 2) if there is no discovery related SIB on the concerned SL frequency, UE does not perform SL discovery transmission/reception on the concerned frequency.

RAN2 agree that for L2 remote UE which is out-of-coverage, but connected to network via a relay UE and in RRC IDLE/INACTIVE state, if the network configuration is not available, i.e., SIB, remote UE shall rely on pre-configuration to perform discovery.

RAN2 agrees to down-prioritize discovery specific resource allocation optimization in this release.

RAN2 agrees to down-prioritize the support of discovery gaps in this release.

RAN2 agree that for L2 remote UE which is out-of-coverage, but connected to network via a relay UE and in RRC CONNECTED state, if the network configuration is not available, i.e., SIB or dedicated signalling, remote UE shall rely on pre-configuration to perform discovery.

RAN2 agrees dedicated discovery resource pool is supported besides shared resource pool configuration, whether it is configured is based on network implementation. And PHY layer parameters and design shall reuse the Rel-16 legacy resource pool design (including resource allocation design).

RAN2 agrees to fix the priority value as 1 of sidelink discovery message in the specification.

No ciphering and integrity protection in PDCP layer is needed for the discovery messages.

Shared resource pool shall be the baseline for discovery message transmission/reception.

For mode 1, if agreed that both shared and dedicated resource pools can be configured, it is up to gNB which one the UE should use to transmit discovery message. For mode 2, if agreed that both shared and dedicated resource pools can be configured, downselect from the following options: a) Left to UE implementation; b) Dedicated pool should be prioritized; c) Shared pool should be prioritised

Proposal 2: RAN2 confirm that the following relay-discovery related agreements are not applicable to non-relay discovery.

As in LTE, the RRC\_IDLE/RRC\_INACTIVE relay UE is able to perform discovery message transmission, in case:

Uu RSRP is above a configured minimum threshold by a hysteresis and below a configured maximum threshold by a hysteresis, or

only minimum threshold is provided and Uu RSRP is above the minimum threshold by a hysteresis, or

only maximum threshold is provided and Uu RSRP is below the maximum threshold by a hysteresis

As in LTE, the RRC\_IDLE/RRC\_INACTIVE remote UE is able to perform discovery message transmission, if and only if Uu RSRP of serving cell is below a configured minimum threshold by a hysteresis.

Define threshHighRelay and threshLowRelay for relay UE and threshHighRemote for remote UE. The value range for the three thresholds can be half of RSRP-Range specified in TS 38.331.

For determining whether remote UE and/or relay UE in RRC CONNECTED can trigger discovery message transmission, i.e., the remote UE and relay UE in the RRC\_CONNECTED can use the threshold based methods as in IDLE/INACTIVE, to determine whether it is allowed to perform discovery message transmission.

Proposal 3: RAN2 confirm that the SL-SRB4 is also applicable to group-based discovery

Proposal 4: RAN2 confirm not support discovery range for non-relay discovery in Rel-17.

Discussion:

Xiaomi are not strongly opposed but think P4 was motivated by limiting impact, and they think it seems strange to exclude it now; they think we should inform SA2 and perhaps SA1 if this is the agreement.

vivo agree with Xiaomi and think spec impact should be evaluated first. They also think SA2 need to be informed as the range requirement is in their spec.

OPPO think an LS to SA2 may be needed. Qualcomm think we can provide a general list of agreements. OPPO think a lot of the agreements are specific to AS and do not need to be informed to SA2. Xiaomi think we did not send them every agreement on relay discovery and we do not need to do it for the non-relay case.

Agreements:

Proposal 3: RAN2 confirm that the SL-SRB4 is also applicable to group-based discovery

Proposal 4 (modified): RAN2 confirm not support discovery range for non-relay discovery in Rel-17. LS to be sent to SA2 to inform them of agreements that may affect them (list of agreements to be finalised in LS drafting).

* LS to be drafted in post-meeting discussion (OPPO)

[For discussion]

Way Forward: RAN2 confirm that since R2 #116, unless an agreement is specifically mentioned for “relay discovery” or “non-relay discovery”, it is applicable to both relay and non-relay discovery.

Agreement:

RAN2 confirm that since R2 #116, unless an agreement is specifically mentioned for “relay discovery” or “non-relay discovery”, it is applicable to both relay and non-relay discovery.

The following documents will not be individually treated

[R2-2109431](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109431%20-%20Remaining%20issues%20on%20discovery.doc) Remaining issues on discovery Qualcomm Incorporated discussion NR\_SL\_relay-Core

[R2-2109512](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109512_Left%20issues%20for%20Sidelink%20Discovery.docx) Left Issues for Sidelink Discovery CATT discussion Rel-17 NR\_SL\_relay-Core

[R2-2109809](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109809%20Discussion%20on%20SL%20discovery%20resource%20pool%20configuration.docx) Discussion on SL discovery resource pool configuration Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SL\_relay-Core

[R2-2109857](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109857%20Further%20discussion%20on%20relay%20discovery.doc) Further discussion on Relay discovery ZTE, Sanechips discussion Rel-17

[R2-2109903](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109903%20-%20Left%20issues%20for%20SL%20discovery.docx) Left issues for SL discovery Ericsson discussion Rel-17 NR\_SL\_relay-Core

[R2-2109932](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109932%20%28R17%20SL%20Relay%20WI_AI8731%20Discovery%29.doc) Using Shared and Dedicated Resource Pools for Discovery InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2109960](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109960_SL_Discovery_Intel.docx) Leftover aspects of discovery for L2 U2N relaying Intel Corporation discussion Rel-17 NR\_SL\_relay-Core

[R2-2110218](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110218%20-Remaining%20Issues%20of%20Discovery%20Message%20Transmission.docx) Remaining Issues of Discovery Message Transmission vivo discussion

[R2-2110271](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110271%20Remaining%20issues%20of%20Relay%20Discovery.docx) Remaining issues of Relay Discovery MediaTek Inc. discussion Rel-17 NR\_SL\_relay-Core

[R2-2110304](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110304%20Relay%20Discovery%20in%20L2%20and%20L3%20relay%20case%20v1.0.doc) Relay Discovery for L2 and L3 relay Lenovo, Motorola Mobility discussion Rel-17

[R2-2110452](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110452%20PDCP%20layer%20aspects%20for%20SL%20relay.doc) PDCP layer aspects for SL discovery Samsung discussion Rel-17 NR\_SL\_relay-Core

[R2-2110489](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110489%20Remaining%20issues%20on%20relay%20discovery.docx) Remaining issues on relay discovery Huawei, HiSilicon discussion Rel-17 NR\_SL\_relay-Core

[R2-2110500](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110500%20Discussion%20on%20common%20issues%20for%20relay%20and%20non-relay%20discovery.docx) Discussion on common issues for relay and non-relay discovery OPPO discussion Rel-17 NR\_SL\_relay-Core

[R2-2110501](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110501%20Discussion%20on%20non-relay%20discovery.docx) Discussion on non-relay discovery OPPO, Apple, Samsung, Ericsson, Qualcomm discussion Rel-17 NR\_SL\_relay-Core

[R2-2110749](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110749.docx) Discovery Range for 5G ProSe Direct Discovery Beijing Xiaomi Mobile Software discussion Rel-17

[R2-2110751](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110751.docx) Discovery with simultaneous Shared and Dedicated Resource Pools Beijing Xiaomi Mobile Softwar discussion Rel-17

#### 8.7.3.2 Relay re/selection

Re-using LTE re/selection as baseline. This agenda item may utilise a summary document (decision to be made based on submitted tdocs).

Summary document

[R2-2111223](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111223_Summary%20of%20AI%208.7.3.2%20Relay%20%28re%29selection-v4_Rapp.docx) Summary of AI 8.7.3.2 Relay (re)selection vivo discussion Rel-17 NR\_SL\_relay-Core

[Prioritized to be agreed]

Agreement:

Proposal 8: RAN2 confirms the working assumption that to include NCI in the relay discovery message as the cell ID.

[Prioritized to be discussed]

Proposal 1: RAN2 to discuss when relay UE performs cell (re)selection, whether relay UE may send an indication/message to its connected remote UE(s) which may trigger relay reselection.

• Option-1: Yes

• Option-2: Yes, only when (re)select to a new gNB

• Option-3: No

Discussion:

OPPO do not think this is necessary, and all of P1-P3 should be treated consistently rather than discussed case by case. We already discussed HO and RLF and they think relay UE does not need to send messages for the other cases.

Proposal 2: RAN2 to discuss When Uu RLF is recovered by relay UE, whether relay UE may send an indication/message to its connected remote UE(s).

Proposal 3: RAN2 to discuss which of the following case should also be agreed for the relay UE to send an indication/message to its connected remote UE(s) which may trigger relay reselection:

• Uu Recovery failure

• HO failure

• Uu RRC reconfiguration failure

[cross WG]Proposal 4: RAN2 to discuss whether different cause value is needed in PC5-S message for HO, RLF and other cases(if agreed in Proposal 1, Proposal 2 and Proposal 3).

• Option-1: Yes

• Option-2: No

• Option-3: Up to CT1

Proposal 5: RAN2 to discuss whether new message/ indication is needed (e.g. PC5-RRC) for HO/RLF and other cases(if agreed in Proposal 1, Proposal 2 and Proposal 3).

* [AT116-e][628][Relay] Signalling from relay UE for cell (re)selection and failure cases (vivo)

 Scope: Discuss P1 ~~and P3~~-P6 of R2-2111223 and attempt to converge. Discussion of P5 excludes the RLF case which is discussed in [AT116-e][622].

 Intended outcome: Report to CB session in R2-2111382

 Deadline: Wednesday 2021-11-10 1600 UTC

[cross WG]Proposal 6: RAN2 to discuss whether the agreed “PC5-S message (similar to LTE) to notify remote UE Uu RLF and HO” is the Disconnect Request message, or is up to SA2.

Proposal 7: RAN2 to confirm whether Cell ID of relay UE candidate is used by L2 remote UE in RRC IDLE or RRC INACTIVE as additional AS criteria for relay (re)selection.

Proposal 9: UE behaviour for cell (re)selection and relay (re)selection which happens during RRC re-establishment procedure, is discussed in CP agenda item (e.g. it is up to remote UE implementation or define prioritization rules considering cell ID on how to select the relay UE or the target cell).

Original Proposal 10 is merged to Proposal 11.

Proposal 11: RAN2 to discuss whether it should be ensured that remote UE will not be triggered to perform relay (re)selection or cell (re)selection immediately after establishing PC5 unicast link with selected relay UE.

[Low priority]

Proposal 13: RAN2 to discuss whether to support the optimization in Release-17 to build a list of relay UE candidates and reselect to them on connection establishment fails without discovery procedure.

Proposal 14: RAN2 to discuss whether IDLE/OOC remote UE can be configured with certain conditions to establish SL based U2N relay connection.

Proposal 15: RAN2 to discuss whether to consider the mobility state of the U2N Relay UE to determine candidate relay UE(s).

Proposal 16: L2 and or L3 relay indication are continued to be discussed in discovery agenda item.

[R2-2111382](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111382_Summary%20of%20%5BAT116-e%5D%5B628%5D_v1_Rapp.docx) Summary of [AT116-e][628][Relay] Signalling from relay UE for cell (re)selection and failure cases (vivo) vivo discussion Rel-17 NR\_SL\_relay-Core

Agreement:

[18/19] Proposal 1 (modified): When idle/inactive relay UE performs cell (re)selection, relay UE may send an indication/message to its connected remote UE(s) which may trigger relay reselection.

[Need discussion]

[12/19] Proposal 2: For the case when Uu RLF is recovered by relay UE, no new indication from relay UE to remote UE is introduced in Rel-17.

[14/19] Proposal 3-1: Relay UE Uu Recovery failure is not specified as a new case for the relay UE to send indication/message to remote UE.

[12/19] Proposal 3-2: Relay UE HO failure is not specified as a new case for the relay UE to send indication/message to remote UE.

[12/19] proposal 3-3: Relay UE Uu RRC reconfiguration failure is not specified as a new case for the relay UE to send indication/message to remote UE.

 [11/19] Proposal 4: For the indication from relay UE to remote UE, if different cause values are not introduced in PC5-RRC message, it is up to CT1 how to define the cause value in PC5-S message.

[12/19] Proposal 5-1: PC5-RRC message is used to inform remote UE when relay UE performs HO.

[12/19] Proposal 5-2: PC5-RRC message is used to inform remote UE when relay UE performs cell (re)selection (if agreed in proposal 1).

Discussion:

ZTE have a concern about using PC5-RRC and think an implicit indication is enough.

Qualcomm agree with the proposals.

Intel think we agreed to do the Uu RLF indication in the CP summary, and these proposals could be considered as a common ~~indication with that~~message with different cause values. Since they are AS layer actions and we have PC5-RRC available, they think it is reasonable to use PC5-RRC.

InterDigital, MediaTek, Xiaomi, CATT, Lenovo, Ericsson support the proposals.

Apple can agree with the proposals and think ZTE’s suggestion to detect cell reselection based on NCGI is not excluded by them.

Kyocera are OK with the proposals but wonder what the HO case covers: is it just intra-gNB? Qualcomm think we have an agreement from the service continuity or CP discussion that the inter-gNB case is also considered.

Agreements:

[12/19] Proposal 5-1: PC5-RRC message is used to inform remote UE when relay UE performs HO.

[12/19] Proposal 5-2: PC5-RRC message is used to inform remote UE when relay UE performs cell (re)selection (if agreed in proposal 1).

FFS detailed signalling design.

[10/19] Proposal 6: For the agreed “PC5-S message (similar to LTE) to notify remote UE Uu RLF and HO”, it is up to SA2 which specific PC5-S message is used.

The following documents will not be individually treated

[R2-2109432](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109432%20-%20Remaining%20issues%20on%20relay%20%28re%29selection.doc) Remaining issues on relay (re)selection Qualcomm Incorporated discussion NR\_SL\_relay-Core

[R2-2109513](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109513_New%20Triggers%20for%20Relay%20Reselection.docx) New Triggers for Relay Reselection CATT discussion Rel-17 NR\_SL\_relay-Core

[R2-2109823](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109823_U2N%20Relay%20UE%20operation%20Threshold%20Conditions%20-%20Impact%20of%20UE%20mobility.docx) U2N Relay UE operation Threshold Conditions: Impact of UE Mobility Philips International B.V. discussion Rel-17 NR\_SL\_relay-Core

[R2-2109858](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109858%20Further%20discussion%20on%20relay%20selection.doc) Further discussion on Relay selection ZTE, Sanechips discussion Rel-17

[R2-2109904](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109904%20-%20Aspects%20for%20SL%20relay%20selection%20and%20reselection.docx) Aspects for SL relay selection and reselection Ericsson discussion Rel-17 NR\_SL\_relay-Core

[R2-2109961](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109961_SL%20Relay%20Reselection_Intel.docx) Open aspects of L2 U2N Relay (re)selection Intel Corporation discussion Rel-17 NR\_SL\_relay-Core

[R2-2110166](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110166_relay_reselection.doc) Relay reselection upon HO to another gNB Kyocera discussion

[R2-2110219](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110219_Remaining%20issues%20on%20Relay%20%28re%29selection.docx) Remaining issues on Relay (re)selection vivo discussion

[R2-2110285](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110285%20Discussion%20on%20sidelink%20relay%20reselection.doc) Discussion on sidelink relay reselection SHARP Corporation discussion R2-2107872

[R2-2110305](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110305%20Relay%20%28re%29selection%20in%20L2%20and%20L3%20relay%20case%20v1.0.doc) Relay (re)selection for L2 and L3 relay Lenovo, Motorola Mobility discussion Rel-17

[R2-2110370](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110370%20CPErrorHandling.docx) Uu connection error handling Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SL\_relay-Core

[R2-2110502](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110502%20Discussion%20on%20remaining%20issue%20of%20relay%20reselection.docx) Discussion on remaining issue of relay reselection OPPO discussion Rel-17 NR\_SL\_relay-Core

[R2-2110617](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110617%20Discussion%20on%20relay%20reselection.docx) Discussion on relay reselection aspects Huawei, HiSilicon discussion NR\_SL\_relay-Core

[R2-2110767](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110767.docx) Support of idle mode mobility for remote-UE in SL UE-to-Nwk relay Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SL\_relay-Core R2-2108462

## 8.11 NR positioning enhancements

(NR\_pos\_enh-Core; leading WG: RAN1; REL-17; WID: RP-210903)

Time budget: 2 TU

Tdoc Limitation: 7 tdocs

Email max expectation: 7 threads

### 8.11.1 Organizational

Rapporteur input. Incoming LS etc. This AI is reserved for rapporteur and organizational inputs; documents in this AI do not count towards the tdoc limitation.

Incoming LSs with RAN2 in Cc:

[R2-2109316](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109316_R1-2108509.docx) Reply LS on determination of location estimates in local co-ordinates (R1-2108509; contact: Ericsson) RAN1 LS in Rel-17 5G\_eLCS\_ph2 To:SA2 Cc:RAN2, RAN3

[R2-2109339](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109339_R3-214312.docx) Reply LS on determination of location estimates in local co-ordinates (R3-214312; contact: Huawei) RAN3 LS in Rel-17 5G\_eLCS\_ph2 To:SA2 Cc:RAN1, RAN2

[R2-2111216](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111216_R1-2110644.docx) LS on DL PRS reception priority by RRC\_INACTIVE UEs (R1-2110644; contact: Intel) RAN1 LS in Rel-17 NR\_pos\_enh-Core To:RAN4 Cc:RAN2

* Above 3 LSs are noted without presentation (checked in email discussion [AT116-e][600])

LS from RTCM

[R2-2109392](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2109392.zip) Liaison Note to 3GPP RAN 2, Reply comments to letter R2-2106596 (RTCM Paper 2021-SC134-0113) RTCM LS in To:RAN2

[R2-2109807](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109807%20Discussion%20RTCM%20reply%20to%20RAN2%20on%20GNSS%20integrity%20coordination.docx) Discussion RTCM reply to RAN2 on GNSS integrity coordination ESA, Intel Corporation discussion Rel-17 FS\_NR\_pos\_enh

* [AT116-e][611][POS] LS to RTCM (ESA)

 Scope: Discuss coordination with RTCM, taking into account the way-forward proposals in R2-2109807 and related parts of R2-2110181:

* Conclude on the intention to specify GNSS integrity signalling in Rel-17
* Determine what information we intend to share with RTCM
* Draft an LS reply (TP to be endorsed later)

 Intended outcome: Report in R2-2111361 and approvable LS in R2-2111362

 Deadline: Friday 2021-11-05 1000 UTC (comments), Monday 2021-11-08 1100 UTC (output available) – extended to Thursday 2021-11-11 0100 UTC to finalise text of LS

Other incoming LSs with RAN2 in To: (“take into account” actions only and no draft reply submitted)

[R2-2109322](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109322_R1-2108564.docx) LS to RAN2 on SRS for Positioning Transmission by UEs in RRC\_INACTIVE State (R1-2108564; contact: Intel) RAN1 LS in Rel-17 NR\_pos\_enh-Core To:RAN2

[R2-2109345](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109345_R3-214457.docx) Reply LS on Positioning Reference Units (R3-214457; contact: Ericsson) RAN3 LS in Rel-17 NR\_pos\_enh-Core To:RAN1, RAN2 Cc:SA2

[R2-2111211](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111211_R1-2110598.docx) LS on support of SP-SRS for positioning by RRC\_INACTIVE UEs (R1-2110598; contact: Intel) RAN1 LS in Rel-17 NR\_pos\_enh-Core To:RAN2

* Above 3 LSs are noted without presentation

Incoming LSs with RAN2 in To: (feedback requested)

[R2-2109328](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109328_R1-2108639.docx) LS on PRS measurement outside the measurement gap (R1-2108639; contact: Huawei) RAN1 LS in Rel-17 NR\_pos\_enh-Core To:RAN2, RAN3, RAN4

Discussion:

Huawei indicate RAN1 have taken a working assumption and there is no necessary action from RAN2, but we can indicate if any concerns.

CATT have a concern with the PRS-related conditions and think there will not be a benefit from Alt 1 where the conditions apply only to the serving cell PRS. They also wonder if RAN1 will send us a conclusion on the downselection of these options.

Intel understand RAN1 will continue discussion and we don’t need to spend RAN2 time on it.

* Noted

Incoming LSs with RAN2 in To: (draft reply submitted)

[R2-2109329](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109329_R1-2108646.docx) LS on beam/antenna information for DL AOD in NR positioning (R1-2108646; contact: Ericsson) RAN1 LS in Rel-17 NR\_pos\_enh-Core To:RAN2, RAN3

Discussion:

Ericsson understand that RAN2 could comment on the two options under consideration.

Qualcomm think RAN1 will continue the discussion and both options can be supported from signalling point of view. They think we can wait. vivo, Huawei, Apple, OPPO, and Nokia agree.

ZTE think this relates more to RAN3 than RAN2, but if a decision needs to be taken they prefer the first option.

* Noted

Draft replies

[R2-2109480](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109480%20%5BDraft%5D%20Response%20LS%20on%20the%20Positioning%20Reference%20Units%20%28PRUs%29%20for%20positioning%20enhancement.docx) [Draft] Response LS on the Positioning Reference Units (PRUs) for positioning enhancement CATT LS out Rel-17 To:RAN1,SA2 Cc:RAN3

[R2-2110803](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110803%20On%20DL-AoD%20Beam.docx) Beam/antenna information for DL AOD in NR positioning Ericsson discussion Rel-17

Running CRs and related reports

[R2-2109673](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109673_EmailDisc-609-38.305%20Running%20CR%20%28Intel%29_P2-Summary.docx) Email discussion report on [609][POS] RAT-dependent stage 2 CR (Intel) Intel Corporation discussion Rel-17 NR\_pos\_enh-Core

* Noted

[R2-2109674](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109674-%20609-Running%2038.305%20CR_v02_Rapp.docx) Email discussion [609] Running 38.305 CR for Positioning WI on RAT dependent positioning methods Intel Corporation draftCR Rel-17 38.305 16.6.0 B NR\_pos\_enh-Core

Discussion:

Qualcomm think some changes need to be made before it can be endorsed.

Intel would prefer to have a post-meeting email discussion to update the CR for endorsement.

Nokia think it could be endorsed as a baseline and we continue to take comments.

* [AT116-e][623][POS] 38.305 CR for RAT-dependent positioning (Intel)

 Scope: Collect comments on the running CR preparatory to endorsement.

 Intended outcome: Updated CR in R2-2111374 and report in R2-2111375

 Deadline: Tuesday 2021-11-09 0800 UTC

[R2-2111374](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111374-Running%2038.305%20CR_v02_CL.docx) Running 38.305 CR for Positioning WI on RAT dependent positioning methods Intel Corporation draftCR Rel-17 38.305 16.6.0 B NR\_pos\_enh-Core

Discussion:

Ericsson think the use of “pre-defined” for on-demand PRS could be just “on-demand PRS configuration”, because the pre-defined aspect is still under discussion.

Huawei agree with Ericsson on the nomenclature, and wonder about alignment with the GNSS integrity CRs and whether we should merge. Intel indicate we agreed to maintain separate running CRs and merge before the plenary at the end of the WI.

Intel assume regarding Ericsson’s comment, we could endorse the CR as a baseline and further discuss the details. Qualcomm agree with Intel; they have similar concerns to Ericsson, but think we need a baseline.

* Endorsed

[R2-2111375](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111375_Summary%20of%20offline%20623-v11_Rapp.docx) Report of offline discussion [AT116-e][623][POS] 38.305 CR for RAT-dependent positioning (Intel) Intel Corporation discussion Rel-17

* Noted

[R2-2110997](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110997_%28Email%20discussion%20report%20on%20%5B614%5D%5BPOS%5D%20GNSS%20Positioning%20Integrity%20Stage%202%20CR%20%28InterDigital%29%29.docx) Email discussion report on [614][POS] GNSS Positioning Integrity Stage 2 CR (InterDigital) InterDigital, Inc. discussion Rel-17 NR\_pos\_enh-Core

* Noted

[R2-2111012](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111012_%20%28Running%20CR%20of%2038_305%20GNSS%20Positioning%20Integrity%29.docx) Running CR of 38.305 for GNSS Positioning Integrity InterDigital, Inc. draftCR Rel-17 38.305 16.6.0 B NR\_pos\_enh-Core

* Revised in R2-2111377

[R2-2111013](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111013%20_%28Running%20CR%20of%2036_305%20GNSS%20Positioning%20Integrity%29.docx) Running CR of 36.305 for GNSS Positioning Integrity InterDigital, Inc. draftCR Rel-16 36.305 16.4.0 B NR\_pos\_enh-Core

* Revised in R2-2111376
* [AT116-e][624][POS] 36.305 and 38.305 CRs for GNSS positioning integrity (InterDigital)

 Scope: Collect comments on the running CRs preparatory to endorsement.

 Intended outcome: Updated CRs in R2-2111376 (36.305) and R2-2111377 (38.305) and report in R2-2111378

 Deadline: Tuesday 2021-11-09 0800 UTC

[R2-2111378](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111378_Summary_624_GNSS%20Positioning%20Integrity%20CRs%20%28InterDigital%29.docx) Email discussion report on [AT116-e][624][POS] 36.305 and 38.305 CRs for GNSS positioning integrity (InterDigital) InterDigital, Inc. discussion Rel-17 NR\_pos\_enh-Core

* Noted

[R2-2111376](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111376%20_%28Running%20CR%20of%2036_305%20GNSS%20Pos%20Integrity%29.docx) Running CR of 36.305 for GNSS Positioning Integrity InterDigital, Inc. draftCR Rel-16 36.305 16.4.0 B NR\_pos\_enh-Core

* Endorsed

[R2-2111377](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111377_%20%28Running%20CR%20of%2038_305%20GNSS%20Pos%20Integrity%29.docx) Running CR of 38.305 for GNSS Positioning Integrity InterDigital, Inc. draftCR Rel-17 38.305 16.6.0 B NR\_pos\_enh-Core

* Endorsed

### 8.11.2 Latency enhancements

Enhancements of signalling, and procedures for improving positioning latency of the Rel-16 NR positioning methods, for DL and DL+UL positioning methods. This agenda item will utilise a summary document.

Including outcome of [Post115-e][605][POS] Pre-configured assistance data (Intel)

Email discussion summary

[R2-2109665](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109665.docx) Summary of [Post115-e][605][POS] Pre-configured assistance data (Intel) Intel Corporation discussion Rel-17 NR\_pos\_enh-Core

Applicability across positioning sessions:

Proposal 1: Assistance data can be (pre-)configured independently of any given LPP positioning session and thus can be reused across multiple positioning sessions.

Proposal 2: It is suggested to agree that in order to reduce positioning latency associated with signaling of assistance data (via both broadcast or dedicated signaling), pre-configured assistance data can be considered valid for usage across multiple LPP positioning sessions.

Discussion:

Qualcomm think P1 and P2, as well as the rest of the proposals, are already supported since Rel-9. Their understanding is that AD can already be provided and used across positioning sessions. They see that P5 is not quite explicit in the specs today but the rest is not new.

Intel indicate that Qualcomm’s concern was raised in the discussion but there seems to be interest from companies to capture at least the principle. For the validity conditions, they understand that the main impact would be from P5 on area-specific validity.

Huawei wonder if it is useful to capture the principles if there is no spec impact. They also think there are leftovers from Rel-16 that should be resolved first, e.g. priority of PRS. vivo think this should be discussed first in RAN1.

Agreements:

Proposal 1: Assistance data can be (pre-)configured independently of any given LPP positioning session and thus can be reused across multiple positioning sessions.

Proposal 2: It is suggested to agree that in order to reduce positioning latency associated with signaling of assistance data (via both broadcast or dedicated signaling), pre-configured assistance data can be considered valid for usage across multiple LPP positioning sessions.

FFS spec impact from these proposals.

Validity conditions:

Proposal 3: It is proposed to agree that validity condition(s) is/are needed for usage of pre-configured assistance data across multiple (consecutive) positioning sessions. The specific validity conditions to be defined can be discussed on a case-by-case basis.

Proposal 4: The UE stops using the pre-configured assistance data for positioning in case the associated validity condition(s) are no longer valid.

Proposal 5: Validity condition for pre-configured assistance data based on a specific area needs to be defined. FFS the spec impact and new signaling needed to support it.

Proposal 6: It is proposed to further discuss if validity of pre-configured assistance data based on explicit modification or release from the LMF/NG-RAN needs to be supported.

Discussion:

vivo think the validity of AD is not clear in the current spec for dedicated LPP signalling.

ZTE can accept the validity conditions, and wonder if the validity condition is the same as the one in RRC\_INACTIVE. For P3, they think the last sentence can be deleted.

Xiaomi are OK with P4, but think if the UE receives new AD, it should stop using the preconfigured AD. For P6, they think it is not necessary to introduce a new procedure to invalidate the assistance data.

CATT think we can focus on dedicated LPP signalling in RRC\_CONNECTED for this agenda item, and specifically on P5 which had majority support and has new impact.

Qualcomm consider that these proposals are generic enough to apply to all positioning AD, not just PRS, and this already describes generic LPP functionality. They do not want to change Rel-16 behaviour (or earlier). For some AD e.g. GNSS almanac/ephemeris we already have validity criteria, and if we want something new it should be for Rel-17 PRS assistance data.

Intel understand that companies are mainly focussed on DL-PRS in this discussion, and the use cases that Qualcomm mentions were not raised by other companies. Think we could capture the scoping to DL-PRS.

Lenovo wonder if we are going to scope the decisions to the use cases that were discussed in the email or leave open the possibility of new validity conditions. Would prefer to delete the last sentence of P3.

Huawei think P5 is not agreeable because the DL-PRS is already inherently defined based on a specific area; they do not see a need to define a validity condition.

OPPO agree with P5, and regarding Huawei’s concern, they think that due to the multipath environment it is complicated to determine when a particular DL-PRS signal can be heard/used.

Nokia understand that we should clarify the distinction from predefined DL-PRS configurations with an associated ID as discussed for on-demand PRS.

Apple see Huawei’s point and think it is difficult to progress with generic proposals. Think maybe nothing is needed. Even for P5 they think it is too generic to agree.

Definition:

Proposal 7: It is proposed to capture the following definition for pre-configured assistance data:

Pre-configured assistance data refers to the assistance data (with associated validity criteria) that can be provided to the UE (before or during an ongoing LPP positioning session), to be then utilized for potential positioning measurements at a future time (e.g. for deferred MT-LR). It is FFS whether this pre-configured assistance data can be provided to the UE using broadcast and/or dedicated signaling.

Discussion:

Qualcomm think we could keep this definition for further work but it does not need to be captured in the spec or as a formal agreement.

Huawei think the definition should exclude broadcast, which is not associated with any LPP session.

CATT think we need to clarify if SRS is included. Huawei think SRS is out of scope for this part of the Rel-17 discussion. vivo agree that latency reduction for UL positioning is not in scope.

OPPO agree we should focus on DL-PRS.

Agreement:

Pre-configured assistance data (distinct from “pre-defined configuration” as discussed for on-demand PRS) refers to the DL-PRS assistance data (with associated validity criteria) that can be provided to the UE (before or during an ongoing LPP positioning session), to be then utilized for potential positioning measurements at a future time (e.g. for deferred MT-LR). FFS whether to capture this in a spec.

Pre-configured SRS triggering:

Proposal 8: With regards to the proposed enhancements for latency reduction, it is proposed to at least down-prioritize option 3, i.e. Dynamic triggering of a preconfigured SRS at UE by gNB for transmitting SRS based on measurement report provided by UE) in Rel-17. The need for supporting other proposed enhancements still needs to be discussed.

Discussion:

Qualcomm think this is OK for connected mode but needs to be discussed separately for RRC\_INACTIVE.

Agreement:

Proposal 8 (modified): Down-prioritize dynamic triggering of a preconfigured SRS at UE in connected mode by gNB for transmitting SRS based on measurement report provided by UE in Rel-17.

1. The introduction of an Add/mod/release mechanism for PRS configurations and a complete definition of priority of PRS configuration for measurement

2. Dynamic triggering of a preconfigured PRS at UE by LMF or gNB for making measurements on DL-PRS

3. Dynamic triggering of a preconfigured SRS at UE by gNB for transmitting SRS based on measurement report provided by UE

4. Priority indications for multiple (pre-)configured assistance data sets corresponding to multiple position fixes

Summary document

[R2-2111252](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111252%20-%20Summary%20of%20AI%208.11.2%20Latency%20enhancements%20%28Samsung%29_v1.docx) Summary of agenda 8.11.2: Latency enhancements Samsung discussion

Proposal 0: RAN2 discuss on which items in latency reduction AI can be considered for the discussion in this meeting based on WID and the progress of related WG, and make the conditions to be considered in the upcoming meeting for ones not discussed in this meeting.

* Scheduled location time
* Response time granularity
* Prioritisation of PRS measurements/reports
* Multiple QoS
* Measurement gap configuration/activation
* Stored capability
* CG for ProvideLocationInformation
* Handover impact on latency

Proposal 2: RAN2 discuss the preconfiguration of Assistance data issues based on the summary document of [Post115-e][605][POS] Pre-configured assistance data (Intel) (R2-2109665).

Discussion:

Chair proposes that we prioritise the first three topics.

Qualcomm think prioritization of PRS measurements/reports is also under discussion in RAN1 and we should receive something from them. Nokia have the same understanding. Huawei think prioritization discussion in RAN1 is between PHY channels (i.e. PRS prioritized over data), not between frequency layers, and the latter is proposed in RAN2.

vivo think prioritization between frequency layers is also in RAN1 scope.

Lenovo think the CG should be considered, because there is a need to align the CG with the measurement report intervals.

Intel think the response time granularity cannot be decided without RAN1/RAN4, so we should wait for input. Also think for PRS prioritization we should be driven by RAN1 and this was the previous RAN2 understanding.

Scheduled location time:

Proposal 1: RAN2 is proposed to further discuss whether the scheduled location time (including other information associated with it) needs to be provided to the UE/NG-RAN or not.

Discussion:

Intel are OK with not providing scheduled time to UE/NG-RAN.

Ericsson think this is not just related to latency but also to the measurement time window, but they think the LMF can consider this and it does not need to be provided to UE/NG-RAN. However, they think we could discuss how we define the measurement time window.

vivo think the response time in NRPPa is already there in RAN3, and we can send an LS to SA2 to inform them that we do not inform the UE/NG-RAN of the scheduled location time. Qualcomm think the response time is still under discussion and anyway does not give enough information to specify a time when the location should be valid. They understand that the response time defines when the measurement should be sent, which may not coincide with when the location is valid (e.g. for RTK the measurement could span minutes). They also note that a scheduled location time is specified in LPPe for RTK for this reason, and do not see a problem with importing the same concept to LPP.

Samsung also prefer not to provide the scheduled time to UE/NG-RAN; they understand that there is no explicit requirement on alignment with the measurement time and the LMF can consider the scheduled location time by itself.

Nokia support signalling the scheduled location time; they understand that the solution came from SA2 and a majority there thought that having the scheduled location time reduces latency. They think if everything is left to LMF implementation, there is not much value in the scheduled time parameter. They do not see a problem with signalling the time.

Response time granularity:

Proposal 3-1: RAN2 agrees to introduce finer granularity for responseTime IE by extending the ‘unit’ field to include “ten-milliseconds”.

Proposal 3-2: RAN2 is proposed to discuss introducing new UE capability for the support of ten-milliseconds unit in ResponseTime IE. FFS if it needs to be indicated per each positioning method or not.

Prioritisation of PRS measurements/reports:

Proposal 4-1: RAN2 agree to introduce the prioritization of at least DL-PRS can be adopted for the shorter measurement reporting latency than measuring all the DL-PRS indicated in AssistanceData.

Proposal 4-2: RAN2 further discuss on:

- Association between DL-PRS set and responseTimeEarlyFix, more than one early location information reports before the final response time

- Support the dropping of low priority measurements that do not meet the required response time.

- Reuse the NR-SelectedDL-PRS-IndexList IE to indicate the priority the PRS in different frequency layers

Proposal 4-3: RAN2 further discuss if there is any specification impact by the RAN1’s conclusion on the prioritization between DL-PRS measurement and other DL channel/signals carrying LPP messages.

Multiple QoS:

Proposal 5-1: RAN2 agree that LMF can indicate the multiple QoS level information i.e., accuracy values to UE in location information request procedure when this LCS request from LCS client is initiated for the multipleQoS class.

Measurement gap configuration/activation:

Proposal 6-0: RAN2 agree that UE’s MG activation request mechanism needs preconfiguration of possible MG configuration to UE.

Proposal 6-1. For UE’s MG activation request, RAN2 agree that LMF is able to indicate the information related to MG configuration to gNB, FFS the details for the MG configuration related information.

Proposal 6-2. For UE’s MG activation request, RAN2 agree that gNB can configure multiple of possible MG configurations to UE before requesting Location Information to UE. FFS for signaling details of gNB’s configuration i.e., Id assignment to each MG, and the signaling layer.

Proposal 6-3. For UE’s MG activation request, RAN2 agree that UE can choose one of the MG preconfigured and indicate to gNB via MAC CE once it is pre-configured with the MG configurations by gNB and Location Information is requested by the LMF.

Proposal 6-4. For UE’s MG activation request, RAN2 agree that gNB will activate/deactivate the indicated MG to be used to UE via MAC CE once it is indicated by UE on specific MG configuration.

Proposal 6-5. For fast MG activation, RAN2 discuss the following sub items regarding LMF’s activation request

- whether option 1 (activation request by UE) and 2 (activation request by LMF) can be configured simultaneously,

- whether LMF’s indication is necessary in the LPP RequestLocationInformation to UE that LMF can handle the MG configuration for positioning.

- Define timing relationship between LPP RequestLocationInformation and NRPPa on MG activation request when option 2 is agreed.

Proposal 6-6. RAN2 discuss the following sub items for the PRS measurement without MG:

- Down-selection of the PRS applicability between serving cell PRS only OR all PRS under conditions to PRS of non-serving cell

- Configurability to UE on MG for positioning between selecting fast MG activation and PRS measurement without MG

Stored capability:

Proposal 7-1: RAN2 agrees that there is no need to introduce new indication to inform the LMF on whether UE positioning capability is variable or not.

Proposal 7-2: RAN2 agrees that storing UE positioning capability in AMF has no RAN2 impact except potential stage 2 description

CG for ProvideLocationInformation:

Proposal 8-1: (Low Priority) RAN2 agree the necessity of the CG-based transmission of LPP ProvideLocationInformation message to LMF.

Proposal 8-2: RAN2 agree that LMF-based CG-based transmission where LMF transmits the assistance information for CG-configuration to gNB via NRPPa.

Proposal 8-3: FFS for the following sub items:

- The further details on assistance information can be FFS.

- Having finer granular value for reportInterval and reportAmount IE can be FFS.

Handover impact on latency (lower priority):

Proposal 9-1: (Low Priority) RAN2 discuss if the handover makes a significant problem on latency increase between LMF and UE due to LPP message discarding in NR.

The following documents will not be individually treated

[R2-2109460](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109460%20Discussion%20on%20positioning%20latency%20reduction.docx) Discussion on positioning latency reduction ZTE discussion

[R2-2109481](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109481%20Discussion%20on%20Enhancements%20for%20Latency%20Reduction.docx) Discussion on Enhancements for Latency Reduction CATT discussion Rel-17 NR\_pos\_enh-Core

[R2-2109663](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109663.docx) Leftover issues on Latency reduction Intel Corporation discussion Rel-17 NR\_pos\_enh-Core

[R2-2109824](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109824_PosLatencyReduction_LenMM.docx) Positioning Latency Reduction Enhancements Lenovo, Motorola Mobility discussion Rel-17

[R2-2109915](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109915%20on%20latency%20impacts.docx) Time T and Measurement Gap for Measurement Time Window Ericsson discussion Rel-17

[R2-2109978](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109978%20Discussion%20on%20latency%20enhancement%20.docx) Discussion on latency enhancement vivo discussion Rel-17 NR\_pos\_enh-Core

[R2-2110103](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110103%20Further%20consideration%20of%20positioning%20latency%20enhancments.doc) Further consideration of positioning latency enhancements OPPO discussion Rel-17 NR\_pos\_enh-Core

[R2-2110178](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110178%20Discussion%20on%20latency%20reduction%20techniques%20from%20other%20groups.docx) Discussion on latency reduction techniques from other groups Huawei, HiSilicon discussion NR\_pos\_enh-Core

[R2-2110179](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110179%20Text%20Proposal%20for%20finer%20granularity%20of%20responseTime.docx) Text Proposal for finer granularity of responseTime Huawei, HiSilicon discussion NR\_pos\_enh-Core

[R2-2110180](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110180%20Discussion%20on%20pre-configured%20PRS.docx) Discussion on pre-configured PRS Huawei, HiSilicon discussion NR\_pos\_enh-Core

[R2-2110336](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110336%20Discussion%20on%20the%20response%20time.docx) Discussion on the response time Samsung discussion Rel-17 NR\_pos\_enh-Core

[R2-2110359](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110359_Pos_latency.docx) Considerations on positioning latency Sony discussion NR\_pos\_enh-Core

[R2-2110798](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110798%20Measurement%20outside%20Gap.docx) PRS Measurements outside measurement Gap Ericsson discussion Rel-17

[R2-2110822](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110822_%28Scheduling%20Location%20in%20Advance%29.docx) Remaining Issues on Scheduling Location in Advance Qualcomm Incorporated discussion

[R2-2110928](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110928%20%28R17%20NR%20POS%20WI_AI8112_Latency%29.doc) Discussion on Enhancements for Latency Reduction InterDigital, Inc. discussion NR\_pos\_enh

[R2-2111075](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111075%20Discussion%20on%20the%20priority%20rule%20for%20latency%20reduction.docx) Discussion on the priority rule for latency reduction CMCC discussion Rel-17 NR\_pos\_enh-Core

[R2-2111081](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111081%20%288.11.2%29%20Simulation%20study%20for%20multiple%20QoS%20class%20handling%20for%20latency%20reduction.docx) Simulation study for multiple QoS class handling for latency reduction Samsung Electronics discussion NR\_pos\_enh-Core

[R2-2111083](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111083%20%288.11.2%29%20multiple%20QoS%20handling%20for%20latency%20reduction.docx) Handling of multiple QoS for latency reduction Samsung Electronics discussion NR\_pos\_enh-Core

[R2-2111084](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111084%20%288.11.2%29%20preconfigured%20AD%20and%20the%20scheduled%20location%20time.docx) Discussion on the Pre-configured Assistance Data Samsung Electronics discussion NR\_pos\_enh-Core

[R2-2111086](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111086%20%288.11.2%29%20Latency%20reduction%20via%20configured%20grant%20for%20positioning%20.docx) Latency reduction via configured grant for positioning Samsung Electronics discussion NR\_pos\_enh-Core

[R2-2111105](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111105%20Positioning%20enhancements%20on%20latency%20reduction.doc) Positioning enhancements on latency reduction Xiaomi discussion

### 8.11.3 RRC\_INACTIVE

Methods, measurements, signalling and procedures to support positioning for UEs in RRC\_ INACTIVE state, for UE-based and UE-assisted positioning solutions. UL and DL+UL NR positioning methods and gNB positioning measurements for UEs in RRC\_INACTIVE are treated at lower priority. This agenda item will utilise a summary document.

Including outcome of [Post115-e][608][POS] PRS configuration and measurement in RRC\_INACTIVE (vivo)

Email discussion summary

[R2-2109979](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109979%20Summary%20of%20%5BPost115-e%5D%5B608%5D%5BPOS%5D%20PRS%20configuration%20and%20measurement%20in%20RRC_INACTIVE.docx) Summary of [Post115-e][608][POS] PRS configuration and measurement in RRC\_INACTIVE vivo discussion Rel-17 NR\_pos\_enh-Core

Proposal 1: The PRS configuration from LMF to UE is independent of the RRC state. That is, no impact on PRS configuration for RRC\_INACTIVE (13/15).

Discussion:

Lenovo think the PRS priority in inactive mode, as discussed in RAN1, could affect the configuration.

Pre-configuration of PRS:

Proposal 2: Agree on the following working assumption and revisit it when the definition and validity criteria of pre-configuration are clear:

If the UE has received the pre-configuration of PRS in RRC\_CONNECTED, it shall store and reuse that pre-configuration in RRC\_INACTIVE and follow its validity criteria, if any (9/15).

Proposal 3: Triggering indication to UE in RRC\_INACTIVE for initiating the measurement of pre-configured PRS via initial access messages will not be supported (15/15)..

Discussion:

vivo indicate that P2 may be agreeable.

Qualcomm think P2 should apply to all AD, not just PRS; and they understand that the RRC state is transparent to the LPP layer, while this proposal would require awareness of the state.

vivo understand that the LMF does not see the RRC state, but the requirement is on the UE. They understand that the requirement would be for the LPP layer to take no action when the UE enters RRC\_INACTIVE, i.e. it does not delete the AD.

Huawei think what we discussed about pre-configuration is not applicable here. This is about one positioning session.

Intel think Qualcomm have a point that we agreed RRC state is transparent to LPP, so the LPP layer does not know what state the UE is in when it receives/uses the AD. So they see nothing to discuss on this issue. They also agree with Huawei.

Agreement:

Proposal 1 (modified): The PRS configuration from LMF to UE is independent of the RRC state. That is, no impact on PRS configuration for RRC\_INACTIVE (13/15) from RAN2 perspective.

SDT assistance information:

Proposal 4: Wait for SDT WI progress to confirm that UE can send assistance information to gNB for SDT configuration. If confirmed, further discuss the specific assistance information in POS WI (10/15).

Proposal 5: The gNB informs LMF of the SDT data volume threshold will not be supported (15/15).

Proposal 7: Assistance information from LMF to gNB for SDT configuration will not be supported (12/15).

Discussion:

P4:

Huawei think this has been discussed in the SDT session, with doubts from some companies about whether there is motivation to support it. Think we could agree that we have motivation to support it, and allow SDT session to progress.

Intel think we do not need to take a formal agreement and companies can coordinate; we don’t need to repeat the discussion here.

ZTE agree with Huawei; Ericsson and OPPO agree with Intel.

CATT think we should wait for SDT progress on P4, but we could discuss P7.

Differential measurement:

Proposal 6: Differential report of multiple consecutive measurements in deferred MT-LR will not be supported (14/15).

LPP segmentation (note P9 is out of WI scope):

Proposal 8: The message size threshold for LPP segmentation is up to UE implementation and has no specification impact in RAN side from RAN2 perspective (14/15).

Proposal 9: LS to SA2 to clarify the potential issue when LPP message (e.g., ProvideLocationInformation) in LCS message (e.g., EventReport) is segmented (12/15).

Summary document

[R2-2111251](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111251%20Summary%20for%20AI%208.11.3%20on%20positioning%20in%20RRC_INACTIVE%20%28OPPO%29.docx) Summary for AI 8.11.3 on positioning in RRC\_INACTIVE OPPO discussion

Easily Agreeable

Proposal 1: Support MT-LR, MO-LR, NI-LR and deferred MT-LR for RRC\_INACTIVE state.

Proposal 3: For positioning in RRC\_INACTIVE state, the positioning assistance data can be delivered to UE through the following ways:

• the existing deferred MT-LR procedure;

• positioning system information, i.e. posSIB;

• pre-configure assistance data when UE in RRC\_CONNECTED state;

• send to UE in RRC\_INACTIVE during ongoing SDT procedure.

Proposal 5: SRS for positioning in RRC\_INACTIVE state can be configured through the following ways:

• SDT DL RRC message

 - Msg B / Msg 4 of RA-SDT

• RRCRelease with SuspendConfig

• pre-configure positioning SRS in RRC\_CONNECTED

• positioning system information, i.e. posSIB

FFS whether UE can be configured with more than one SRS configurations for RRC\_INACTIVE positioning.

Proposal 6: Support SP SRS for positioning in RRC\_INACTIVE state and SP SRS activation MAC CE is used by network to trigger SP SRS transmission.

Proposal 8: Follow the CG-SDT approach for Positioning SRS configuration and TA:

• The posSRS configuration is released when the UE sends RRCResumeRequest to an gNB other than the gNB where it is released to RRC\_INACTIVE state.

• UE releases posSRS configuration when TA timer expires in RRC\_INACTIVE.

• TA timer configuration can be included in RRCRelease with suspendConfig for UL positioning in RRC\_INACTIVE.

• When cell reselection is performed and UE initiates RRC resume procedure to the cell which is different from the cell in which the posSRS is configured, the TA timer configuration for SRS should be released.

FFS whether UE can indicate network for SRS configuration update;

FFS on UE behaviour for SRS transmission and measurement reporting after state transition.

FFS on whether RSRP change based solution is reused for TA validation.

Need Further Discussion

Proposal 2: RAN2 discuss whether to capture the following procedures in TS 38.305:

• LPP PDU and LCS message transfer with SDT in RRC\_INACTIVE state;

• DL and RAT-independent positioning in RRC\_INACTIVE state;

• UL/ UL+DL positioning in RRC\_INACTIVE state.

Proposal 4: Send LS to SA2 including the baseline procedure for RAT-dependent and RAT-independent positioning.

Proposal 9: Adopt the stage2 procedure in Annex C as baseline for UL and UL+DL positioning in RRC\_INACIVE.

Proposal 7: RAN2 further discuss whether to support AP SRS in RRC\_INACTIVE state.

Proposal 10: RAN2 further discuss the following issues of positioning in RRC\_INACTIVE:

- Whether to support ECID in RRC\_INACTIVE

- DL-PRS reception priority

- UE capability

* [AT116-e][625][POS] Proposals from RRC\_INACTIVE positioning summary (OPPO)

 Scope: Discuss the proposals from the agenda item summary and identify agreeable aspects.

 Intended outcome: Report to CB session in R2-2111379

 Deadline: Thursday 2021-11-11 0100 UTC

[R2-2111379](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111379%20%5BAT116-e%5D%5B625%5D%5BPOS%5D%20Proposals%20from%20RRC_INACTIVE%20positioning%20summary%20%28OPPO%29_summary.docx) [AT116-e][625][POS] Proposals from RRC\_INACTIVE positioning OPPO discussion Rel-17 NR\_pos\_enh-Core

Potential easy agreements:

Proposal 1: From RAN2 perspective, only deferred MT-LR is supported for RRC\_INACTIVE state in R17. (13/13)

Proposal 4: For positioning in RRC\_INACTIVE state, the positioning assistance data can be delivered to UE through the following ways:

- the existing deferred MT-LR procedure; (12/13)

- positioning system information, i.e. posSIB;(12/13)

- pre-configure assistance data when UE in RRC\_CONNECTED state;(11/13)

- send to UE in RRC\_INACTIVE during ongoing SDT procedure. (9/13)

Discussion:

ZTE think other cases besides deferred MT-LR would not have additional impact on our specs and should be supported when the UE is already in the SDT active period. Xiaomi and vivo agree with ZTE.

Intel understand we already agreed that deferred MT-LR is supported, and they agree with ZTE that we should not take P1 now with the word “only”.

vivo are unsure about the first bullet of P4: Does it mean AD received in RRC\_CONNECTED?

Ericsson have the same understanding about the first bullet, that the UE would be in connected mode.

Huawei think the first and third bullets overlap.

Qualcomm agree that “existing deferred MT-LR” is confusing because it applies to RRC\_CONNECTED.

Agreement:

Proposal 4 (modified): For positioning in RRC\_INACTIVE state, the positioning assistance data can be delivered to UE through the following ways:

- positioning system information, i.e. posSIB;(12/13)

- pre-configure assistance data when UE in RRC\_CONNECTED state;(11/13)

- send to UE in RRC\_INACTIVE during ongoing SDT procedure. (9/13)

Proposal 5: Adopt the stage2 procedure in Annex C as baseline for UL and UL+DL positioning in RRC\_INACTIVE for further study. (10/12)

Discussion:

Qualcomm think there are issues with this proposal that need to be addressed, the main one being that the UE receives an LPP Request Location Information every time a periodic event is triggered. They also think it does not work without assistance from the UE to the gNB, and they think it violates the decision that the LPP layer does not need to be aware of the RRC state.

Huawei understand that there is no dependency on the LMF or the LPP layer knowing the RRC state. They think this is the only proposal compatible with the SA2 spec. CATT agree with Huawei.

Qualcomm think the last step of the procedure does not work unless the UE knows to request an acknowledgement. Huawei think this can be done in the SDT framework as subsequent downlink data.

Ericsson think both sides have a point and we cannot conclude now.

Intel think we could conclude there is no stage 3 impact.

Proposal 6: SRS for positioning in RRC\_INACTIVE state can be configured through the following ways:

- RRCRelease with SuspendConfig (13/13)

- SDT DL RRC message, i.e. Msg B / Msg 4 of RA-SDT (9/13)

- pre-configure positioning SRS in RRC\_CONNECTED (9/13)

Proposal 8: Support SP SRSp for positioning in RRC\_INACTIVE state. (12/13)

Proposal 9: SP Positioning SRS Activation/Deactivation MAC CE is reused for triggering SRSp transmission in RRC\_INACTIVE. (12/12)

Proposal 10: AP SRSp is not supported for positioning in RRC\_INACTIVE state. (11/13)

Discussion:

Huawei support these proposals and think we should also take the stage 2 baseline from P5.

ZTE, Apple, and Intel support P6/8/9/10.

CATT understand in P6, bullets 1 and 3 are for a UE that does not move out of the serving cell; bullet 2 is a candidate solution for a UE that moves. They would like to further discuss broadcast SRS configuration for all UEs along with the second bullet.

OPPO think CATT’s proposal was discussed but did not have majority support in the email discussion.

Ericsson think preconfigured positioning SRS in RRC\_CONNECTED is not clear. CATT have a similar concern.

vivo wonder on the second bullet of P6 is the RRC reconfiguration can be sent via SDT. Intel understand that RRCReconfiguration is used in MsgB/Msg4 in SDT and they do not see a problem.

Huawei understand that the SDT configuration is only given to the UE in RRCRelease as a dedicated configuration, but they think RRCRelease can be included in MsgB/Msg4, so the second bullet is OK.

Agreement:

Proposal 6: SRS for positioning in RRC\_INACTIVE state can be configured through the following ways:

- RRCRelease with SuspendConfig (13/13)

- SDT DL RRC message, i.e. Msg B / Msg 4 of RA-SDT (9/13)

- WA: pre-configure positioning SRS in RRC\_CONNECTED (9/13)

FFS detailed signalling for these approaches.

Proposal 8: Support SP SRSp for positioning in RRC\_INACTIVE state. (12/13)

Proposal 9: SP Positioning SRS Activation/Deactivation MAC CE is reused for triggering SRSp transmission in RRC\_INACTIVE. (12/12)

Proposal 10: AP SRSp is not supported for positioning in RRC\_INACTIVE state. (11/13)

Proposal 11: Follow the CG-SDT approach for Positioning SRS configuration and TA (10/13):

- UE releases posSRS configuration when TA timer expires in RRC\_INACTIVE.

- TA timer configuration can be included in RRCRelease with suspendConfig for UL positioning in RRC\_INACTIVE.

- The posSRS configuration is released when the UE sends RRCResumeRequest to an gNB other than the gNB where it is released to RRC\_INACTIVE state.

- When cell reselection is performed and UE initiates RRC resume procedure to the cell which is different from the cell in which the posSRS is configured, the TA timer configuration for SRS should be released.

Proposal 14: RSRP change based TA validation solution in CG-SDT is reused for positioning in RRC\_INACTIVE. (10/11)

Need further discussion online:

Proposal 2: RAN2 further discuss whether to capture the agreed baseline procedures in TS 38.305 (5/13):

- LPP PDU and LCS message transfer with SDT in RRC\_INACTIVE state;

- DL and RAT-independent positioning in RRC\_INACTIVE state;

- UL/ UL+DL positioning in RRC\_INACTIVE state.

Proposal 3: Send LS to SA2 including RAN2 agreements related to positioning in RRC\_INACTIVE to request SA2 to determine any SA2 specification impacts. (8/12)

Proposal 7: Pre-configured multiple SRS configurations for RRC\_INACTIVE positioning is not supported in Rel-17. (9/12)

Proposal 12: From RAN2 perspective, SRS transmission/configuration is not impacted due to state transition unless SRS configuration is reconfigured/released. (8/12)

Proposal 13: Check with RAN4 on whether UE measurements are still valid when UE switches from Inactive to connected mode

Proposal 15: RAN2 further study whether and how to define UE capability for positioning in RRC\_INACTIVE state.

The following documents will not be individually treated

[R2-2109461](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109461%20Discussion%20on%20positioning%20in%20RRC%20INACTIVE%20state.docx) Discussion on positioning in RRC INACTIVE state ZTE discussion

R2-2109482 Discussion on UL NR positioning in RRC\_INACTIVE CATT discussion Rel-17 NR\_pos\_enh-Core Withdrawn

[R2-2109758](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109758-%20Supporting%20positioning%20in%20RRC_INACTIVE%20state.docx) Supporting positioning in RRC\_INACTIVE state OPPO discussion Rel-17 NR\_pos\_enh-Core

[R2-2109759](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109759-%20Discussion%20on%20UL%20Positioning%20methods%20in%20RRC_INACTIVE%20state.docx) Discussion on UL Positioning methods in RRC\_INACTIVE state OPPO discussion Rel-17 NR\_pos\_enh-Core

[R2-2109825](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109825_RRCInactive_Positioning_LenMM.docx) On Positioning in RRC\_INACTIVE state Lenovo, Motorola Mobility discussion Rel-17

[R2-2109918](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109918%20Inactive%20mode%20positioning.docx) Discussion on RRC Inactive mode Positioning Ericsson discussion Rel-17

[R2-2109980](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109980%20Discussion%20on%20UL%20positioning%20in%20RRC_INACTIVE.docx) Discussion on UL positioning in RRC\_INACTIVE vivo discussion Rel-17 NR\_pos\_enh-Core

[R2-2110021](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110021%20Support%20of%20UL%26UL%2BDL%20positioning%20in%20RRC_INACTIVE.docx) Support of UL&UL+DL positioning in RRC\_INACTIVE Intel Corporation discussion Rel-17 NR\_pos\_enh-Core

[R2-2110174](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110174%20Way-forward%20for%20RRC_INACTIVE%20positioning.docx) Way-forward for RRC\_INACTIVE positioning Huawei, CATT, China Unicom, CMCC, Fraunhofer, Futurewei, HiSilicon, Intel Corporation, Spreadtrum Communications, OPPO, VIVO, Xiaomi, ZTE Corporation discussion NR\_pos\_enh-Core

[R2-2110249](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110249_RRC_INACTIVE_Fraunhofer.docx) UE Positioning in RRC\_INACTIVE mode Fraunhofer IIS; Fraunhofer HHI discussion Rel-17

[R2-2110337](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110337%20Discussion%20on%20the%20measurement%20reporting%20in%20RRC_INACTIVE.docx) Discussion on the measurement reporting in RRC\_INACTIVE Samsung discussion Rel-17 NR\_pos\_enh-Core

[R2-2110360](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110360_Pos_Inactive.docx) Considerations on positioning RRC Inactive Sony discussion Rel-17 NR\_pos\_enh-Core

[R2-2110823](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110823_%28Positioning%20in%20RRC_INACTIVE%29.docx) Remaining issues for positioning of UEs in RRC\_INACTIVE State Qualcomm Incorporated discussion

[R2-2110824](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110824_%28LS%20to%20SA2%20on%20RRC_INACTIVE%29.docx) [draft] LS on DL-only and RAT-Independent Positioning in RRC\_INACTIVE State Qualcomm Incorporated LS out To:SA2 Cc:RAN3

[R2-2110929](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110929%20%28R17%20NR%20POS%20WI%20AI8113_INACTIVE_AD%29.doc) Discussion on Positioning in RRC INACTIVE state InterDigital, Inc. discussion NR\_pos\_enh

[R2-2110930](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110930%20%28R17%20NR%20POS%20WI%20AI8113_INACTIVE_SDT%29.doc) Discussion on reporting of positioning information using SDT InterDigital, Inc. discussion NR\_pos\_enh

[R2-2111076](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111076%20Considerations%20on%20Positioning%20in%20RRC_INACTIVE%20state.docx) Considerations on Positioning in RRC\_INACTIVE state CMCC discussion Rel-17 NR\_pos\_enh-Core

[R2-2111106](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111106%20Discussion%20on%20positioning%20for%20UEs%20in%20RRC%20Inactive.doc) Discussion on positioning for UEs in RRC Inactive Xiaomi discussion

### 8.11.4 On-demand PRS

Specify UE-initiated and LMF-initiated on-demand transmission and reception of DL PRS for DL and DL+UL positioning for UE-based and UE-assisted positioning solutions. This agenda item will utilise a summary document.

Including outcome of [Post115-e][606][POS] MO-LR for on-demand PRS (CATT)

Email discussion summary

[R2-2109483](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109483%20%5BPost115-e%5D%5B606%5D%5BPOS%5D%20MO-LR%20for%20on-demand%20PRS%20%28CATT%29.docx) Report of [Post115-e][606][POS] MO-LR for on-demand PRS (CATT) CATT discussion Rel-17 NR\_pos\_enh-Core

Easy Agreement:

Proposal 1: RAN2 to agree to support the UE originated request of on-demand PRS via MO-LR for autonomous self location. (11/14)

Proposal 3: RAN2 to agree that UE can send an MO-LR Request message included in an UL NAS TRANSPORT message to the serving AMF including an LPP Request Assistance Data message which is used for on-demand DL-PRS transmission, and the MOLR-Type of this MO-LR Request message is “assistanceData”. (12/14)

Proposal 4: RAN2 to agree the following general stage 2 procedure as baseline for UE initiated on-demand PRS via MO-LR. (13/14) [Figure 2 of R2-2109483, with the associated list of steps as given in section 5 of R2-2109483]

Discussion:

Nokia have no concern with the procedure but think it should be taken into the discussion on the running CR.

Apple think we do not necessarily need to capture this in our specs; it is more SA2 stage 2 impact. They would prefer to capture less detail, perhaps a modification to an existing flow. CATT understand that we have service-level flows in our stage 2 and most companies wanted to capture this level of detail, because it is a different LCS message flow from the other cases.

vivo agree with Apple and think there is a lot of overlap with the general MO-LR procedure.

Ericsson think we can talk about the LPP Request Assistance Data instead of the MO-LR, and understand that there is no impact.

Intel understand the main difference from the existing procedure in the running CR is the MO-LR aspect, and they would prefer to handle the details in post-meeting discussion.

Agreements:

Proposal 1: RAN2 to agree to support the UE originated request of on-demand PRS via MO-LR for autonomous self location. (11/14)

Proposal 3: RAN2 to agree that UE can send an MO-LR Request message included in an UL NAS TRANSPORT message to the serving AMF including an LPP Request Assistance Data message which is used for on-demand DL-PRS transmission, and the MOLR-Type of this MO-LR Request message is “assistanceData”. (12/14)

Proposal 4: RAN2 to agree the following general stage 2 procedure as baseline for UE initiated on-demand PRS via MO-LR. (13/14) [Figure 2 of R2-2109483, with the associated list of steps as given in section 5 of R2-2109483.] To be discussed in development of the running stage 2 CR (post-meeting) how much of this detail we need to capture in 38.305.

Need Further Discussion:

Proposal 2: RAN2 to agree that UE initiate the on-demand PRS request via MO-LR only if the DL-PRS configurations for on-demand PRS are provided to UE via posSIBs (10/14).

Note: According to companies’ comments, P2 only focus MO-LR for on on-demand PRS request. And P5 only focus on-demand PRS request via LPP.

Discussion:

ZTE think it is up to LMF implementation to determine how to handle the UE’s request, and the LMF can always reject it; so they see that it does not matter if the UE sends a request the network cannot grant.

Qualcomm have the same view as ZTE and think this would create a difference from ordinary Request Assistance Data. They understand that the UE can already request AD that the network may or may not support, e.g. in GNSS.

CATT indicate that there was a majority to require the posSIB in order to have the UE under control of the network, and the supporting companies did not want to have the UE send the request freely.

vivo support the proposal and think that a request without permission is likely to be meaningless signalling. They think it is similar to power saving where a UE can be configured with guidance on whether to signal its preference.

Ericsson think we have the legacy mechanism where the UE can request AD, and the question is whether it can request additional information not advertised by the network. They see this as more of a UE implementation issue.

Qualcomm think the restriction does not make sense and cannot accept it at this time; they think this is already within Rel-16 functionality. They also think there is some confusion between MO-LR and LPP request.

Proposal 5: RAN2 to agree that UE can trigger the on-demand PRS request only if the PRS configurations for on-demand PRS have been provided to the UE. (9/13)

Proposal 6: RAN2 to agree that UE can only request the configurations within the PRS configuration for on-demand PRS provided by NW (8/13).

[R2-2110966](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110966%20%5BDraft%5D%20LS%20on%20MO-LR%20for%20on-demand%20PRS.docx) [Draft] LS on MO-LR for on-demand PRS CATT LS out Rel-17 NR\_pos\_enh-Core To:SA2

Discussion:

Huawei think if we have not identified an SA2 issue we do not need to send the LS. If it is for information only it can be done by internal communication. Ericsson have the same view.

CATT think we need to inform SA2 because we indicated FFS on this point in an LS last meeting.

Nokia think it’s not critical to send the LS now and would rather see how the stage 2 develops. Apple think the LS is not essential.

Summary document

[R2-2111256](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2111256.zip) Summary of Agenda Item 8.11.4: On-demand PRS Lenovo, Motorola Mobility discussion

Potentially agreeable proposals

Proposal 1.1: The UE may initiate an on-demand PRS request per positioning method including DL-TDoA, DL-AoD and Multi-RTT, via the existing LPP RequestAssistanceData message.

Proposal 1.2: If Proposal 1.1 is agreed, then there is no need for introducing a new LPP message to carry the on-demand PRS request.

Discussion:

Nokia do not understand P1.1: Is it saying we need to indicate something about the positioning method as part of the request? Lenovo clarify that the intention was to expand on the agreement to enhance this message, and this proposal would associate the requested on-demand PRS with the actual positioning method to be used. Nokia are still not sure if this is necessary since the PRS configuration applies to multiple methods.

Qualcomm agree with Lenovo’s comment. They understand that LPP Request AD already exists for the positioning methods, and all we need in addition is the details of what the UE requests. So they see this as a natural extension. Ericsson agree with Qualcomm.

Huawei think currently the PRS configuration can be different per method, and it is natural to have the same thing for on-demand.

Nokia can accept the proposals. ZTE agree with the proposals. Intel also. Nokia would like to clarify if the parameters requested by RAN1 might include anything not fitting with the existing signalling for AD.

Agreements:

Proposal 1.1: The UE may initiate an on-demand PRS request per positioning method including DL-TDoA, DL-AoD and Multi-RTT, via the existing LPP RequestAssistanceData message.

Proposal 1.2: There is no need for introducing a new LPP message to carry the on-demand PRS request.

Proposal 1.3: UE may indicate its preferred DL-PRS configuration to the LMF, irrespective of whether a (pre-defined) DL-PRS configuration is available or not at the UE.

Discussion:

Apple do not fully understand the proposal and think it is tied to P2. They think it is a nice mechanism to have the preconfigurations and this is sort of an optimisation.

Qualcomm think this is included in the RAN1 parameter list and should be straightforward.

Intel prefer to avoid UE requests that the LMF cannot support, but they agree that if the UE only wants to request DL-PRS, the existing Rel-16 mechanism can be reused. If we want to support additional Rel-17 parameters, it would be good to have the predefined configuration.

Note: Proposal 2 and Proposal 8.1 can be jointly discussed.

Proposal 2: The UE may request explicit on-demand PRS parameter(s) from the network

Proposal 8.1: RAN2 to further discuss:

• Whether a parameter list may be associated with the request of one or more DL-PRS parameters

• If there is need to associate each explicit parameter with a separate ID.

Discussion:

Ericsson and Xiaomi are fine with P2. Apple think P2 is not needed and more of an optimisation.

Intel understand that P2 is related to what parameters are needed, hence to RAN1 discussion. They think we can wait.

Proposal 3: LPP ProvideAssistanceData message is enhanced to enable the on-demand PRS response signalling from the LMF based on the UE’s on-demand PRS request.

• Error indication is supported for a partial or completely unfulfilled on-demand PRS request.

• FFS other scope of enhancements (e.g., ACK/NACK signalling).

Proposal 7: Send LS to RAN3 relating to the latest on-demand PRS Stage 2 Running CR, based on the draft LS of [20]. [R2-2111090]

Discussion:

Ericsson think the scope of the hypothetical LS would need to be discussed. They think some indication is needed from the LMF to the gNB and RAN3 are waiting for input from us; we should decide what information can be provided from LMF to gNB.

CATT have the same understanding that RAN3 are waiting for us, and think we should capture our agreements, especially the stage 2 procedure, for them.

Nokia feel it’s critical to decide on P2 before sending an LS. Intel think the contents would relate to RAN1 parameters and they do not see a strong need for RAN2 to send an LS.

Qualcomm think RAN1 already agreed on the list of parameters, and the NRPPa and LPP signalling can be pretty much the same. They agree it is not urgent to send an LS to RAN3, but do not object to sending it. They understand that RAN1 agreed to P2 already. Ericsson agree with Qualcomm.

Nokia are not sure of Qualcomm’s understanding. They agree RAN1 settled on parameters, but are not sure there is an agreement that the UE can request them. They would prefer that whatever parameters RAN1 agreed may be explicitly request or part of a predefined configuration. Think more discussion is needed.

Proposal 10: Support the need of transmitting assistance information from UE to LMF to aid in configuring on-demand PRS. FFS further details such as signalling and content of UE assistance information.

Proposal 11: Trigger conditions/criteria for LMF-initiated on-demand PRS is up to network implementation.

Requires further discussion

Proposal 4: Network control of UE-initiated on-demand PRS is supported. The following options are to be downselected:

• Option A: UE can only request on-demand PRS based on prior reception of on-demand PRS configuration sets

• Option B: Configuration of a prohibit timer

• Option C: Reattempt timer

• Option D: Stop message indication from the LMF

• Note: If error indication in Proposal 3 is supported, Option D is not required.

Proposal 5: Further discuss the on-demand PRS capability definition for UE-initiated on-demand PRS and whether additional alignment with RAN1 is required.

Proposal 6: On the gNB on-demand PRS response to the LMF, consider the following options:

• Option A: Further discuss the type of DL PRS configuration information to be transmitted from the gNB to the LMF, e.g., activity report, supported configuration IDs, PRS configuration currently being transmitted.

• Option B: Leave the discussion up to RAN3.

Proposal 8.2: On the pre-defined on-demand PRS configuration, further discuss whether the pre-defined on-demand PRS configuration sets should be provided based on:

• Different PRS granularities (e.g., per frequency layer/TRP/Resource Set/Resource ID)

• Bundling/grouping mechanism for pre-defined configuration sets

• A limit on the maximum number of PRS configuration sets

Proposal 9: Further discuss the information associated with a pre-defined on-demand PRS configuration, which may include the following options:

• Option A: Validity criteria, e.g., area, timer

• Option B: Prioritization indications, FFS whether the pre-defined PRS configuration is based on a network and/or UE configured priority.

Proposal 12: FFS the support for triggering condition/criteria for UE-initiated on-demand PRS.

The following documents will not be individually treated

[R2-2109462](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109462%20Discussion%20on%20on-demand%20PRS.docx) Discussion on on-demand PRS ZTE discussion

[R2-2109484](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109484-Discussion%20on%20on-demand%20PRS.docx) Discussion on on-demand PRS CATT discussion Rel-17 NR\_pos\_enh-Core

[R2-2109664](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109664.docx) Support of On-Demand PRS request Intel Corporation discussion Rel-17 NR\_pos\_enh-Core

[R2-2109757](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109757%20Discussion%20on%20on-demand%20DL-PRS.doc) Discussion on on-demand DL-PRS OPPO discussion Rel-17 NR\_pos\_enh-Core

[R2-2109826](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109826_On-DemandPRS_LenMM.docx) Support of On-Demand DL-PRS Lenovo, Motorola Mobility discussion Rel-17

[R2-2109916](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109916%20On%20Demand%20PRS.docx) On demand PRS Ericsson discussion Rel-17

[R2-2109981](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109981%20Discussion%20on%20on-demand%20PRS.docx) Discussion on on-demand PRS vivo discussion Rel-17 NR\_pos\_enh-Core

[R2-2110040](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110040%20stage-2-on-demand-PRS-v0.docx) Stage-2 procedure for on-demand PRS Apple discussion NR\_pos\_enh-Core

[R2-2110175](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110175%20Discussion%20on%20on-demand%20PRS.docx) Discussion on on-demand PRS Huawei, HiSilicon discussion NR\_pos\_enh-Core

[R2-2110247](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110247_OnDemandPRS_Fraunhofer.docx) On-demand PRS Fraunhofer IIS, Fraunhofer HHI discussion Rel-17

[R2-2110361](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110361_Pos_PRS_Ondemand.docx) Considerations on positioning PRS On-demand Sony discussion Rel-17 NR\_pos\_enh-Core

[R2-2110825](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110825_%28On-demand%20PRS%29.docx) Remaining issues for on-demand DL-PRS Qualcomm Incorporated discussion

[R2-2110931](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110931%20%28R17%20NR%20POS%20WI_AI8114_OnDemand_DL%29.doc) Discussion on procedures for On-demand PRS for DL-based positioning InterDigital, Inc. discussion NR\_pos\_enh

[R2-2110932](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110932%20%28R17%20NR%20POS%20WI_AI8114_OnDemand_DL%2BUL%29.doc) Discussion on procedure for On-demand PRS for DL+UL based positioning InterDigital, Inc. discussion NR\_pos\_enh

[R2-2110956](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110956%20On-demand%20PRS%20Stage2.docx) Clarifications to on-demand PRS Stage 2 Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_pos\_enh-Core

[R2-2110957](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110957%20UE-initiated%20On-demand%20PRS%20requests.docx) UE-initiated on-demand PRS requests Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_pos\_enh-Core

[R2-2110958](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110958%20Pre-configured%20assistance%20data%20for%20on-demand%20PRS%20.docx) Pre-configured assistance data for on-demand PRS Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_pos\_enh-Core

[R2-2111090](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111090%20%5BDraft%5D%20LS%20on%20stage-2%20on-demand%20PRS%20procedure.docx) [Draft] LS on stage-2 on-demand PRS procedure CATT LS out Rel-17 NR\_pos\_enh-Core To:RAN3

[R2-2111107](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111107%20Positioning%20enhancement%20to%20on-demand%20DL%20PRS%20.doc) Positioning enhancement to on-demand DL PRS Xiaomi discussion

### 8.11.5 GNSS positioning integrity

Signalling, and procedures to support GNSS positioning integrity determination. This agenda item will utilise a summary document.

Including outcome of [Post115-e][607][POS] Integrity assistance data (Huawei)

Coordination with RTCM (outcome of [AT116-e][611])

[R2-2111361](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111361_Summary%20of%20offline%20611_v02_ESA.docx) Email discussion on LS to RTCM for GNSS integrity ESA discussion NR\_pos\_enh-Core

Proposal 1. Request feedback from RTCM SC134 on the specific technical attributes:

- overbounding of GNSS errors: zero-mean assumption (provision of standard deviation only) or non-zero mean assumption (provision of mean in addition to standard deviation); paired overbounding vs single overbounding.

- additional items are FFS for now and depend on progress during RAN2 #116.

Proposal 2. RAN2 to proceed with the Rel-17 work scope. What is achieved is FFS and depends on contributions and proposals under discussions in R2-2110181.

Proposal 3. RAN2 agrees to leverage in the future on standards for GNSS integrity message produced by RTCM SC134 when this become available.

Proposal 4. Include in the draft LS all our agreements/conclusions dealing with GNSS integrity.

Discussion:

Swift think in P1 we should include the specific technical term “paired overbounding” rather than zero vs. nonzero mean.

Huawei are OK with the proposals.

Agreements:

Proposal 1. Request feedback from RTCM SC134 on the specific technical attributes:

- overbounding of GNSS errors: zero-mean assumption (provision of standard deviation only) or non-zero mean assumption (provision of mean in addition to standard deviation); paired overbounding vs single overbounding.

- additional items are FFS for now and depend on progress during RAN2 #116.

Proposal 2. RAN2 to proceed with the Rel-17 work scope. What is achieved is FFS and depends on contributions and proposals under discussions in R2-2110181.

Proposal 3. RAN2 agrees to leverage in the future on standards for GNSS integrity message produced by RTCM SC134 when this become available.

Proposal 4. Include in the draft LS all our agreements/conclusions dealing with GNSS integrity.

[R2-2111362](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111362%20LS%20to%20RTCM%20on%20GNSS%20integrity%20assistance%20data.docx) LS to RTCM on GNSS integrity assistance data ESA LS out Rel-17 NR\_pos\_enh-Core To:RTCM SC134

Discussion:

ESA think we need to update the LS to include agreements of this meeting, and we should extend the deadline.

* Email discussion [611] to be extended to finalise the LS and capture agreements: to Thursday 2021-11-11 0100 UTC
* Revised in R2-2111390

[R2-2111390](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CDocs%5CR2-2111390.zip) LS to RTCM on GNSS integrity assistance data ESA LS out Rel-17 NR\_pos\_enh-Core To:RTCM SC134

* Approved

[R2-2111482](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111482_Summary%20of%20offline%20611_v11_ESA.docx) Email discussion on LS to RTCM for GNSS integrity ESA discussion NR\_pos\_enh-Core

* Noted

Email discussion summary

[R2-2110181](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110181%20%5BPost115-e%5D%5B607%5D%5BPOS%5D%20Integrity%20assistance%20data.docx) Summary of [Post115-e][607][POS] Integrity assistance data Huawei, HiSilicon discussion NR\_pos\_enh-Core

Proposal1-1: The paired overbounding technique is supported for bounding the error probability distribution for GNSS integrity as a baseline.

Proposal1-2: Error representation by SSR is supported for GNSS integrity. FFS alignment with the assistance data for OSR in RTCM.

Proposal1-3: The support for GNSS integrity in R16 is in-efficient for the use cases defined for GNSS integrity in TR 38.857 for R17

Proposal1-4: Alert parameters can also be used for feared events in GNSS assistance data in addition to GNSS feared events

Proposal1-5: Assistance data for GNSS-feared event can be categorized into the five categories of (a)Integrity Bounds (b) Residual Risks (c) Correlation Times (d) Alerts (e) Validity Times

Proposal1-7: The only needed assistance data for GNSS integrity service is Integrity Risk

Discussion:

Qualcomm think P1-1 overlaps with the LS for RTCM and think we could take a WA. For P1-2, they think alignment with SSR AD is FFS as well. On P1-3, they see no impact.

Qualcomm think the alert parameters require a bit more discussion; they are not sure the DNU flags are needed and think they may cause unnecessary overhead. If the intention is only to indicate a failure event when it happens, this could be done more efficiently. For P1-5, they think we need definitions so the agreement does not become a blank check.

Swift think P1-3 could be stronger, and think the Rel-16 AD does not satisfy the use cases. For P1-7, they agree with the intention but disagree with the wording, and understand the intention was to capture that we do not identify further AD needed now; they also think the IR should have been a range.

Huawei indicate on P1-7 that during the discussion, the question asked was related to Swift’s TP to the last meeting; the only integrity service AD in that TP was integrity risk, and the question was whether companies see more AD that is needed. Regarding Qualcomm’s comment on P1-4, Huawei understand that most companies felt the alert parameters can be used for GNSS AD feared events, so the DNU flag is not limited only to the GNSS feared events. And on P1-3, they think the “inefficient” wording was intended to mean that the Rel-16 mechanism is not sufficient for the use cases/QoS that we have already agreed, and the wording could be changed to reflect that. Qualcomm think this is covered by the WI justification.

Ericsson indicate on the DNU flags, the AD may be valid for position estimation; they think it could be good to focus on this question. For example, if there is a redundancy in the reference network, it may provide something that can be used in place of a reference indicated as DNU.

ESA want to clarify that there may be no RTCM specifications in Rel-17, in respect of P1-2.

Qualcomm understand the motivation for a minimum integrity range but not the maximum, and think P1-7 is not completely clear.

Agreements:

Proposal1-1 (modified): WA: The paired overbounding technique is supported for bounding the error probability distribution for GNSS integrity as a baseline.

Proposal1-2 (modified): Error representation by SSR is supported for GNSS integrity. FFS alignment with the assistance data for OSR in RTCM (also FFS alignment with SSR, if RTCM produce something in that direction in the Rel-17 time frame).

Signal structure

Proposal2-1: A single new "common assistance data" and a single new "generic assistance data" are defined for GNSS integrity AD. FFS whether and how the new assistance data can be integrated into the existing assistance data.

Proposal2-9: Assistance data for GNSS integrity can be sent periodically.

Proposal2-11: The assistance data in GNSS-RealTimeIntegrity can be reused for GNSS integrity in R17

Discussion:

Swift do not agree with P2-1 and think at least the service alerts and constellation alerts should be separated.

Huawei indicate in the TP from Swift, the AD were offered in high granularity, and some companies felt this would have a high overhead cost especially for broadcast. They think the signalling can be optimised by combining the AD, hence the proposal.

Qualcomm would prefer to integrate the AD into existing IEs, but think we do not know what the individual IEs are yet and we could leave this aspect for later. They think we need to understand the minimum AD needed at the device to calculate integrity, e.g. start from “standard deviation of error bounds” and then discuss which errors need to be considered.

Intel think the main problem is that companies want to align with RTCM, and if RTCM cannot answer our questions on time we need to decide what to do.

Agreements:

Proposal2-9: Assistance data for GNSS integrity can be sent periodically.

Proposal2-11: The assistance data in GNSS-RealTimeIntegrity can be reused for GNSS integrity in R17

Take the following agreements as baseline for the discussion on assistance data for GNSS integrity, also keeping the room for further clarification on the fields, explanation and changes

Proposal2-2: Adopt the fields pConstellation, pSatellite, epochTime, iod-ssr, validityPeriodSeconds, and validityPeriodDays for the assistance data for constellation parameters. FFS the other parameters

Proposal2-3: Adopt the fields meanCodeBias, stdDevCodeBias, epochTime, iod-ssr, validityPeriodSeconds, validityPeriodDays, and svID for the assistance data for bias error bounds. FFS the other parameters.

Proposal2-4: Adopt orbitClockErrorMeanShapeVector, orbitClockErrorCovarianceShapeMatrix, orbitClockErrorScaleFactor, epochTime, iod-ssr, validityPeriodSeconds, validityPeriodDays, and svID for the assistance data for orbit clock error. FFS the other parameters

Proposal2-5: Adopt fields EpochTime, iod-ssr, validityPeriod, pIonosphere, tIonosphere, tCorrelationInosphere, and tCorrelationIonosphereRate as the assistance data for ionosphere parameters. FFS the other parameters

Proposal2-6: Adopt the fields meanIonosphere, stdDevIonosphere, epochTime, iod-ssr, correctionPointSetID, validityPeriod, gridList, and svID as the assistance data for ionosphere error sources. FFS the other parameters

Proposal 2-7: Adopt the fields epochTime, iod-ssr, validityPeriod, pTroposphere, tTroposphere, tCorrelationTroposphere, and tCorrelationTroposphereRate for the assistance data for troposphere parameters. FFS the other parameters

Proposal2-8: Adopt the fields meanTroposphereVerticalWetDelay, stdDevTroposphereVerticalWetDelay epochTime, iod-ssr, correctionPointSetID, validityPeriod, gridList, and svID as assistance data for troposphere error source. FFS the other parameters

Proposal2-10: Adopt serviceDNU, ionosphereDNU and troposphereDNU for service alert. FFS the other parameters for service parameters and alert.

Discussion:

Huawei understand that this baseline is aligned with GNSS industry norms. Intel support using it as a baseline. Swift also.

Qualcomm are not aware of any standard baseline for integrity, and think RTCM have been working on it already for a long time without a standard. They think we can produce a common denominator of all proposals for Rel-17. ZTE and vivo agree with Qualcomm.

Ericsson think it is quite a step to go into the specific parameters, but think there is a natural relation to the error sources and error distribution. Think we could continue by email.

Summary document

[R2-2111263](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111263%20summary%20of%20AI%208.11.5%20GNSS%20positioning%20integrity.docx) Summary of Agenda item 8.11.5- GNSS positioning integrity CATT discussion Rel-17 NR\_pos\_enh-Core

Location Information (UE-based):

Proposal 3: RAN2 to agree not to report achieved KPIs (TIR, AL, TTA) together with integrity results.

Proposal 4: RAN2 to agree to report integrity flag for at least UE-based mode.

Proposal 4-a: RAN2 to agree the LMF may indicate which reporting mode is enabled in the LPP message RequestLocationInformation for at least UE-based mode.

Assistance Data (UE-based):

Proposal 5: RAN2 to agree the TP of ‘Integrity Service Alert’, ‘Integrity Correlation Times’ and ‘Integrity Service Parameters’ in R2-2110141.

Proposal 6: RAN2 to further discuss the TP of ‘Integrity Principle of Operation’ in R2-2110141, especially the proposed IEs: constellationDoNotUse, svDoNotUse, orbitClockRateErrorMeanShapeVector, orbitClockErrorMeanScaleFactor, etc.

Proposal 7: RAN2 to further discuss the TP of ‘Integrity Bounds’ in R2-2110141, e.g. the formula Bound = mean + K \* stdDev, K = normInv(IRallocation / 2), irMinimum <= IRallocation <= irMaximum

LMF-based/UE-assisted integrity:

Proposal 1: RAN2 to discuss whether to support LMF-based/UE-assisted Integrity computation in Rel-17 or not.

Proposal 2: RAN2 to discuss not support UE report UE feared events information to LMF for LMF-based/UE-assisted mode in Rel-17.

Proposal 1-a: Add to GNSS-MeasurementList IE two new fields: multipath value with range from 0 to 50m and the standard deviation of the value.

Discussion:

ESA think supporting LMF-based is not a big problem in spec terms, because there are error sources that need to be known at the LMF. They think there are measurements reported to the LMF that can be exploited for integrity, e.g. signal strength, multipath. Fraunhofer agree.

Qualcomm think it can be best-effort; they see no technical issue but are not sure if there is a market need for UE-assisted GNSS.

OPPO think LMF-based integrity would be beneficial in terms of UE power saving.

Ericsson think integrity is not only about the highest possible accuracy and finest resolution, but also at the level of standard resolution. So we should not be tied to RTK precision and think there are less accurate use cases.

Agreement:

Pursue LMF-based integrity on a best-effort basis in Rel-17.

Proposal 1-b: RAN2 to discuss the integrity information relating to GNSS local environment feared events reported by UE includes at least of:

• Timestamp

• Position estimate

• Specific GNSS local environment feared event information

Way forward on collaborating with RTCM:

Proposal 8: RAN2 to agree to continue working on GNSS integrity during Rel-17 and a new LS to RTCM SC134 including agreements at RAN2#116-e. FFS the plan how to align its specs with RTCM if RTCM integrity standard is not available in Rel-17 time frame.

Alignment with Other WGs:

Proposal 9: Send an LS to SA1 requesting them to study and evaluate any potential LCS Quality of Service aspects for positioning integrity support.

The following documents will not be individually treated

[R2-2109463](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109463%20Discussion%20on%20positioning%20integrity.docx) Discussion on positioning integrity ZTE discussion

[R2-2109920](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109920%20GNSS%20Integrity.docx) On GNSS Integrity Ericsson discussion Rel-17

[R2-2109982](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109982%20Discussion%20on%20open%20issues%20for%20GNSS%20positioning%20integrity.docx) Discussion on open issues for GNSS positioning integrity vivo discussion Rel-17 NR\_pos\_enh-Core

[R2-2110102](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110102%20Discussion%20on%20supporting%20positioning%20integrity%20in%20RAN.doc) Discussion on supporting positioing integrity in RAN OPPO discussion Rel-17 NR\_pos\_enh-Core

[R2-2110141](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110141%20-%20Discussion%20on%20GNSS%20Integrity.docx) Discussion on GNSS Integrity Assistance Data Swift Navigation, Mitsubishi Electric Corporation, Intel Corporation, Ericsson discussion Rel-17

[R2-2110176](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110176%20Remaining%20issues%20on%20positioning%20integrity.docx) Remaining issues on positioning integrity Huawei, HiSilicon discussion NR\_pos\_enh-Core

[R2-2110246](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110246_UE_Integrity_Fraunhofer_Ericsson_ESA.docx) UE-aided detection of threat to GNSS systems and assistance data signaling Fraunhofer IIS; Fraunhofer HHI; Ericsson; ESA discussion R2-2107147

[R2-2110445](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110445%20On%20GNSS%20Positioning%20Integrity.docx) On GNSS Positioning Integrity Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_pos\_enh

[R2-2110933](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110933%20%28R17%20NR%20POS%20WI%20AI8115_GNSS_Integrity%29.doc) Discussion on procedures and signalling for GNSS positioning integrity InterDigital, Inc. discussion NR\_pos\_enh

[R2-2111087](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111087%20%288.11.5%29%20Consideration%20on%20the%20signalling%20design%20for%20Positioning%20Integrity.docx) Consideration on the signalling design for Positioning Integrity Samsung Electronics discussion NR\_pos\_enh-Core

[R2-2111108](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111108%20Discussion%20on%20GNSS%20positioning%20integrity.doc) Discussion on GNSS positioning integrity Xiaomi discussion

### 8.11.6 A-GNSS enhancements

Including support of BDS B2a and B3I signals and support of NavIC.

[R2-2109485](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109485_BDS%2036305%20CR.docx) Introduction of B2a and B3I signal in BDS system in A-GNSS CATT, CAICT draftCR Rel-17 36.305 16.4.0 B NR\_pos\_enh-Core R2-2107138

* Endorsed

[R2-2109486](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109486_BDS%2038305%20CR.docx) Introduction of B2a and B3I signal in BDS system in A-GNSS CATT, CAICT draftCR Rel-17 38.305 16.6.0 B NR\_pos\_enh-Core R2-2107139

* Endorsed

[R2-2109487](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109487_37355%20CR_Introduction%20of%20B2a%20signal%20in%20BDS%20system%20in%20A-GNSS.docx) Introduction of B2a signal in BDS system in A-GNSS CATT, CAICT draftCR Rel-17 37.355 16.6.0 B NR\_pos\_enh-Core R2-2107140

* Revised in R2-2111504

[R2-2111504](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111504_37355%20CR_Introduction%20of%20B2a%20signal%20in%20BDS%20system%20in%20A-GNSS.docx) Introduction of B2a signal in BDS system in A-GNSS CATT, CAICT draftCR Rel-17 37.355 16.6.0 B NR\_pos\_enh-Core R2-2107140

* Endorsed

[R2-2109488](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109488_37355%20CR_Introduction%20of%20B3I%20signal%20in%20BDS%20system%20in%20A-GNSS.docx) Introduction of B3I signal in BDS system in A-GNSS CATT, CAICT draftCR Rel-17 37.355 16.6.0 B NR\_pos\_enh-Core R2-2107141

* Endorsed
* [AT116-e][613][POS] BDS B2a and B3I signals (CATT)

 Scope: Discuss the CRs in R2-2109485, R2-2109486, R2-2109487, and R2-2109488, collect any comments and produce updates if necessary for endorsement.

 Intended outcome: Endorsable CRs

 Deadline: Friday 2021-11-05 1000 UTC (comments), Monday 2021-11-08 1100 UTC (output available)

[R2-2111514](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111514%20Report%20of%20%5BAT116-e%5D%5B613%5D%5BPOS%5D%20BDS%20B2a%20and%20B3I%20signals%28CATT%29.docx) [AT116-e][613][POS] BDS B2a and B3I signals (CATT) CATT discussion Rel-17 NR\_pos\_enh-Core

* Noted

### 8.11.7 Other

Input on other WI objectives.

PRUs

[R2-2109489](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109489%20Discussion%20on%20Positioning%20Reference%20Units%28PRUs%29.docx) Discussion on Positioning Reference Units(PRUs) CATT, ZTE Coroporation, Intel Coroporation discussion Rel-17 NR\_pos\_enh-Core

[R2-2109827](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109827_PRUs_LenMM.docx) Support of Positioning Reference Units Lenovo, Motorola Mobility discussion Rel-17

[R2-2109919](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109919%20PRU.docx) On the Positioning Reference Units aspects Ericsson discussion Rel-17

[R2-2109983](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109983%20Discussion%20on%20support%20for%20positioning%20reference%20unit.docx) Discussion on support for positioning reference unit vivo discussion Rel-17 NR\_pos\_enh-Core

[R2-2110039](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110039%20PRU-v0.docx) Stage-3 impacts of PRU support Apple discussion NR\_pos\_enh-Core

[R2-2110177](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110177%20Discussion%20on%20PRU.docx) Discussion on PRU Huawei, HiSilicon discussion NR\_pos\_enh-Core

[R2-2110826](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110826_%28Positioning%20Reference%20Units%29.docx) Remaining issues for Positioning Reference Units Qualcomm Incorporated discussion

[R2-2110827](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110827_%28LS%20to%20SA2%20on%20PRUs%29.docx) [draft] Response LS on Positioning Reference Units (PRUs) for enhancing positioning performance Qualcomm Incorporated LS out To:SA2, RAN1 Cc:RAN3

[R2-2110934](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2110934%20%28R17%20NR%20POS%20WI%20AI8117_PRU%29.doc) Discussion on supporting Positioning Reference Units InterDigital, Inc. discussion NR\_pos\_enh

[R2-2111109](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111109%20Discussion%20on%20how%20to%20manage%20PRU.doc) Discussion on how to manage PRU Xiaomi discussion

* [AT116-e][615][POS] PRUs (Qualcomm)

 Scope: Discuss the handling of the PRU topic taking the related contributions into account, and determine a way forward.

 Intended outcome: Report to positioning session in R2-2111364, and LS out if necessary

 Deadline: Monday 2021-11-08 1000 UTC (report available) – extended to Friday 2021-11-12 1000 UTC to approve LS by email

[R2-2111364](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111364_%28%5BAT116-e%5D%5B615%5D%5BPOS%5D%20PRUs%29_Summary.doc) Summary of [AT116-e][615][POS] PRUs Qualcomm Incorporated discussion

Proposal 5: Regarding the handling of the PRU topic, agree the following way forward:

(1) Send an LS to SA2 asking SA2 whether the MT-LR or MO-LR location procedures as currently specified in TS 23.273 can be used to enable an LMF obtaining location measurements from PRUs (via LPP) and to trigger SRS transmission of PRUs (via NRPPa), or whether an LMF needs to be enabled to instigate location procedures for a PRU (e.g., LPP, NRPPa procedures) without receiving a location request for the PRU from an AMF (i.e., in the absence of an MT-LR or MO-LR for the PRU), and if so, whether support can be provided as part of Release 17.

(2) Send an LS to RAN1 asking RAN1 whether the LMF determined "correction information" obtained from PRU measurements need to be provided to target UEs for UE-based mode of operation, and if so, ask RAN1 to provide further details on the specific "correction information" which need to be provided to target UEs. In addition, ask RAN1 to provide further details on the "PRU antenna orientation information" which should be provided to an LMF.

(3) RAN2 continues to discuss the general PRU functionality and capabilities.

(4) Revisit the handling of the PRU topic once a response LS from SA2 has been received.

A draft LS to SA2 and RAN1 (cc: RAN3) is proposed in Section 7 below.

Discussion:

Qualcomm understand we need feedback from SA2 about whether there is spec impact on their side, and the LS to RAN1 is for clarification.

Huawei think the current LS to SA2 is OK, and for the LS to RAN1 they think RAN2 may be able to determine this information by itself; they understand that if there is any correction term needed, it can be reflected in the AD and there is no specification impact.

CATT agree with the LS to both groups, but have a concern on the SA2 side because Rel-17 is frozen there and there is no time budget for PRUs.

Intel think the proposal is good, and regarding the LS to SA2, they acknowledge that SA2 have no allocated time but assume this is normal TEI17 handling. For RAN1, they think we need to understand what additional AD is needed for PRUs.

Nokia think we can avoid the SA2 dependencies.

Agreement:

Proposal 5: Regarding the handling of the PRU topic, agree the following way forward:

(1) Send an LS to SA2 asking SA2 whether the MT-LR or MO-LR location procedures as currently specified in TS 23.273 can be used to enable an LMF obtaining location measurements from PRUs (via LPP) and to trigger SRS transmission of PRUs (via NRPPa), or whether an LMF needs to be enabled to instigate location procedures for a PRU (e.g., LPP, NRPPa procedures) without receiving a location request for the PRU from an AMF (i.e., in the absence of an MT-LR or MO-LR for the PRU), and if so, whether support can be provided as part of Release 17.

(2) Send an LS to RAN1 asking RAN1 whether the LMF determined "correction information" obtained from PRU measurements need to be provided to target UEs for UE-based mode of operation, and if so, ask RAN1 to provide further details on the specific "correction information" which need to be provided to target UEs. In addition, ask RAN1 to provide further details on the "PRU antenna orientation information" which should be provided to an LMF.

LS to be progressed by email (extension of [AT116-e][615], to approve by email by EOM).

Proposal 3: RAN2 confirm that the PRU considered as a UE supports the normal LPP procedures for PRU capability transfer.

Proposal 1: RAN2 confirms that a PRU can support at least the following functionality (as described in the RAN1 LS), dependent on PRU capability:

- Provide the positioning measurements (e.g., RSTD, RSRP, Rx-Tx time differences) to an LMF.

- Transmit the UL SRS signals for positioning.

- Provide its own known location coordinate information to an LMF.

- Provide its antenna orientation information to an LMF.

Discussion:

Intel agree with P1 and P3.

Apple think P3 is fine, but have some concern about the known location coordinates in P1; they indicate the question did not include the word “known” and it is a bit unclear what companies support. They acknowledge providing the location to LMF is mentioned in the RAN1 LS, but think this is not in RAN1 scope to decide and should be discussed here. They think OAM is the default approach for providing the location to the LMF.

Lenovo are generally supportive of P1 and P3, and understand that the PRU can provide its location via signalling or it can be provided via OAM. They also understand that the confidence interval of the location is important and wonder if it will be further discussed.

Ericsson think we previously indicated that the “known” location was known to some accuracy, and LPP has the facility for a device to indicate its confidence. They think there is no antenna orientation information in LPP today and the last bullet is a bit more disputed.

Huawei are fine with the current proposals, but would like to clarify if the “known location coordinate information” is the same as “location” or implies a specific format. Qualcomm understand that it is the same as location, and indicate that the bullets were copied from the RAN1 LS. They agree that the antenna orientation information is not in LPP today, but RAN1 asked for it.

Qualcomm have some concern if we would use LPP to provide the PRU’s location to the LMF, because we should not overload LPP with functionality that is not useful to a UE.

Agreements:

Proposal 3: RAN2 confirm that the PRU considered as a UE supports the normal LPP procedures for PRU capability transfer.

Proposal 1 (modified): RAN2 confirms that a PRU can support at least the following functionality (as described in the RAN1 LS), dependent on PRU capability:

- Provide the positioning measurements (e.g., RSTD, RSRP, Rx-Tx time differences) to an LMF.

- Transmit the UL SRS signals for positioning.

- FFS known location information and antenna orientation information

Proposal 2: RAN2 to discuss further whether PRU specific information can be configured in an LMF via proprietary means (e.g., OAM), and if so, which PRU specific information this includes.

[R2-2111488](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111488.doc) Response LS on Positioning Reference Units (PRUs) for enhancing positioning performance Qualcomm Incorporated, CATT LS out To:SA2, RAN1 Cc:RAN3

* Approved (conclusion of email discussion [AT116-e][615])

Other

[R2-2109917](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2109917%20High%20accuracy.docx) On high accuracy aspects Ericsson discussion Rel-17

[R2-2111089](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202111%20-%20RAN2_116-e%2C%20Online%5CExtracts%5CR2-2111089%20Discussion%20on%20incoming%20LSs%20from%20RAN1%20on%20positioning.docx) Discussion on incoming LSs from RAN1 on positioning vivo discussion Rel-17 NR\_pos\_enh-Core

# Post-Meeting Email Discussions

* [Post116-e][601][POS] Network control and UE request for on-demand PRS parameters (Ericsson)

 Scope: Discuss the level of network control of the UE request for on-demand PRS, and the content of the UE request:

* Whether the UE is required to receive on-demand PRS parameters before requesting PRS
* Other network control mechanisms for the UE’s request for on-demand PRS (prohibit timer, reattempt timer, stop message)
* Whether the UE can request preferred PRS configurations that go beyond what the network indicated (if the network indicated anything)
* Whether the UE can request explicit on-demand PRS parameters from the network, and if so, the content of the request
	+ Taking RAN1 conclusions into account
* Whether posSI can be the response to the on-demand PRS request

 Intended outcome: Report to next meeting

 Deadline: Long

* [Post116-e][602][POS] Stage 2 baseline for integrity assistance data (Swift)

 Scope:

* Phase I: Discuss the principles of operation and the needed assistance data for integrity, starting from the text proposals in sections 2.1.2-2.1.4 of R2-2110141.
* Phase II: Develop agreeable TPs to 36.305/38.305 on the information to be transferred.

 Intended outcome: Agreeable draft CRs to next meeting

 Deadline: Long

* [Post116-e][603][Relay] LS to SA2 on discovery (OPPO)

 Scope: Draft an LS to be sent to SA2 to inform them of RAN2 agreements on discovery that may affect them.

 Intended outcome: Approved LS

 Deadline: Short (not for RP)

* [Post116-e][604][Relay] Remaining issues on service continuity (Xiaomi)

 Scope: Discuss the remaining issues on service continuity:

* Measurement configuration and reporting:
	+ Whether to consider S-measure criterion based on RSRP of serving relay and other AS criteria for indirect-to-direct path switch (P8-1/P8-2 of R2-2111276)
	+ Whether to consider AS criteria for measurement when performing SL measurement for path switch (P7-1 of R2-2111276)
	+ Whether to have allow-list and block-list of relay UEs (or serving cells of relay UEs) (P3 of R2-2111276)
	+ Whether to have new events in addition to Event X and Event Y (serving relay/neighbour cell for indirect-to-direct, candidate relay for direct-to-indirect) (P6 or R2-2111276)
	+ Which ID to report for serving cell of relay UE (NCGI/NCI/PCI) (P10 of R2-2111276)
	+ Relay UE ID to include in measurement report and how the network learns the ID (P9-1/P9-2 of R2-2111276)
	+ Conclude on the proposal that relay (re)selection is not performed by an RRC\_CONNECTED L2 remote UE, except for the RLF case (P11 of R2-2111276)
* Determine an option for ensuring UL PDCP lossless behaviour in indirect-to-direct path switch (P26 of R2-2111276):
	+ Option 1: No spec impact, i.e., assume loss of UL PDCP PDUs is a corner case or can be addressed by network implementation
	+ Option 2: Remote UE retransmits PDCP SDUs for which the successful delivery of the corresponding PDCP PDU has not been confirmed by PDCP status report after path switch

 Intended outcome: Report to next meeting

 Deadline: Long

* [Post116-e][605][Relay] Relay running CR to 38.351 (OPPO)

 Scope: Endorse an update of R2-2111485 with decisions of this meeting.

 Intended outcome: Endorsed CR

 Deadline: Short (not for RP)

* [Post116-e][606][Relay] Relay running CR to 38.300 (MediaTek)

 Scope: Endorse an update of R2-2109543 with decisions of this meeting.

 Intended outcome: Endorsed CR

 Deadline: Short (not for RP)

* [Post116-e][607][Relay] Relay running CR to 38.321 (Apple)

 Scope: Endorse an update of R2-2110054 with decisions of this meeting.

 Intended outcome: Endorsed CR

 Deadline: Short (not for RP)

* [Post116-e][608][Relay] Relay running CR to 38.323 (Samsung)

 Scope: Endorse an update of R2-2110447 with decisions of this meeting.

 Intended outcome: Endorsed CR

 Deadline: Short (not for RP)

* [Post116-e][609][Relay] Relay running CR to 38.331 (Huawei)

 Scope: Endorse an update of R2-2110490 with decisions of this meeting.

 Intended outcome: Endorsed CR

 Deadline: Short (not for RP)

* [Post116-e][610][Relay] Relay running CR to 38.304 (Ericsson)

 Scope: Endorse an update of R2-2110687 with decisions of this meeting.

 Intended outcome: Endorsed CR

 Deadline: Short (not for RP)

* [Post116-e][611][POS] RAT-dependent positioning running CR to 38.305 (Intel)

 Scope: Endorse an update of R2-2111374 with decisions of this meeting.

 Intended outcome: Endorsed CR

 Deadline: Short (not for RP)

* [Post116-e][612][POS] GNSS integrity CRs to 36.305 and 38.305 (InterDigital)

 Scope: Endorse updates of R2-2111376 and R2-2111377 with decisions of this meeting.

 Intended outcome: Endorsed CRs

 Deadline: Short (not for RP)

# Annex: List of At-Meeting Email Discussions

* [AT116-e][600][POS][Relay] Organisational Nathan – Positioning/Relay (MediaTek)

 Scope: Organisational discussions and announcements, as needed throughout the meeting weeks

 Intended outcome: Well-informed participants

 Deadline: Friday 2021-11-12 1000 UTC

* [AT116-e][611][POS] LS to RTCM (ESA)

 Scope: Discuss coordination with RTCM, taking into account the way-forward proposals in R2-2109807 and related parts of R2-2110181:

* Conclude on the intention to specify GNSS integrity signalling in Rel-17
* Determine what information we intend to share with RTCM
* Draft an LS reply (TP to be endorsed later)

 Intended outcome: Report in R2-2111361 and approvable LS in R2-2111362

 Deadline: Friday 2021-11-05 1000 UTC (comments), Monday 2021-11-08 1100 UTC (output available) – extended to Thursday 2021-11-11 0100 UTC to finalise text of LS

* [AT116-e][612][Relay] Non-relay discovery (OPPO)

 Scope: Evaluate the spec impact of non-relay discovery specific aspects and determine a way forward for handling this objective.

 Intended outcome: Report to CB session, in R2-2111363

 Deadline: Tuesday 2021-11-09 0800 UTC (report available)

* [AT116-e][613][POS] BDS B2a and B3I signals (CATT)

 Scope: Discuss the CRs in R2-2109485, R2-2109486, R2-2109487, and R2-2109488, collect any comments and produce updates if necessary for endorsement.

 Intended outcome: Endorsable CRs

 Deadline: Friday 2021-11-05 1000 UTC (comments), Monday 2021-11-08 1100 UTC (output available)

* [AT116-e][614][POS] AI 5.5 CRs (vivo)

 Scope: Evaluate and conclude on the CRs in R2-2111126 and R2-2111127.

 Intended outcome: Agreed CRs and report in R2-2111548

 Deadline: Thursday 2021-11-11 0200 UTC

* [AT116-e][615][POS] PRUs (Qualcomm)

 Scope: Discuss the handling of the PRU topic taking the related contributions into account, and determine a way forward.

 Intended outcome: Report to positioning session in R2-2111364, and LS out if necessary

 Deadline: Monday 2021-11-08 1000 UTC (report available) – extended to Friday 2021-11-12 1000 UTC to approve LS by email

* [AT116-e][616][POS] Updates for RAN1 positioning feature list (Intel)

 Scope: Review the CRs in R2-2109679, R2-2109680, R2-2109681, R2-2110172, and R2-2110173, and draft a response to RAN1 indicating where we have corrected the implementation of the changes.

 Intended outcome: Agreed CRs and approved LS

 Deadline: Tuesday 2021-11-09 0900 UTCs

* [AT116-e][617][POS] Correction on BDS B2I clock model (Swift)

 Scope: Check and update the CR in R2-2111072.

 Intended outcome: Agreeable CR

 Deadline: Tuesday 2021-11-09 0800 UTC

* [AT116-e][618][POS] CR to 38.321 on posSRS handling (Huawei)

 Scope: Draft a CR to 38.321 capturing the NOTE agreed under agenda item 6.3.4.

 Intended outcome: Agreeable CR in R2-2111369

 Deadline: Tuesday 2021-11-09 0800 UTC

* [AT116-e][619][POS] Stage 2 Rel-16 positioning CRs (Huawei)

 Scope: Check the CRs in R2-2110169 and R2-2110170.

 Intended outcome: Agreed CRs

 Deadline: Tuesday 2021-11-09 0800 UTC – extended to Friday 2021-11-12 1000 UTC for checking of R2-2111388

* [AT116-e][620][Relay] Reply LS to SA2 on discovery and relay (re)selection (CATT)

 Scope: Discuss the questions in R2-2111236 and draft a reply, taking into account decisions of this meeting.

 Intended outcome: Approvable LS in R2-2111370 and report in R2-2111371

 Deadline: Thursday 2021-11-11 0100 UTC

* [AT116-e][621][Relay] 38.351 skeleton (OPPO)

 Scope: Collect comments on the skeleton of 38.351.

 Intended outcome: Report to CB session in R2-2111372, and revised skeleton in R2-2111485

 Deadline: Thursday 2021-11-11 0100 UTC

* [AT116-e][622][Relay] Remaining proposals from relay control plane (InterDigital)

 Scope: Attempt to converge the proposals for discussion from R2-2109928 and the proposals from R2-2111368.

 Intended outcome: Report to CB session in R2-2111373

 Deadline: Tuesday 2021-11-09 0800 UTC (can be extended to Thursday if needed)

* [AT116-e][623][POS] 38.305 CR for RAT-dependent positioning (Intel)

 Scope: Collect comments on the running CR preparatory to endorsement.

 Intended outcome: Updated CR in R2-2111374 and report in R2-2111375

 Deadline: Tuesday 2021-11-09 0800 UTC

* [AT116-e][624][POS] 36.305 and 38.305 CRs for GNSS positioning integrity (InterDigital)

 Scope: Collect comments on the running CRs preparatory to endorsement.

 Intended outcome: Updated CRs in R2-2111376 (36.305) and R2-2111377 (38.305) and report in R2-2111378

 Deadline: Tuesday 2021-11-09 0800 UTC

* [AT116-e][625][POS] Proposals from RRC\_INACTIVE positioning summary (OPPO)

 Scope: Discuss the proposals from the agenda item summary and identify agreeable aspects.

 Intended outcome: Report to CB session in R2-2111379

 Deadline: Thursday 2021-11-11 0100 UTC

* [AT116-e][626][Relay] Direct-to-indirect path switch (Huawei)

 Scope: Discuss P14-1/P15/P16/P14-2/P17/P23 of R2-2111276, and attempt to converge the options.

 Intended outcome: Report to CB session in R2-2111380

 Deadline: Thursday 2021-11-11 0100 UTC

* [AT116-e][627][Relay] Bearer mapping and PC5 PDU format in adaptation layer (MediaTek)

 Scope: Discuss P12/P13/P14 of R2-2111274, and the first two bullets of P11.

 Intended outcome: Report to CB session in R2-2111381

 Deadline: Wednesday 2021-11-10 1600 UTC

* [AT116-e][628][Relay] Signalling from relay UE for cell (re)selection and failure cases (vivo)

 Scope: Discuss P1 ~~and P3~~-P6 of R2-2111223 and attempt to converge. Discussion of P5 excludes the RLF case which is discussed in [AT116-e][622].

 Intended outcome: Report to CB session in R2-2111382

 Deadline: Wednesday 2021-11-10 1600 UTC