3GPP TSG-RAN WG2 Meeting #111-e R2-20xxxxx

Online, August 17th - 28th, 2020

Source: Session Chair (MediaTek)

Title: Report of session on positioning and sidelink relay

# Status of At-Meeting Email Discussions

This subclause is not an Agenda Item. It contains a running summary of the email discussions assigned to take place during the meeting weeks. This section will be moved to an appendix in the final version of the report.

* [AT111-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 2020-08-28 1000 UTC

* [AT111-e][601][POS] UE E-CID measurement reporting in LTE Rel-15 (Nokia)

Scope: Discuss the CR in R2-2008051 and determine if it is agreeable.

Intended outcome: Agreed CR (revised in R2-2008257 if necessary)

Deadline: Wednesday 2020-08-19 1000 UTC

* [AT111-e][602][Relay] TR skeleton approval (OPPO)

Scope: Discuss and approve the TR skeleton from R2-2006602 updated as necessary.

Intended outcome: Agreeable TR skeleton, in R2-2008251

Deadline: Monday 2020-08-24 1200 UTC

* [AT111-e][603][Relay] Scope, requirements, and scenarios (InterDigital)

Scope: Discuss proposals on the scope, requirements, and scenarios for UE-to-network and UE-to-UE relaying, including:

* Coverage scenarios
* Connectivity scenarios
* Uu and PC5 RATs
* RRC states for relaying
* Cast types for the PC5 link
* Potential reuse of requirements from earlier releases (e.g. FeD2D, LTE ProSe relaying)

Extension to conclude on P5, P7, and remaining open issues on P9-P24, and conclude on the agreeable parts.

Intended outcome: Summary with potential agreeable TP, in R2-2008252; summary of extended discussion in R2-2008264

Deadline: Monday 2020-08-24 1200 UTC; extended to Thursday 2020-08-27 1200 UTC

* [AT111-e][604][Relay] L3 relay protocol stacks (Qualcomm)

Scope: Discuss and document the proposed L3 relay design(s), focussing on general mechanisms of L3 architecture based sidelink relaying including protocol stacks and high level description of required UP/CP functionalities..

Intended outcome: Summary with potential agreeable TP, in R2-2008253; summary of extended discussion in R2-2008265; final summary in R2-2008267

Deadline: Monday 2020-08-24 1200 UTC; extended to Wednesday 2020-08-26 1000 UTC

* [AT111-e][605][Relay] L2 relay mechanism (MediaTek)

Scope: Discuss and document the proposed L2 relay design(s), focussing on general mechanisms of L2 architecture based sidelink relaying including protocol stacks and high level description of required UP/CP functionalities.

Intended outcome: Summary with potential agreeable TP, in R2-2008254; summary of extended discussion in R2-2008266; final summary in R2-2008269

Deadline: Monday 2020-08-24 1200 UTC; extended to Wednesday 2020-08-26 1000 UTC; further extended to Thursday 2020-08-27 1200 UTC

* [AT111-e][606][Relay] Discovery model and procedure (OPPO)

Scope: Discuss proposals on the discovery model and procedures, including:

* Protocol stacks for discovery
* Potential reuse of discovery models from LTE
* Resource pool for discovery
* Visibility of discovery signalling in AS layers
* Conditions for discovery
* Authorisation related aspects

Intended outcome: Summary with potential agreeable TP, in R2-2008255

Deadline: Wednesday 2020-08-26 1200 UTC

* [AT111-e][607][POS] Integrity definitions, KPIs, and use cases (Swift)

Scope: Discuss proposals and attempt to reach consensus on definitions, KPIs, and use cases for positioning integrity.

Intended outcome: Summary with potential agreeable TP, in R2-2008256. Extension to further converge and produce a text proposal in R2-2008262, with attention to anticipated specification impact.

Deadline: Thursday 2020-08-20 1100 UTC – extended to Thursday 2020-08-27 1200 UTC

* [AT111-e][608][POS] SUPL update to methods table in 38.305 (Qualcomm)

Scope: Checking of the CR in R2-2007630.

Intended outcome: Agreed CR

Deadline: Thursday 2020-08-27 1200 UTC

* [AT111-e][609][POS] Checking of R2-2007831, R2-2007828, and R2-2006841 (Huawei)

Scope: Confirm the changes in R2-2007831, R2-2007828, and R2-2006841 taking into account RAN3 progress where relevant. For R2-2006841, step 5 of the flow should be updated but no new procedure is introduced.

Intended outcome: Agreed CRs

Deadline: Thursday 2020-08-27 1200 UTC

* [AT111-e][610][POS] RRC miscellaneous CR (Ericsson)

Scope: Generate a positioning update RRC CR:

* Review R2-2006942 and capture RAN2 agreements from P1 and P2 of R2-2007581
* Discuss P8, P10, P11 of R2-2007581 and capture agreeable aspects

Intended outcome: Agreeable CR in R2-2008258

Deadline: Thursday 2020-08-27 1200 UTC

* [AT111-e][611][POS] LPP miscellaneous CR (Qualcomm)

Scope: Capture RAN2 decisions on P3-P6 of R2-2008120; discuss P7-P16 of R2-2008120 and merge the results into a rapporteur CR.

Intended outcome: Agreeable CR, in R2-2008260; summary in R2-2008268

Deadline: Thursday 2020-08-27 1200 UTC

* [AT111-e][612][POS] Assumptions for analysis of commercial use cases (Ericsson)

Scope: Align understanding of the RAN2 scope and assumptions for accuracy, latency, and efficiency objectives for commercial use cases. Attempt to capture a summary of proposals to this meeting that can be discussed in RAN2 directly.

Intended outcome: Summary in R2-2008261

Deadline: Wednesday 2020-08-26 1200 UTC

* [AT111-e][613][POS] Integrity error sources (Huawei)

Scope: Categorise the identified error sources and develop a way forward, considering RAT-dependent and RAT-independent methods, with the understanding that the use of specific positioning methods may be use-case-dependent.

Intended outcome: Summary in R2-2008263

Deadline: Thursday 2020-08-27 1200 UTC

# 4 EUTRA corrections Rel-15 and earlier

See Appendix A for reference to Work items, work item codes and WIDs.

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.

[R2-2008051](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008051.docx) UE E-CID measurement reporting Nokia, Nokia Shanghai Bell CR Rel-15 36.305 15.5.0 0091 - F LCS\_LTE

* [AT111-e][601][POS] UE E-CID measurement reporting in LTE Rel-15 (Nokia)

Scope: Discuss the CR in R2-2008051 and determine if it is agreeable.

Intended outcome: Agreed CR (revised in R2-2008257 if necessary)

Deadline: Wednesday 2020-08-19 1000 UTC

[R2-2008257](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008257.docx) UE E-CID measurement reporting Nokia, Nokia Shanghai Bell CR Rel-15 36.305 15.5.0 0091 1 F LCS\_LTE

* Nokia think a similar change could be introduced in 38.305, and wonder if we should fix earlier releases. Intel think for stage 2 it is not critical to change the earlier releases. Qualcomm think even Rel-15 may not be necessary and we could fix it from Rel-16 only. Huawei think we could rely on the magic sentence. Intel think the text is from Rel-9 and has not produced problems, and the magic sentence suggests that earlier UEs may have problems that need to be fixed. Huawei disagree with this implication and understand that it means the change can be adopted in any release; they think the magic sentence was introduced exactly to avoid large numbers of duplicate CRs for past releases. Qualcomm point out the revision number is wrong.
* Add the magic sentence and convert to Rel-16.
* Agreed with these changes as R2-2008259 (Rel-16). A new CR number is needed; proponent to contact the secretary.

# 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

## 5.5 Positioning corrections

Corrections to both the stage 2 and stage 3 aspects related to positioning. Stage 2 CRs should be discussed with the specification rapporteur before submission.

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

[R2-2006665](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\38305_CR0026_(Rel-15)_R2-2006665.docx) Correction on 38.305 in Table 4.3-1Supported versions of UE positioning methods CATT CR Rel-15 38.305 15.6.0 0026 - F NR\_newRAT-Core

* vivo agree with the change but wonder if the UE provision of measurements to the gNB should be mentioned for the RAN-assisted case. CATT think the terminology could be updated to clarify which node “performs” rather than “provides” measurements.
* Intel think we should only clarify statements like this if there is a real problem such as IOT.
* Qualcomm think 23.273 says the UE “obtains” measurements for UE-based, and they understand that the terms “LMF-based” and “LMF-assisted” only exist in RAN2 specifications. They think it would be beneficial to have the definitions but we could change only for Rel-16.
* Ericsson think the proposal is common understanding, and it could have some clarification benefit for a new reader but would be OK to leave as it is. Think the word “provide” is appropriate and we should not change to indicate who “performs” measurements.
* CATT think the clarification of the meaning of “LMF-based” is necessary and will relate to the integrity enhancements in Rel-17.
* ZTE support the CR.
* Nokia think these definitions are already made clear in section 3.1 and nothing new is needed.
* Qualcomm think for UE-based it is wrong to say the UE “provides” measurements; it “performs” or “obtains” them.
* Intel think if there is a Rel-17 concern we can discuss in Rel-17. CATT think the clarification is valid also in the earlier releases. Intel think if we agree the CR, the consequences if not approved should justify it, and clarification is not a good motivation for a CR to an earlier release.
* Nokia also have a concern and think section 3.1 covers it.
* Not pursued

[R2-2006666](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\38305_CR0027_(Rel-16)_R2-2006666.docx) Correction on 38.305 in Table 4.3-1Supported versions of UE positioning methods CATT CR Rel-16 38.305 16.1.0 0027 - A NR\_newRAT-Core

[R2-2006667](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\36305_CR0089_(Rel-15)_R2-2006667.docx) Correction on 36.305 in Table 4.3-1Supported versions of UE positioning methods CATT CR Rel-15 36.305 15.5.0 0089 - F NR\_newRAT-Core

* Not pursued

[R2-2006668](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\36305_CR0090_(Rel-16)_R2-2006668.docx) Correction on 36.305 in Table 4.3-1Supported versions of UE positioning methods CATT CR Rel-16 36.305 16.1.0 0090 - A NR\_newRAT-Core

# 6 Rel-16 NR Work Items

Essential corrections. While high maintenance intensity is expected, Rel-16 corrections are treated separately per WI.

## 6.6 NR Positioning Support

(NR\_pos-Core; leading WG: RAN1; REL-16; started: Mar 19; target; Jun 20; WID: RP-200218, SR: RP-201342). R2 and R1 parts are 100% complete.

(NR TEI16 Positioning)

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

Email max expectation: 5 email threads

### 6.6.1 General and Stage 2 corrections

Including incoming LSs, Including impact to 36.305 and 38.305. Stage 2 corrections should be discussed with the specification rapporteur before submission.

Incoming LSs

[R2-2006522](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006522_R3-204379.docx) Reply LS on Aperiodic SRS (R3-204379; contact: Intel) RAN3 LS in Rel-16 NR\_pos-Core To:RAN2 Cc:RAN1

* Noted

[R2-2006523](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006523_R3-204380.docx) LS on mapping of PosSIB(s) to Area(s) (R3-204380; contact: Huawei) RAN3 LS in Rel-16 NR\_pos-Core To:RAN2

* Noted

[R2-2008514](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008514_R3-205719.docx)         LS on the NOTE in architecture figure in TS 38.305 (R3-205719; contact: Intel) RAN3 LS in Rel-16 NR\_pos-Core To:RAN2

* Noted (contributions can be seen next meeting)

Discussion related to R2-2008441 on UE capabilities from RAN1 (document not treated in this session)

* Intel clarify that the RRC and 38.306 impacts have been handled in the RRC capability discussion.
* Huawei wonder if the positioning capabilities were captured, since the main session indicated that it would be treated separately. Intel indicate that the intention was to handle any capabilities related to LPP separately, but for RRC and 38.306 they understand that they are OK to treat in the main RRC discussion.

Summary document

[R2-2008098](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008098%20Summary%20of%206.6.1.docx) Summary of 6.6.1 CATT discussion Rel-16 NR\_pos-Core Late

P1:

* Nokia wonder why the UE-based/UE-assisted entries were deleted. Qualcomm clarify this was for consistency with the new text. Ericsson ask for confirmation that this is in the most recent SUPL release and the reference is up to date. Qualcomm indicate this was handled as a bugfix in SUPL 2.0. CATT ask if the reference in 38.305 needs updating. Qualcomm understand that SUPL 2.0 remains as the same release. Polaris confirm this understanding. NextNav clarify it is handled as a maintenance release, and wonder if we should update the “NG-RAN node assisted” column and the E-CID description as “for E-UTRA”. Qualcomm point out we have separate E-CID methods for E-UTRA and NR, so they think the table is correct in that respect; and there is a separate Rel-15 CR addressing the NG-RAN node assisted aspect.
* NextNav think the table would be clearer for E-CID if we changed the method names.
* Nokia think Note 4 may need to be removed for clarity, and rely on stage 3 to clarify the relationship of NR CID and E-UTRA E-CID. Qualcomm think the table and note are correct because NR CID really was introduced as part of E-UTRA E-CID in Rel-15. Also point out this is somewhat out of scope for the CR. Intel tend to agree with Qualcomm and think we should focus on the proposed changes; confusion between the E-CID methods should not happen with the current table and section 8. Ericsson think we should not delete the UE-assisted and UE-based differentiation in the legacy text. Qualcomm point out we have no UE-based OTDOA in LPP so only UE-assisted is valid. Ericsson think a parallel change could be needed to 36.305.
* Ericsson would like some more time. Can discuss by email.
* Intel wonder why for NR we need to distinguish DL E-CID. Qualcomm think the SUPL CR is explicit about DL only, because the SLP cannot get the UL measurements from the gNB.
* [AT111-e][608][POS] SUPL update to methods table in 38.305 (Qualcomm)

Scope: Checking of the CR in R2-2007630.

Intended outcome: Agreed CR

Deadline: Thursday 2020-08-27 1200 UTC

P2:

* On SRS-only RP, CATT think we can also discuss if the definition of PRS-only TP should be updated accordingly for DL-only positioning. Ericsson think we may not need this definition and it should have been also discussed in RAN3; they are not sure of the motivation for the new definition. Intel tend to agree with Ericsson that this should be discussed in RAN3 and they can generate a stage 2 CR. Qualcomm think this is not purely a RAN3 issue since we already use the term “SRS-only RP” in 38.305. On the PRS-only TP, we need to maintain backward compatibility with LTE. Huawei agree that the term is already used and we should define it. Intel agree that if we use the term it makes sense to define it. Ericsson wonder if we could use the existing term RP without specifying SRS-only. Ericsson would like more time for a comeback on this proposal.
* On A-AoA definition and abbreviations for A-AoA and Z-AoA, Nokia wonder if in section 3.2 it should say “angle” or “angles”.
* OK to have this change with the correction to “angle”.
* On section 8.9.1 where “UL AoA” is added, Intel point out the dash is missing.
* Qualcomm think there are additional editorial points, and this CR is not based on the latest version of the spec.
* Nokia think there is some misuse of measurement terminology.
* [AT111-e][609][POS] Checking of R2-2007831, R2-2007828, and R2-2006841 (Huawei)

Scope: Confirm the changes in R2-2007831, R2-2007828, and R2-2006841 taking into account RAN3 progress where relevant. For R2-2006841, step 5 of the flow should be updated but no new procedure is introduced.

Intended outcome: Agreed CRs

Deadline: Thursday 2020-08-27 1200 UTC

P3:

* Nokia think there is related discussion in RAN3 on the geographic coordinates, and it should be discussed in one place. So we should wait for RAN3 decision. Intel agree, and in general think this proposal is to capture RAN3 agreement and RAN3 can do it directly. Huawei also agree. Qualcomm understand that RAN3 have decided RAN2 should take care of it. Huawei report that there is ongoing email discussion in RAN3 and understand that RAN3 will produce the details with no LS exchange needed. Qualcomm believe this discussion is on stage 3 and the chair notes indicate RAN2 should handle it; they note RAN2 introduced this table.
* Handle by email [609]

P4/P5:

* Intel wonder why RAN2 should confirm the meaning of an NRPPa message. CATT understand that P4 just confirms the function of the message, but they think P5 is more in RAN3 scope. vivo have the same understanding as CATT on P4 and P5. Qualcomm think generally RAN2 is responsible for 38.305 and they agree this can be decided in RAN2.
* Intel wonder if we agree this, will we still need to wait for RAN3 on the details and capture more next time? Qualcomm agree it would make sense to align stage 2 to NRPPa once stage 3 is complete. Huawei think P4 is stable already and we could capture it; they understand that RAN3 have a lot of work and there is no harm in discussing it here.
* CATT wonder if we should clarify the working scope for stage 2 between RAN2 and RAN3. Nokia think this has become a bit of a grey area; in 38.300 we allow RAN3 to send agreed CRs to RAN2 for final review and application to the spec, and it would be good to have something like this for 38.305. Qualcomm think this is under normal working procedures and any group can provide input, with the final check and approval in RAN2 responsibility. CATT agree RAN2 can check CRs from RAN3, but think RAN2 cannot originate CRs on NRPPa; they agree with Nokia’s suggestion to have RAN3 provide stage 2 CRs to RAN2 for final check. Chair thinks this could be driven by companies in RAN3. Intel agree with Qualcomm about the procedure; RAN3 can only endorse a CR to a RAN2 spec and send it to us for final agreement. Intel also agree that of course RAN2 cannot change NRPPa, but we can capture RAN3 stage 3 details into stage 2 if RAN3 have not done it.
* Ericsson think RAN3 are heavily loaded; they think we could try to agree the principle of P4.
* Nokia agree RAN3 can endorse CRs for RAN2 agreement, but think there is some extra effort to make sure stage 2/stage 3 are aligned with the current way of working; they would like RAN3 to confirm the contents of the NRPPa message officially. Intel think load is a concern in RAN2 as well and we should not spend a lot of time on this issue; instead we can capture P4/P5 next meeting.
* Noted

P6:

* Huawei think the consequence of not agreeing this proposal is just some wasted SRS transmissions; they do not see it as critical.
* CATT think the existing procedure works; the UE can send the periodic SRS first and the gNB receives it when configured to. So they also see this as an enhancement that could be discussed in Rel-17.
* Qualcomm think step 5 in the existing sequence is not correct because there is no activation for the periodic case, and this could be clarified in the wording. CATT agree with Qualcomm. Intel also agree and think we do not need to introduce a new procedure. Ericsson think this is acceptable as long as we clarify the applicability of step 5.
* Step 5 can be updated; CR to be revised offline.

P7:

* Intel think this can be discussed in RAN3 directly as it is related to an NRPPa message. Ericsson agree. CATT think this should not be an issue since it is clear that for multi-RTT the signal should be Rel-16 SRS, and agree it can be discussed in RAN3. Huawei understand that this is exactly the issue since the gNB does not know that Rel-16 SRS is needed.
* Noted (RAN3 can discuss)

P8:

* Huawei think this is also an NRPPa proposal that can be discussed in RAN3. CATT agree.
* Noted (RAN3 can discuss)

[R2-2008614](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008614%20%5bAT111-e%5d%5b609%5d%5bPOS%5d%20Checking%20of%207831,%207828,%20and%206841%20(Huawei).docx) [AT111-e][609][POS] Checking of R2-2007831, R2-2007828, and R2-2006841 (Huawei) Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

* No comments, documents are agreeable

Proposal 1: R2-2008494 can be agreed with the following changes

 Addition of definition for “SRS-only RP” and revised the definition of PRS-only TP

 Change of the definition for A-AoA and citing the abbreviation in the main text for A-AoA and Z-AoA accordingly

 Addition of explanation for abbreviations posSI and RSRQ

 Correction of the typos and action sequence of the role of gNB

 Addition of location measurement indication for NR DL-PRS measurements

 For the NL1 interface, Change the figure 5.1-1; Change the interface name from NLs to NL1 in 6.1.5; Update the text in 6.1.5

Proposal 2: R2-2008493 can be agreed with the following changes:

 Assistance data that may be transferred from gNB to the LMF:

 Change description of Geographical coordinates of TRP

 Requested UL-SRS transmission characteristics

 Add the number of requested SRS resources and SRS resource sets in the message from LMF to gNB.

 TRP Measurement request information

 Delete the PCI, CGI of the TRP;

 Update the description of UL timing information of reference TRP

 Delete the start time, and duration of the measurements.

 Add the Measurement quantities.

Proposal 3: R2-2008495 can be agreed with the following changes:

 Clarification is added that step 5 is only applicable for semi-persistent and aperiodic UL SRS configuration

CRs

[R2-2006841](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006841%20UL%20SRS%20Configurations.docx) Signalling sequence for UL SRS Configuration Ericsson discussion Rel-16 38.305

[R2-2008495](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008495%20UL%20SRS.docx) Signalling sequence for UL SRS Configuration Ericsson CR Rel-16 38.305 16.1.0 0033 - F NR\_pos-Core

* Agreed

[R2-2007630](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007630_(CR%2038305-g10%20SUPL%20support).docx) Correction to SUPL support for NR positioning methods Qualcomm Incorporated CR Rel-16 38.305 16.1.0 0028 - F NR\_pos-Core

* Agreed in email discussion [AT111-e][608]

[R2-2007828](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007828%20Correction%20to%20Stage-2%20for%20gNB%20and%20LMF%20information%20transfer.docx) DraftCR to Stage-2 for gNB and LMF information transfer Huawei, HiSilicon CR Rel-16 38.305 16.1.0 0029 - F NR\_pos-Core

* Revised in R2-2008493

[R2-2008493](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008493%20Correction%20to%20Stage-2.docx) DraftCR to Stage-2 for gNB and LMF information transfer Huawei, HiSilicon CR Rel-16 38.305 16.1.0 0029 1 F NR\_pos-Core

* Agreed

[R2-2007829](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007829%20Text%20proposal%20on%20stage2%20spec%20for%20aperiodic%20SRS.docx) Text proposal on stage2 spec for aperiodic SRS Huawei, HiSilicon CR Rel-16 38.305 16.1.0 0030 - F NR\_pos-Core

[R2-2007830](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007830%20TP%20for%20POSITIONING%20INFORMATION%20REQUEST.docx) TP for POSITIONING INFORMATION REQUEST Huawei, HiSilicon CR Rel-16 38.305 16.1.0 0031 - F NR\_pos-Core

[R2-2007831](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007831%20Miscellaneous%20correction%20to%20stage2%20specification.doc) Miscellaneous correction to stage2 specification Huawei, HiSilicon CR Rel-16 38.305 16.1.0 0032 - F NR\_pos-Core

* Revised in R2-2008494

[R2-2008494](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008494%20Miscellaneous%20correction%20to%20stage2.doc) Miscellaneous correction to stage2 specification Huawei, HiSilicon CR Rel-16 38.305 16.1.0 0032 1 F NR\_pos-Core

* Agreed

### 6.6.2 RRC corrections

Including impact to 36.306, 36.331 and 38.331.

Summary document

[R2-2007581](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007581%20Summary%20of%20the%20AI%206.6.2%20for%20RRC%20in%20Pos.docx) Summary of the AI 6.6.2 for positioning RRC correction Huawei, HiSilicon discussion Late

P1:

* Huawei understand that this is basically editorial. Intel agree this is a correct change.
* Huawei think this can be merged to the miscellaneous corrections CR.
* Field description will be removed; to be merged into R2-2006942.

P2:

* Huawei understand that this is also editorial but may not be strongly motivated. Qualcomm do not see a strong need to change the ASN.1 even though BC. Nokia think we could go with the rapporteur’s preference. Intel understand there is no backward compatibility issue with changing a field name, but do not have a strong view. Ericsson think it would be OK to align.
* Align the field names; to be merged into R2-2006942.

P3:

* Qualcomm think this change is not needed.
* Noted

P4/P5/P6:

* Huawei clarify this issue is still under RAN4 discussion, but RAN4 have agreed a UE capability is needed; they prefer to add a new field description rather than add to an existing one, because the new field is no longer conditionally optional.
* Chair wonders if there is value in endorsing a baseline CR without agreeing to it. Ericsson think we can capture the ASN.1 impact.
* Intel understand that we need to wait for RAN4 no matter whether we agree to a baseline or not. They think the change is simple once RAN4 have concluded, so we don’t need to endorse a baseline CR, and think we cannot capture capability now and the function in the next version. Huawei clarify they do not intend to endorse the existing CR formally but just to wait for RAN4 and capture their agreements as soon as possible. They can also accept just waiting for RAN4.
* Ericsson think we can start discussion before hearing from RAN4. Intel think we should only trigger RAN2 discussion if we receive an agreement from RAN4.
* Noted (wait for RAN4)

P7:

* Intel think there are also LPP changes proposed related to this change, and we need to discuss whether to capture them.
* Qualcomm think the system information area ID is described in RRC and any related procedure should remain in RRC. For both P7 and P8, they think we do not need descriptions of the handling in LPP.
* CATT think P7 is not related to LPP but a general clarification of the interface between layers. However, their motivation is the assumption that LPP needs this information.
* Intel agree with Qualcomm that the validity is handled in RRC.
* Ericsson think this is more UE implementation and may not need to be specified. Nokia agree that there is no requirement to handle this in LPP.
* CATT think LPP needs this information to judge whether the system information is valid.
* Intel agree with Ericsson that this is UE implementation.
* Noted

P9:

* Apple understand that this is covered in email discussion [014].
* [AT111-e][610][POS] RRC miscellaneous CR (Ericsson)

Scope: Generate a positioning update RRC CR:

* Review R2-2006942 and capture RAN2 agreements from P1 and P2 of R2-2007581
* Discuss P8, P10, P11 of R2-2007581 and capture agreeable aspects

Intended outcome: Agreeable CR in R2-2008258

Deadline: Thursday 2020-08-27 1200 UTC

[R2-2008271](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008271%20Dis%20for%20RRC.docx) [AT111-e][610][POS] RRC miscellaneous CR (Ericsson) Ericsson discussion Rel-16 NR\_pos-Core

Agreements:

No extension marker is introduced for field posSI-BroadcastStatus.

[R2-2008258](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008258%20CR%20RRC%20Corrections.docx) Minor corrections and update for RRC Positioning Ericsson CR Rel-16 38.331 16.1.0 1757 1 F NR\_pos-Core

* Agreed

Measurement gap patterns

[R2-2006544](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006544%20Remaining%20issues%20on%20measurement%20gap%20for%20NR%20positioning.docx) Remaining issues on measurement gap for NR positioning vivo discussion NR\_pos-Core

[R2-2006926](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006926%20RRCMeasurement%20gaps.docx) Measurement gaps for PRS-based measurements Ericsson CR Rel-16 38.331 16.1.0 1754 - B NR\_pos-Core

[R2-2007559](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007559%20capability%20.docx) Introuduction of UE Capabilitues for support of measurement gaps for PRS-based measurements Ericsson CR Rel-16 38.306 16.1.0 0384 - B NR\_pos-Core

[R2-2007832](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007832%20Introduction%20of%20PRS%20mesurement%20gap.doc) Introduction of PRS mesurement gap Huawei, HiSilicon CR Rel-16 38.331 16.1.0 1925 - F NR\_pos-Core

[R2-2007837](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007837%20Correction%20on%20PRS%20mesurement%20gap%20capability.doc) Correction on PRS mesurement gap capability Huawei, HiSilicon CR Rel-16 38.306 16.1.0 0393 - F NR\_pos-Core

System information

[R2-2006664](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\38331_CR1726_(Rel-16)_R2-2006664.docx) Correction on 38.331 to capture agreements of area scope for posSIB validity CATT CR Rel-16 38.331 16.1.0 1726 - F NR\_pos-Core

[R2-2006755](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\38331_CR1736_(Rel-16)_R2-2006755.docx) Correction on on-demand SI in RRC\_CONNECTED CATT CR Rel-16 38.331 16.1.0 1736 - F NR\_pos-Core

[R2-2006844](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006844%20Extention%20.docx) Addition of extension marker for positioning SI broadcast status Ericsson CR Rel-16 38.331 16.1.0 1741 - F NR\_pos-Core

[R2-2007076](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007076_CR1779_38331_Rel16_Corrections%20to%20acquisition%20of%20posSIB(s)%20in%20RRC_CONNECTED.docx) Corrections to acquisition of posSIB(s) in RRC\_CONNECTED Samsung Electronics Co., Ltd CR Rel-16 38.331 16.1.0 1779 - F NR\_pos-Core

[R2-2007078](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007078_CR1781_38331_Rel16_Corrections%20to%20handing%20posSIB-MappingInfo%20in%20received%20SIB1.docx) Corrections to handing posSIB-MappingInfo in received SIB1 Samsung Electronics Co., Ltd CR Rel-16 38.331 16.1.0 1781 - F NR\_pos-Core

* Revised in R2-2008273

[R2-2008273](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008273_CR1781r1_38331_Rel16_Corrections%20to%20handing%20posSIB-MappingInfo%20in%20received%20SIB1.docx) Corrections to handing posSIB-MappingInfo in received SIB1 Samsung Electronics Co., Ltd CR Rel-16 38.331 16.1.0 1781 1 F NR\_pos-Core

* Agreed

Others

[R2-2006942](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006942%20RRC%20Minor.docx) Minor corrections and update for RRC Positioning Ericsson CR Rel-16 38.331 16.1.0 1757 - F NR\_pos-Core

* Revised in R2-2008258 (incorporating outcome of discussion [AT111-e][610])

[R2-2007547](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007547_CR_unused%20field_38.331.docx) Corrections to unused field nr-CarrierFreq and misalignment between LPP and RRC Samsung Electronics Romania CR Rel-16 38.331 16.1.0 1860 - F NR\_pos-Core

### 6.6.3 LPP corrections

Including impacts to UE capabilites

Summary document

[R2-2008120](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008120_(Summary%20of%206.6.3%20LPP%20Corrections).docx) Summary of LPP corrections agenda item 6.6.3 Qualcomm Incorporated discussion NR\_pos-Core

P1:

* Intel think RRC allows NBC changes and we could do the same for LPP to avoid additional extensions and dummification.
* Huawei understand that in this meeting we can take NBC changes. CATT share the same view and think it can be discussed case by case if something requires a BC change.
* We can take NBC changes to LPP in this meeting

P2:

* Intel agree with this proposal and think capabilities can be included or treated separately.
* Merge to a single rapporteur CR

P3:

* vivo understand that the current structure has no problem, but there is some misalignment in the RAN1 spec. So they think an LS is needed.
* ZTE think we should move dl-PRS-NumSymbols to resource level since there is no RAN1 agreement saying it is the same for all resources in a set.
* CATT think no action is needed and the current RAN2 spec follows the RAN1 guidance. They think it is not critical to align the parameter data structures and the RAN1 LS implies that the value will be the same across a resource set.
* Nokia think we can follow the L1 parameter list and the current spec is aligned. So we would make no changes now, but could send an LS to RAN1 for clarification.
* Chair wonders if we could fix it later with a BC change. Qualcomm think it would be difficult as the parameter is mandatory.
* Intel understand the RAN1 intention was to have a common value across the resource set, and the parameter list is consistent with that. So they see that no change is needed and also no LS.
* Huawei think if we make a change for this, there is no RAN1 agreement to support it. They understand that any change should be driven from RAN1 and think RAN2 doesn’t need to act.
* vivo point out there is also no RAN1 agreement saying the number of symbols is the same across a set. So we need to send an LS to prompt them to capture the constraint.
* CATT agree with Intel that the LS with the parameter list was clear, and we should wait for an LS from RAN1.
* Ericsson think no action is needed, and do not see a misalignment between LPP and 38.214. The latter just says that there is a parameter for the resource defining the number of symbols, but does not specify whether it is variable per resource or per set.
* Qualcomm have the same understanding as Intel, Ericsson, and Huawei, but think it would be harmless to send an LS. Intel think we would only get feedback next meeting and we would have to make an awkward change; they also think the parameters were sent back to RAN1 for checking already, and this issue can be handled directly in RAN1 if companies have a concern.
* ZTE think it would be good to have aligned wording in the specifications.
* Ericsson think nothing is broken from RAN2 perspective, and agree with Intel that it can be handled in RAN1.
* No action in RAN2 on this issue now

P4:

* Qualcomm understand that the SSB index is provided in the QCL information and it is not needed in NR-SSB-Config.
* ZTE also think it is not needed in NR-SSB-Config.
* vivo agree to delete the field description.
* Delete field description of ssb-Index in NR-SSB-Config

P5:

* Ericsson think we agreed to something similar for beam information, and there is overhead for the locations that could be reduced. They also think the location can be the same within a frequency layer (multiple TRPs representing the same site) due to the limitation on the number of resource sets for a TRP.
* Qualcomm think the coincident TRPs will not occur in real deployments, even if they are mounted on the same tower, but they are OK with the proposal.
* CATT think the LMF can calculate positions more accurately if TRPs are not precisely collocated, so they understand that this will not have benefits in real deployments.
* Intel also think this is not a likely scenario in real deployments, but the proposal does not harm the specification.
* Ericsson think collocated TRPs between different frequency layers is a real scenario, to allow using the same antenna location. For the open office scenario they foresee a small device with multiple sectors precisely collocated.
* Huawei think the LMF implementation can handle the scenario by using the same PRS-Id for different TRPs. Ericsson think this does not work across frequency layers because each layer has a locally unique PRS-Id and it cannot be reused in this way.
* CATT think the proposal is acceptable for the case of different frequency layers.
* vivo understand that the PRS-Id could be reused. We have the frequency layer level that can distinguish them. Ericsson think this was discussed previously and the PRS-Id has to be unique per TRP within the assistance data scope, e.g. to distinguish which measurements are being reported.
* Huawei understand that a TRP can have 2 PRS resource sets per frequency layer, and up to 8 across frequency layers, and the ID is the same across the frequency layers in this case. Ericsson have a different understanding and think the parameter list does not reflect this; they consider that the requirement to support 8 resource sets is what the UE can handle, not what a single TRP can operate, and the AD hierarchy would have to be different to support PRS-Id reuse. Huawei think RAN1 discussed this issue in terms of the value range of the ID.
* Qualcomm have the understanding that the TRPs from different frequency layers are normally separate sites, but think it would do no harm to have the possibility in the spec.
* Huawei can accept the proposal, but want to clarify that the PRS-Id can be reused across frequency layers, e.g. if one TRP transmits with different bandwidths on different frequency layers. Ericsson disagree but think it is a separate issue from the signalling.
* OPPO can accept the proposal but think we should clarify if the PRS-Id can be reused across frequency layers. They have the same understanding as Huawei and some concern that we introduce two methods of representing the same situation. Qualcomm think the spec does not need to care about how the PRS-Id is assigned; it is up to network deployment.
* Introduce the associatedDL-PRS-ID in the TRP location info element.

P6:

* Intel understand that without this the LMF does not know the UE’s CA configuration, and wonder if the UE would need to update the capability when its CA configuration changes. They think this could be considered in Rel-17.
* Huawei think there is nothing the LMF can do with this information.
* Do not introduce the intra-/inter-band CA capabilities for SRS at the LMF

P7/P8:

* Qualcomm think we need the capabilities, and the questions are which IE to extend, how many instances of the capability to support, and how to structure them. They understand that we need to extend the top-level capability IE and can avoid repeating the capability for 1024 bands. On the ASN.1 structure they would like to avoid capturing SEQUENCEs of a single element.
* Huawei think it is OK to take R2-2007632 as a baseline, but think the periodic SRS capability should be mandatory.
* Intel understand that Qualcomm’s assumption is the UE will only report the capabilities for bands that are configured in the current CA configuration, and wonder if this will mean updating the capability when the configuration changes. Qualcomm think this is the consequence and the UE capability becomes dynamic. Intel note there is no mechanism for the UE to push the capability.
* [AT111-e][611][POS] LPP miscellaneous CR (Qualcomm)

Scope: Capture RAN2 decisions on P3-P6 of R2-2008120; discuss P7-P16 of R2-2008120 and merge the results into a rapporteur CR.

Intended outcome: Agreeable CR, in R2-2008260; summary in R2-2008268

Deadline: Thursday 2020-08-27 1200 UTC

[R2-2008268](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008268_%5bAT111-e%5d%5b611%5d%5bPOS%5d%20LPP%20miscellaneous.docx) Summary of email discussion [AT111-e][611][POS] LPP miscellaneous CR Qualcomm Incorporated discussion Rel-16 NR\_pos-Core

* CATT clarify that there were late comments on area scope and wonder if some more time is needed. Ericsson think email is needed to focus on the area scope and posSIB validity needs to be captured, but it has no effect on the LPP CR. CATT intend to move the validity description from LPP to RRC.
* Huawei think it is OK to have the email discussion, but are not sure why the validity check should be moved to the RRC. Intel are also OK to have an email discussion and generally prefer to handle the validity in RRC.
* CATT indicate there is no ASN.1 impact from the proposed change. Qualcomm think this aspect has not changed from Rel-15 SIBs, and maybe we could think about this until the next meeting. CATT think the posSIB validity is currently unclear in RRC.
* posSIB validity can be examined next meeting.
* Summary is noted
* Huawei indicate RAN4 are discussing the PRS measurement gap and we may need a short email discussion to handle any ASN.1 impact from their decision. Intel understand that RAN4 will not introduce new patterns this release and want to be clear that we only act if we receive a liaison.
* Nokia want to understand if the discussion would happen irrespective of a decision from RAN4 and prefer that we would only discuss if we do get an LS. Huawei understand that the RAN4 discussion will happen on the Friday but there is no guarantee of an LS, and if there is no LS we will not make any changes.
* [Post111-e][634][POS] Positioning measurement gaps (Huawei)

Scope: Handle any input received from RAN4 on new measurement gap patterns for Rel-16.

Intended outcome: Agreed CR if necessary

Deadline: Friday 2020-09-04 1200 UTC

|  |  |
| --- | --- |
| Proposal in R2-2008120 [0] | Comments |
| **Proposal 7:** Add the SRS Resource capabilities 13-8c/d/e per R1-2005110 to LPP specification as per band capability.  **Proposal 8:** With respect to the UL-SRS Resource capabilities, use the CR in R2-2007632 [7] as baseline. RAN2 to check the details of [7] and then merge it into the LPP Rapporteur CR. | * capabilities 13-8c/d/e have been added using [7] as baseline. * *SRS-CapabilityBandCombinationList* has been removed from IE *NR-UL-SRS-Capability.* |
| **Proposal 9:** With respect to the *timingReportingGranularityFactor* field description, RAN2 to check the details of the proposed field description in R2-2006546 [9] and then merge it into LPP Rapporteur CR. | * *timingReportingGranularityFactor* field description has been added to IE *NR-DL-TDOA-RequestLocationInformation* and IE *NR-Multi-RTT-RequestLocationInformation* based on [9] with modifications as discussed in section 3.1. |
| **Proposal 10:** With respect to the missing field description for *nr-RSTD-ResultDiff* use R2-2007834 [11] as baseline (see also Proposal 12). | * Merged with Proposal 12. |
| **Proposal 11:** With respect to the *areaScope* for posSIBs, RAN2 to discuss and decide whether any additional specification in TS 37.355 is needed or not. If additional specification is needed in TS 37.355, check the details of the proposed changes in R2-2006663 [3] and then merge it into LPP Rapporteur CR. | * No changes/additions with respect to areaScope have been made in R2-2008260. |
| **Proposal 12:** RAN2 to check the details in R2-2007834 [11] and then merge it into the LPP Rapporteur CR. | * field descriptions in IEs *xxx‑SignalMeasurementInformation* have been added based on [11]. |
| **Proposal 13:** RAN2 to check the details in R2-2007836 [13] and then merge it into LPP Rapporteur CR. | * field descriptions related to DL-PRS configuration have been added based on [13]. * Sorting of fields in the field description Tables has been done in the order of appearance in the ASN.1. * Value range of *nr-DL-PRS-ExpectedRSTD-Uncertainty* has been changed from INTEGER (-246..246) to INTEGER (0..246). |
| **Proposal 14:** With respect to the assistance data sharing via IE *NR-SelectedDL-PRS-IndexList,* use the CR in R2-2007634 [8] as baseline. RAN2 to check the details of [8] and then merge it into the LPP Rapporteur CR. | * Descriptions for IE *NR-SelectedDL-PRS-IndexList* have been added based on [8]. * It has been clarified that in case of an OPTIONAL list in IE *NR-SelectedDL-PRS-IndexList* is absent, all elements of this list are "selected". * It has been specified that the IE *NR-DL-PRS-ProvideAssistanceData* shall be present only once (in case of assistance data for multiple methods are provided). |
| **Proposal 15:** With respect to the assistance data order in IE *NR-DL-PRS-AssistanceData* and/or *NR-SelectedDL-PRS-IndexList*, await the conclusion in RAN1. | * No changes/additions with respect to the assistance data order in IE *NR-DL-PRS-AssistanceData* have been made in R2-2008260. |
| **Proposal 16:** RAN2 to check the details in R2-2007635 [9] and then merge it into LPP Rapporteur CR. | * Padding rule for C0 has been added based on [9]. |

[R2-2008260](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008260_(CR%2037355%20miscellaneous%20corrections)_v4.docx) LPP miscellaneous corrections Qualcomm Incorporated CR Rel-16 37.355 16.1.0 0272 - F NR\_pos-Core

* Agreed

CRs

[R2-2006543](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006543%20Correction%20of%20DL-PRS-NumSymbols.docx) Correction of DL-PRS-NumSymbols vivo discussion NR\_pos-Core

[R2-2006546](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006546%20Discussion%20on%20remaining%20issues%20on%20LPP.docx) Discussion on remaining issues on LPP vivo discussion NR\_pos-Core

[R2-2006663](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\37355_CR0262_(Rel-16)_R2-2006663.docx) Correction on 37.355 to capture agreements of area scope for posSIB validity CATT CR Rel-16 37.355 16.1.0 0262 - F NR\_pos-Core

[R2-2006847](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006847%20reference%20TRP.docx) Need of reference TRP in the TRP-LocationInfo IE for UE-based assistance data distribution efficiency Ericsson discussion Rel-16 37.355

[R2-2006949](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006949%20Handling%20on%20RAN1%20positioning%20related%20capabilities.doc) Handling on RAN1 positioning related capabilities Intel Corporation discussion Rel-16 NR\_pos-Core

[R2-2006950](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006950%20Capture%20RAN1%20positioning%20related%20capabilities.docx) Capture RAN1 positioning related capabilities Intel Corporation CR Rel-16 37.355 16.1.0 0263 - F NR\_pos-Core

[R2-2007632](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007632_(CR%2037355-g10%20UE%20Capabilities).docx) Addition of missing SRS for Positioning capabilities Qualcomm Incorporated CR Rel-16 37.355 16.1.0 0264 - F NR\_pos-Core

[R2-2007634](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007634_(CR%2037355-g10%20AD%20sharing%20and%20priority%20description).docx) Assistance data sharing and priority for measurements Qualcomm Incorporated CR Rel-16 37.355 16.1.0 0265 - F NR\_pos-Core

[R2-2007635](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007635_(CR37355-g10%20padding%20of%20c0).docx) Addition of missing padding rule for initial counter c0 Qualcomm Incorporated CR Rel-16 37.355 16.1.0 0266 - F LCS\_LTE\_acc\_enh-Core, NR\_pos-Core

[R2-2007833](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007833%20Correction%20of%20the%20SRS%20capability%20in%20LPP.docx) Correction of the SRS capability in LPP Huawei, HiSilicon CR Rel-16 37.355 16.1.0 0267 - F NR\_pos-Core

[R2-2007834](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007834%20Correction%20on%20SignalMeasurementInformation.doc) Correction on SignalMeasurementInformation Huawei, HiSilicon CR Rel-16 37.355 16.1.0 0268 - F NR\_pos-Core

[R2-2007835](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007835%20Correction%20on%20ProvideAssistantData.doc) Correction on ProvideAssistantData Huawei, HiSilicon CR Rel-16 37.355 16.1.0 0269 - F NR\_pos-Core

[R2-2007836](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007836%20Correction%20on%20PRS%20configuration.doc) Correction on PRS configuration Huawei, HiSilicon CR Rel-16 37.355 16.1.0 0270 - F NR\_pos-Core

[R2-2007941](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007941%20Correction%20to%20NR-SSB-Config.docx) Correction to NR-SSB-Config ZTE Corporation, Sanechips CR Rel-16 37.355 16.1.0 0271 - F NR\_pos-Core

### 6.6.4 MAC corrections

[R2-2006545](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006545%20Discussion%20on%20SRS%20for%20positioning%20during%20the%20DRX%20inactive%20period.docx) Discussion on SRS for positioning during the DRX inactive period vivo discussion NR\_pos-Core

* Intel ask what the MAC spec impact of P1 and P3 would be; their understanding is that the current spec should already support them.
* CATT disagree with P1 and think the UE can make this decision in implementation; they would prefer not to limit the behaviour.
* Huawei think for P1, the active time is a longer duration than the onDurationTimer and the UE should be able to transmit throughout the active time. They understand that RAN4 will discuss this issue in this meeting cycle.
* Qualcomm think we should not introduce new functionality, and the current spec indicates there is no different behaviour compared to Rel-15 SRS. They think based on the status of RAN4, DRX enhancements should be postponed.
* Ericsson agree with Qualcomm that this can be discussed in the Rel-17 framework. CATT agree and think we should wait for RAN4 conclusion. Nokia also agree.
* Intel want to clarify what the existing behaviour is if we change nothing now; they understand it aligns with P1/P3. Also point out we already sent a related LS to RAN4.
* Huawei think if we agree to P1, it is not aligned with the current behaviour because of the difference between active time and onDurationTimer. So taking P1 would change the MAC.
* Noted

### 6.6.5 Other

# 7 Rel-16 EUTRA Work Items

Essential corrections

## 7.6 LTE Positioning

(NavIC, LTE TEI16 Positioning)

# 8 Rel-17 NR Work Items

## 8.7 NR Sidelink relay SI

(FS\_NR\_SL\_relay; leading WG: RAN2; REL-17; WID: RP-193253)

Time budget: 2 TU

Tdoc Limitation: 4 tdocs

Email max expectation: 4 threads

### 8.7.1 Organizational

TR skeleton, rapporteur inputs, other organizational documents. Documents in this AI do not count towards the tdoc limitation.

Incoming LS

[R2-2006531](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006531_S2-2004750.docx) LS on Security Requirements for Sidelink/PC5 Relays (S2-2004750; contact: MediaTek) SA2 LS in Rel-17 FS\_5G\_ProSe To:SA3 Cc:RAN2, RAN3

* Noted

Workplan

[R2-2006601](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006601%20-%20Work%20plan%20of%20R17%20SL%20relay.doc) Work plan of R17 SL relay OPPO discussion Rel-17 FS\_NR\_SL\_relay

* ZTE note there are some topics included only in this meeting and wonder if we should complete the discussion and ignore these topics in future meetings. OPPO clarify we intend to progress as much as possible and use the other meetings if necessary; the plan does not exclude future meetings for these topics.
* Ericsson think we officially have not had an extension to the SI and wonder if it is safe to plan on three meetings instead of two. Chair thinks with only two meetings we would just have to conclude on the issues where we managed to discuss. OPPO clarify the work plan is based on the template of the SID.
* AT&T think Ericsson’s point is well taken and we need to make progress.
* Futurewei wonder about the categorisation of items as “easy” or “hard”: Is it really necessary, or is it enough to have the timetable for when we finish? They also agree with Ericsson’s concern about whether we can count on three meetings. OPPO think the point on “easy” and “hard” is well taken and it is only intended as guidance for what needs more time.
* Huawei want to avoid explicitly postponing something to the third meeting, until we know we have a third meeting.
* Noted

TR skeleton

[R2-2006602](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Docs\R2-2006602.zip) Skeleton of TR 38.836 v0.0.0 OPPO draft TR Rel-17 38.836 0.0.0 FS\_NR\_SL\_relay

* Revised in R2-2008251
* [AT111-e][602][Relay] TR skeleton approval (OPPO)

Scope: Discuss and approve the TR skeleton from R2-2006602 updated as necessary.

Intended outcome: Agreeable TR skeleton, in R2-2008251

Deadline: Monday 2020-08-24 1200 UTC

[R2-2008251](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Docs\R2-2008251.zip) Skeleton of TR 38.836 v0.0.0 OPPO draft TR Rel-17 38.836 0.0.0 FS\_NR\_SL\_relay

* Endorsed

Other

[R2-2007168](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007168.docx) ?[Draft]? LS to SA3 on the security related aspects for NR sidelink relay CATT LS out FS\_NR\_SL\_relay To:SA3

* [Post111-e][624][Relay] Update of TR 38.836 (OPPO)

Scope: Update the TR to take account of agreements of RAN2#111-e. Email discussion rapporteurs for [AT111-e][603], [AT111-e][604], [AT111-e][605], and [AT111-e][606] are asked to provide initial input text.

Intended outcome: Endorsed TR

Deadline: Friday 2020-09-04 1200 UTC

### 8.7.2 Scope, requirements, and scenarios

Clarify the required contents of the TR, high-level requirements, assumptions on supported scenarios. Including expectations on other groups if any.

* [AT111-e][603][Relay] Scope, requirements, and scenarios (InterDigital)

Scope: Discuss proposals on the scope, requirements, and scenarios for UE-to-network and UE-to-UE relaying, including:

* Coverage scenarios
* Connectivity scenarios
* Uu and PC5 RATs
* RRC states for relaying
* Cast types for the PC5 link
* Potential reuse of requirements from earlier releases (e.g. FeD2D, LTE ProSe relaying)

Extension to conclude on P5, P7, and remaining open issues on P9-P24, and conclude on the agreeable parts.

Intended outcome: Summary with potential agreeable TP, in R2-2008252; summary of extended discussion in R2-2008264

Deadline: Monday 2020-08-24 1200 UTC; extended to Thursday 2020-08-27 1200 UTC

[R2-2008252](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008252%20-%20summary%20of%20offline%20603Relay_v39_Rapp.docx) [AT111-e][603] Scope, requirements, and scenarios (Interdigital) InterDigital discussion Rel-17 FS\_NR\_SL\_relay

P1/P2/P3:

* LG ask if the remote and relay UE are connected and the relay UE is handed over to LTE, how do we handle this case? Considering this they think the UE may need to be triggered to do path switch.
* Ericsson think if we agree P1-P3, the scenario described by LG would result in releasing the relaying. They think this could be investigated later.
* Futurewei understand that this scenario could be considered later. Lenovo have a similar view and are OK with the proposals.
* vivo agree with the proposals but think we should eliminate the case considered by LG if we are not going to support cross-RAT cases.
* Agreed

P4:

* Huawei think we should be clear about when “UE-to-NW relay” means the architecture and when it means the relay UE. Ericsson agree.
* Ericsson think it should be under network control which link the remote UE uses (when in coverage).
* Agreed

P5:

* ZTE agree to support both the same and different gNBs, and think we cannot assume no RAN2 impact.
* Ericsson wonder if the remote UE has data to transmit, why it would transmit to a gNB that is not its serving gNB. Chair think this could happen at edge of cell.
* LG wonder if “same gNB” means “same PCell”.
* Qualcomm think the different gNB scenario is possible. For LG’s question, they think we can discuss further.
* Lenovo understood that “same gNB” meant “same serving cell” and think the different gNB scenario makes sense to avoid upper layers needing to know about the serving cell.
* Spreadtrum wonder if the remote UE should monitor paging from the gNB or the relay UE.
* Samsung think the different gNB scenario adds complexity, and wonder if we are going to study the scenarios in parallel or focus on the same gNB first. They would prefer the latter. Interdigital think we don’t know if it will add complexity, and the simplest approach may be to not rule anything out. Samsung think we should avoid different solutions for the different scenarios.
* Huawei think the different gNB is valid but not the main use case and think we could strive to minimise the additional impact.
* Futurewei think we should aim for a common solution for the cases. They think the issue is mainly about connection establishment with the UE-to-NW relay and service continuity; for connection establishment they see commonality but think there may be impact for service continuity.
* Ericsson agree with the comment from Samsung and think we should not add scenarios. Would prefer to start with the single gNB. vivo see some validity in Samsung’s comment but prefer not to prioritise now, and think we could target a common solution.
* Lenovo suggest that we could continue the discussion on this point.
* Convida think we could also clarify the definition of “same gNB” (e.g. would we model the remote UE as having two serving cells, do we support simultaneous Uu and PC5 connectivity).
* Futurewei think there was a majority view in the email discussion and we could conclude.
* Nokia think we should not deprioritise a potentially significant use case because of anticipated complexity at this stage.
* Can discuss further by email (including P5 and P7, focussing on whether to prioritise the cases and clarification of the meaning of “same gNB”).

P6:

* Apple think we target a common solution for UE-to-UE and UE-to-NW, and if all UEs are OOC we may not be able to rely on RAN3 to handle authorisation. So we may need to assume the relay UE is in coverage.
* Futurewei agree we want to have a common approach but are not sure we can enforce the relay being in coverage. They think the relay UE could be authorised by preconfiguration or provisioning.
* Qualcomm think all UEs OOC is a significant use case especially for PS.
* ZTE also support the proposal and think authorisation works for V2X when OOC, so it should be a solvable problem here.
* OPPO think OOC is important, and looking at the SA2 solutions they understand that there are candidates that support this case even without RAN authorisation.
* Huawei think the different coverage cases may cause different solutions, and we should add a guideline that we strive for a common solution.
* MediaTek support the proposal.
* Fujitsu wonder if this would also apply to groupcast/broadcast and would prefer to clarify that the goal for a common solution only applies to unicast.
* Agreed

P8:

* Qualcomm support the proposal. MediaTek also.
* Samsung understand that this would exclude groupcast/broadcast data since we have no PC5-RRC connection for those cases. They think data could be unicast over Uu but groupcast/broadcast over PC5. Interdigital think there was a majority to consider unicast as a priority.
* Futurewei think it should say “after” rather than “once” to avoid the implication of a race condition.
* vivo have some concern regarding relaying paging or SIBs.
* Fujitsu are also concerned about not excluding groupcast/broadcast.
* ZTE wonder what remote UE behaviour would be expected if the relay UE starts in idle/inactive mode.
* Convida support the proposal.
* Agreed (for unicast data only; we take no conclusion on groupcast/broadcast at this time).

Agreements:

NR sidelink is assumed on PC5 between the remote UE(s) and the UE to NW relay or UE to UE relay.

NR Uu is assumed on the Uu link of the UE to NW relay.

Cross-RAT configuration/control of remote/relay UEs is not considered.

For UE to NW relay, the following are considered: 1) UE to NW Relay UE in coverage and remote UE out of coverage; 2) UE to NW relay UE and remote UE both in coverage.

For UE to UE relays, any of the UEs involved in relaying can be either in coverage or out of coverage. RAN2 will strive for a common solution to the in- and out-of-coverage cases.

For UE to NW relay, relaying of unicast data between the remote UE and the network can occur after a PC5-RRC connection is established between the relay UE and the remote UE.

Proposal 9: Relaying of data between a remote source UE and a remote destination UE can occur once a PC5 link is established between the source UE, relay, and destination UE.

Proposal 10: Configuring/scheduling a UE’s sidelink by SN is out of scope of this study.

Proposal 11: For UE to NW relay, RAN2 assumes the remote UE has an active connection with only a single relay UE or to Uu at a given time. The remote UE can have a direct Uu connection or a connection via a single relay UE, but these two connections should not be active at the same time. Transmissions over different links (e.g. during path switch) are not precluded.

Proposal 12: For UE to UE relay, RAN2 assumes the remote UE has an active connection with only a single relay UE at a given time. Transmissions over different links (e.g. during path switch) are not precluded.

Proposal 13: For UE to NW relay, RAN2 focuses initial study on unicast data traffic between the UE and the NW.

Proposal 14: For UE to UE relay, RAN2 focuses initial study on unicast data traffic between the remote source UE and the remote destination UE.

Proposal 15: For L3 UE to NW relay, both relay and remote UEs can perform relay discovery in any RRC state. A remote UE can perform relay discovery whle OOC.

Proposal 16: For L3 UE to NW relay, a relay UE must be in RRC\_CONNECTED to perform relaying of data.

Proposal 17: For L2 relay, the RRC state of the relay and remote UE’s can change when connected via PC5.

Proposal 18: For L2 relay, both relay and remote UE must be in RRC CONNECTED to perform active relaying of data.

Proposal 19: For L2 relay, the relay UE can be either in RRC\_IDLE or RRC\_CONNECTED as long as the PC5-connected remote UE is in RRC\_IDLE.

Proposal 20: The remote UE in L2 UE to NW relay supports RRC\_INACTIVE. UE behavior specific to RRC\_INACTIVE can be considered in the WI stage.

Proposal 21: The relay UE in L2 UE to NW relay supports RRC\_INACTIVE. UE behavior specific to RRC\_INACTIVE can be considered in the SI/WI stage.

Proposal 22: RAN2 assumes no restrictions on the RRC states of any UEs involved in UE to UE relaying.

Proposal 23: RAN2 to further discuss whether to capture the requirements in this question, and if yes whether to:

i) Use them as comparison criteria in the L2/L3 comparison

ii) Identify in the TR which requirements can be applicable to L2 and/or L3

Proposal 24: RAN2 assumes an initial plan for prioritization (can be revisited if needed):

i) First focus on UE to NW relay and issues of UE to UE relay with similar solution as UE to NW relay

ii) Study issues specific to UE to UE relay if time permits, with leftovers in the WI

[R2-2008264](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008264%20-%20summary%20of%20offline%20603Relay_ext_v19_Rapp.docx) [AT111-e][603] Scope, requirements, and scenarios (Interdigital) InterDigital discussion Rel-17 FS\_NR\_SL\_relay

P5/P7:

* LG think in the same-cell case, it is beneficial to do path switch without handover. But they are OK to study both scenarios.
* Lenovo think we should not use the term PCell for idle/inactive UEs.
* Ericsson wonder if the impact is only on the remote UE of considering the different cell case. If mobility affects the relay UE we would have to consider group handover.
* On P9, vivo think the terminology could be clarified to distinguish transmitting and receiving remote UEs. On P11, they wonder if “active” means “having UP traffic”. Interdigital indicate this is the intention: the proposal is to rule out that UP traffic would be routed in both links.
* Nokia have some uncertainty about the meaning of P11 as well. Does it mean no data bearers, no actual transmission?
* LG wonder if P10 refers to both relay and remote UE. Interdigital confirm it does.
* Kyocera think P12 has the same issue as P11 with the “active” connection. CATT disagree because there is no issue of path switch in the UE-to-UE case. Huawei understand that “active” implies the UE is not allowed to transmit data on the two links at the same time. vivo think this is not a big issue and can agree on P12. Intel agree.

Agreements:

Revised Proposal 5: For UE to NW relay, RAN2 supports the scenario that a remote UE in coverage of a first cell connects to a relay UE which is connected/in coverage of a different cell (or vice versa). RAN2 will strive for a common solution between same cell and different cell cases for this scenario. If a common solution is not possible and impacts are found to supporting different cell case, RAN2 works on the same cell case with higher priority.

Revised Proposal 7: For the UE to UE relay, RAN2 supports the scenario that UEs can be in coverage of the different cell. RAN2 will strive for a common solution between same cell and different cell cases for this scenario. If a common solution is not possible and impacts are found to supporting different cell case, RAN2 works on the same cell case with higher priority.

Revised Proposal 9: Relaying of data between a remote source (transmitting) UE and a remote destination (receiving) UE requires first that a PC5 link(s) is established between the source UE, relay, and destination UE.

Proposal 10: Configuring/scheduling a UE’s sidelink (either relay or remote) by SN is out of scope of this study.

Revised Proposal 12: For UE to UE relay, RAN2 assumes the remote UE has an active end to end connection via only a single relay UE at a given time.

Revised Proposal 13: For UE to NW relay, RAN2 focuses study on unicast data traffic between the UE and the NW.

Revised Proposal 14: For UE to UE relay, RAN2 focuses study on unicast data traffic between the remote source UE and the remote destination UE.

Proposal 16: For L3 UE to NW relay, a relay UE must be in RRC\_CONNECTED to perform relaying of data.

Revised Proposal 15: For L3 UE to NW relay, the Uu RRC state of the relay UE and remote UE can change when connected via PC5. Both relay UE and remote UE can perform relay discovery in any RRC state. A remote UE can perform relay discovery while OOC.

Revised Proposal 17: For L2 UE to NW relay, the Uu RRC state of the relay UE and remote UE can change when connected via PC5. Both relay UE and remote UEs can perform relay discovery in any RRC state. A remote UE can perform relay discovery while OOC.

Proposal 18: For L2 UE to NW relay, both relay UE and remote UE must be in RRC CONNECTED to perform active relaying of data.

Revised Proposal 19: For L2 UE to NW relay, the relay UE can be either in RRC\_IDLE or RRC\_CONNECTED as long as the PC5-connected remote UE is in RRC\_IDLE.

Proposal 22: RAN2 assumes no restrictions on the RRC states of any UEs involved in UE to UE relaying.

Proposal 24: RAN2 assumes an initial plan for prioritization (can be revisited if needed):

i) First focus on UE to NW relay and issues of UE to UE relay with similar solution as UE to NW relay

ii) Study issues specific to UE to UE relay if time permits, with leftovers in the WI

Revised Proposal 11: For UE to NW relay, RAN2 assumes the remote UE has an active end-to-end connection via only a single relay UE or via Uu at a given time. The remote UE can have a direct Uu connection or a connection via a single relay UE, but these two connections should not be active at the same time. Mechanisms for ensuring service continuity (e.g. during path switch) are not precluded.

[R2-2008046](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Docs\R2-2008046.zip) General considerations on working for NR SL relay Huawei, HiSilicon, Apple, CMCC, China Telecom, China Unicom, MediaTek Inc., Sharp, Spreadtrum, Xiaomi, ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006609](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006609.docx) Clarification on the Scenarios for NR Sidelink Relay CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006721](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006721%20consideration%20on%20the%20study.docx) Considerations on the Study of NR Sidelink Relay Futurewei discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006554](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006554%20-%20Study%20item%20scope%20and%20focus%20areas%20prioritization.docx) Discussion on sidelink relay study item scope and focus areas prioritization Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006570](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006570.docx) Scenarios and Assumptions on Sidelink Relay MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006603](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006603%20-%20Scenarios%20for%20sidelink%20relay%20study.doc) Scenarios for sidelink relay OPPO discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006717](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006717%20NR%20Sidelink%20Relay%20Requirements%20and%20Scenarios.docx) Requirements, Assumptions and Supported Scenarios for NR Sidelink Relay Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006735](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006735%20Initial%20Considerations%20for%20NR%20SL%20Relay.doc) Initial considerations on NR sidelink relay ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006758](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006758%20(R17%20SL%20Relay%20SI_A872).doc) Discussion and TP on Requirements and Scenarios for SL Relays InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006856](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006856-UE-to-UE%20Relay%20for%20unicast%20SL.docx) NR SL-based UE-to-UE relay for unicast SL Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006857](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006857-casting%20types%20in%20SL%20based%20relays.docx) Casting types in NR SL-based relays Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006866](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006866_8_7_2_Scope%20requirements%20and%20scenarios%20in%20sidelink%20relay.doc) Scope, Requirements and Scenarios in NR Sidelink Relaying Fujitsu discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006968](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006968%20Sidelink%20relay%20scenario.doc) NR sidelink relay scenarios Samsung Electronics Co., Ltd discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007038](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007038_SL%20relay%20discussion%20in%20SI%20phase.doc) SL relay discussion in SI phase vivo discussion Rel-17

[R2-2007039](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007039_Scope%20and%20Scenarios%20of%20SL%20relay.docx) Scope and Scenarios of SL relay vivo discussion Rel-17

[R2-2007043](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007043.doc) Scope and scenarios on NR sidelink relay Spreadtrum Communications discussion

[R2-2007099](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\._R2-2007099%20SL%20relay%20scearios_v1.doc) Discussion on NR Sidelink Relay Scenarios Apple, Convida Wireless discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007202](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007202%20High-level%20requirements%20-cln.doc) High-level requirements Samsung Electronics GmbH discussion

[R2-2007290](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007290-%20Service%20continuity%20in%20sidelink%20relay.docx) Service continuity scenarios for sidelink relay Ericsson discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007293](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007293-%20Scope%20and%20initial%20steps%20for%20SL%20relay.docx) Scope and initial steps for SL relay Ericsson discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007626](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007626_relaying.doc) Initial considerations for SL relaying Kyocera discussion Rel-17

[R2-2007775](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007775%20Discussion%20on%20UE-to-network%20coverage%20extension.docx) Discussion on UE-to-network coverage extension ETRI discussion Rel-17

[R2-2008017](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008017%20Scope%20and%20scenarios%20for%20NR%20sidelink%20relay.docx) Scope and scenarios for NR sidelink relay LG Electronics Inc. discussion Rel-17 FS\_NR\_SL\_relay

### 8.7.3 Relaying Mechanisms and their characteristics

Start to populate the TR. Put on the table mechanisms, their characteristics at least with respect to aspects A-F for L2 and L3 relay etc.

* [AT111-e][604][Relay] L3 relay protocol stacks (Qualcomm)

Scope: Discuss and document the proposed L3 relay design(s), focussing on general mechanisms of L3 architecture based sidelink relaying including protocol stacks and high level description of required UP/CP functionalities..

Intended outcome: Summary with potential agreeable TP, in R2-2008253; summary of extended discussion in R2-2008265; final summary in R2-2008267

Deadline: Monday 2020-08-24 1200 UTC; extended to Wednesday 2020-08-26 1000 UTC

* [AT111-e][605][Relay] L2 relay mechanism (MediaTek)

Scope: Discuss and document the proposed L2 relay design(s), focussing on general mechanisms of L2 architecture based sidelink relaying including protocol stacks and high level description of required UP/CP functionalities.

Intended outcome: Summary with potential agreeable TP, in R2-2008254; summary of extended discussion in R2-2008266; final summary in R2-2008269

Deadline: Monday 2020-08-24 1200 UTC; extended to Wednesday 2020-08-26 1000 UTC; further extended to Thursday 2020-08-27 1200 UTC

[R2-2008253](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008253%20-%20Rapporteur%20summary%20of%20offline%20discussion%20%5b604%5d%5bRelay%5d%20L3%20relay%20protocol%20stacks%20(merge%20TP).docx) Summary of offline discussion [604][Relay] L3 relay protocol stacks (Qualcomm) Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

* Noted without presentation (replaced by R2-2008265)

[R2-2008265](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008265%20-%20Rapporteur%20summary%20of%20offline%20discussion%20%5b604%5d%5bRelay%5d%20L3%20relay%20protocol%20stacks%20(merge%20TP)-phase2.docx) Summary of offline discussion [604][Relay] L3 relay protocol stacks (Qualcomm) Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

* Chair thinks P1 should describe no RAN2 “impacts”.
* Futurewei think SA2 did not “specify” the solutions and we should use a different word. Qualcomm think the solutions are specified in the TR.
* Huawei understand the intention of P1 is just to confirm that from RAN2 perspective the protocol stacks can be supported. They would prefer “issues” to “impacts”.
* vivo think we can indicate no issue to support these architectures and we can take them as a baseline.
* Ericsson agree “specified” is probably not the right word but think the point is to capture the designs and we should not spend much time on the wording. For P15 and P16, they think it is asymmetrical that we do not capture something for UE-to-UE relay as well and we should capture the SA2 designs similar to what we do for UE-to-network. Qualcomm understanding on P15 and P16 is that in the current SA2 TR, there is no CP stack captured and we are not sure what we can reference. But they would be OK to add a reference to the SA2 spec for the UE-to-UE stack.
* Apple think we don’t need to capture P13.
* Huawei consider for P14, if we take N3IWF as a baseline, we need to analyse the RAN impact to carry NAS signalling. For P10, they are not sure if we need to capture the hop-by-hop security, since it is a legacy procedure in SA2 scope.
* Nokia think it is OK to capture P14 and analyse further for RAN2 impact.
* ZTE agree that P13 is not needed in this context. On P10, they think N3IWF might not be deployed, and in this case the end-to-end security may not be available; so they think we should capture the hop-by-hop solution as well. Qualcomm think this issue has been discussed in SA2 and RAN2 cannot make this judgement.
* LG think P13 is valid to consider in the study item. Chair understands that service continuity can be discussed later.
* Futurewei think on P2, we can reference the call flow but we need to develop the AS portion, which is only one block in the SA2 figure. Qualcomm clarify the proposal is to add a step for AS impact.
* vivo wonder why we don’t discuss authorisation here (P3). Qualcomm clarify the same issue is in scope in discussion [AT111-e][606] and we shouldn’t duplicate, and authorisation is agnostic to the relay architecture.
* Huawei think for P9 we could postpone the proposal until we have some discussion of RAN2 impacts of QoS.
* Capture a reference to the SA2 UE-to-UE stack and agree P1 in the form below.
* P1/P2/P3/P5/P6/P7/P8/P9 are agreed

Proposal 1: On user plane protocol stacks of L3 UE-to-NW relay, capture the followings in RAN2 TR:

• SA2 captured two user plane protocol stacks for L3 UE-to-NW relay in TR 23.752 (Figure 6.6.1-2 of solution#6 and Figure 6.23.2-3 of solution#23). No impacts are identified to support them from RAN2 perspective.

Proposal 2: In RAN2 TR, capture Figure 6.6.2-1 of TR 23.752 with a reference to SA2 TR with identified RAN2 impacts analysis. Relay (re)selection is added after the step of “Discovery”. Other procedures identified with RAN2 impact can also be added in the Figure. RAN2 will further consider procedures with RAN2 impact.

Proposal 3: Leave discussion on Relay / Remote UE authorization in email discussion#606

Proposal 5: In TR, add one editor note “whether new PC5-S signaling is also introduced depends on SA2”

Proposal 6: On QoS support, capture in TR: SA2 captured two solutions for QoS support of L3 UE-to-NW relay:

• PCF sets separate Uu QoS parameters and PC5 QoS parameters in solution#25 of TR 23.752.

• End-to-End QoS support in solution#24 of TR 23.752, where relay can obtain a mapping between PQI and 5QI from SMF/PCF

Proposal 7: After relay obtains the mapping between PQI and 5QI from SMF/PCF (in solution#24 of [1]), RAN2 further discuss whether it is sufficient to enforce E2E QoS via legacy PC5 RRC reconfiguration of SLRB and resource allocation.

Proposal 8: RAN2 don’t intend to study QoS enhancement for L3 UE-to-NW relay to SA2 (e.g. whether gNB can perform PDB split). RAN2 can discuss AS impacts related to SA2 specified QoS solutions.

Proposal 9: Remote UE doesn’t need to provide information on which QoS flows need to be relayed to relay in AS layer.

* Above proposals are agreed
* Ericsson think on P10, it doesn’t hurt to document in the RAN2 TR what is in the SA2 TR, and whether N3IWF will be deployed is out of RAN2 scope. Intel agree it’s OK to capture this.
* Intel wonder about security for the UE-to-UE case. Qualcomm think we have an agreement that we can refer to the SA2 TR but P15 leaves this issue to them. Intel think this is not reflected in the current TP.
* vivo are OK with P10 for UE-to-NW and agree that N3IWF deployment issues are outside our scope. Futurewei point out the SA2 TR says the N3IWF solution is “optional”, and think the reason we capture these solutions is to look at their consequences on the RAN side.
* Huawei think there is nothing new to capture in the hop-by-hop security and it is not an aspect of relay security; they understand that it does not provide end-to-end security, and we need to wait for SA3 evaluation. Qualcomm note they have included an FFS as to whether it can satisfy the security requirements. Ericsson do not understand why there would be an issue with capturing what SA2 have captured. Lenovo are fine to capture the hop-by-hop security but do not want to capture the N3IWF, because they do not see that it is in RAN2 scope. Chair understands that we are tasked by SA2 to evaluate the N3IWF overhead, so we have some related work. Samsung have the same understanding and would like to capture both. Nokia also have the same understanding. vivo think we don’t have to discuss the topic from scratch but without guidance from SA2 to discuss something, we could end up in a loop.
* Futurewei understand that companies are OK with capturing the SA2 solutions as in P10, but RAN2 will still evaluate these solutions in terms of security.
* Apple think we should capture the two solutions in P10 but we could delete the “hop-by-hop”/”end-to-end” aspect. Interdigital agree that evaluating them for security is out of RAN2 scope. Huawei agree with Apple’s suggestion as a compromise.

On security, capture in TR: SA2 captured two solutions for security support of L3 UE-to-NW relay:

• Via legacy Uu security and PC5 security

• Via N3IWF in solution #23 of TR 23.752

RAN2 will evaluate any impact in RAN2 scope from these solutions.

* Discussion can continue to progress P4, P11, P14-P16. Summary in R2-2008267.

Proposal 14: RAN2 leaves control plane protocol stacks of L3 UE-to-NW relay to SA2.

Proposal 15: RAN2 leaves protocol stacks of L3 UE-to-UE relay to SA2.

Proposal 16: Postpone the study of control plane procedure of L3 UE-to-UE relay until the L3 UE-to-NW relay design is stable. This is based on the assumption that L3 UE-to-UE relay has similar control plane procedure as L3 UE-to-NW relay, instead of prioritization between UE-to-NW and UE-to-UE relay.

Proposal 4: In TR, capture that “Rel-16 NR V2X PC5-RRC establishment procedure is reused to setup a secure unicast link between Remote UE and Relay UE before unicast traffic relaying”.

Proposal 12: On service continuity of L3 UE-to-NW relay, capture in TR: “SA2 specified one solution for the service continuity of L3 UE-to-NW relay in upper layer via N3IWF (i.e. solution#23 in TR 23.572). RAN2 didn’t identify RAN2 impact and thereby leave the evaluation of service continuity to SA2.”

Proposal 11: RAN2 to online discuss whether to send LS to SA3 on RAN specific security questions for L3 UE-to-NW relay based on CATT’s draft LS (R2-2007168).

[R2-2008267](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008267%20-%20Summary%20of%20offline%20discussion%20%5b604%5d%5bRelay%5d%20L3%20relay%20protocol%20stacks%20(merge%20TP)-phase3_Final.docx) Summary of offline discussion [604][Relay] L3 relay protocol stacks (Qualcomm) Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

Agreements:

1) In TR, capture that “Rel-16 NR V2X PC5-RRC establishment procedure is reused to setup a secure unicast link between Remote UE and Relay UE before unicast traffic relaying”.

2) RAN2 leaves control plane protocol stacks of L3 UE-to-NW relay to SA2. And RAN2 TR adds a reference to SA2 TR. FFS if there is RAN2 impact to support the related control plane procedures.

3) Proposal 15: RAN2 leaves protocol stacks of L3 UE-to-UE relay to SA2. And RAN2 TR adds a reference to SA2 TR.

4) First focus on the study of control plane procedures which are similar to L3 UE-to-NW relay and L3 UE-to-UE relay

5) Postpone the discussion on whether sending LS to SA3 for RAN specific security questions of L3 UE-to-NW relay

[R2-2008254](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008254%20Summary%20of%20%5bAT111-e%5d%5b605%5d%5bRelay%5d%20L2%20Relay%20Mechanism%20(MediaTek).docx) [AT111-e][605][Relay] L2 Relay Mechanism (MediaTek) MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

* Noted without presentation (replaced by R2-2008266)

[R2-2008266](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008266%20Summary%20of%20%5bAT111-e%5d%5b605%5d%5bRelay%5d%20L2%20Relay%20Mechanism%20(MediaTek).docx) [AT111-e][605][Relay] L2 Relay Mechanism (MediaTek) MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

Discussion on block of “easy” proposals (P1/P3/P6-P12):

* Samsung have some concerns for P6; they agree it is technically possible but would prefer to keep the specific information as an example until we discuss other possible solutions. They also note the adaptation layer header is not security protected and we should be careful about what is exposed.
* Qualcomm have similar concerns on P6 but think we could take is as a WA.
* Apple understand that the second bullet in P9 is only about RLC/MAC configuration on PC5 and we should clarify that.
* Spreadtrum also have a concern about P6 and think the adaptation layer should be added for all UEs (i.e. present on PC5 as well). Chair understands that P6 is only about Uu adaptation layer and PC5 is discussed separately.
* Huawei are fine with the clarification from Apple on P9, and think we can agree on P6 because the second bullet is not exactly the ID of the RB; we could say “information related to the ID of the bearer”.
* ZTE think the first bullet on P7 is not clear as to whether it relates to transmission from the remote UE or reception by remote UE. On P6 and P7, they think the function of the Uu and PC5 adaptation layers may be different in different directions and these are only related to P1 and P3.
* vivo have concerns on P3/P6/P7. Think the UE-to-NW and UE-to-UE adaptation layers may be different, and would prefer that we treat the specific information as an assumption rather than an agreement. MediaTek clarify P6 and P7 distinguish between UE-to-NW and UE-to-UE. vivo think we may not need the adaptation layer for UE-to-UE.
* Ericsson also have concerns about the detailed information in P6/P7. Think we can capture that the adaptation layer is needed, but the details can be further discussed later especially in relation to security. On the second bullet in P9, they want to be clear about what “configuration defined in specs” means: preconfiguration or default configuration?
* Samsung agree with Ericsson about P6 and P9.
* LG think P12 needs to consider RAN paging as well.
* Intel think we could agree to P1/P3, and think we could take P6 with the change to make the information exemplary. On P9 they are not sure if we can be more specific now.
* Nokia think we need more time on some of these decisions, e.g. they would prefer to keep the details FFS in P6.
* CATT think we could agree P1/P3. For P6, they think this is a hard decision and we need to resolve the adaptation layer functions first.
* MediaTek understand that the majority view is that bearer mapping is a main function of the adaptation layer.
* Huawei think on P6, we have agreement that bearer mapping is an adaptation layer function, and we need both the UE ID and bearer ID for this. They see no connection to the routing function in the wording of this proposal. For both P6 and P7, they think we could take a WA. Samsung agree with this but think there is substantial opposition to the proposal.
* Lenovo agree with Huawei and think we should discuss the adaptation layer functions first. They understand that bearer mapping on the “second” link (e.g. to the gNB on the UL) is a minimum function.
* Kyocera agree we should have the adaptation layer, and point out that the UE-to-NW and UE-to-UE cases may have different needs.
* OPPO are supportive of P6/P7, and point out that the SID indicated FeD2D as the baseline and companies had a clear majority view on the support of the specific information. Futurewei have a similar view and think we don’t need to iron out all the details; the main point of the study is to make sure it is feasible.
* Qualcomm think we may need a new spec for the adaptation layer and we should discuss the functionality before the details.
* vivo think the details on P7 may require coordination with SA2 and this is the point of the FFS part. They think it is clearer for UE-to-NW.
* Nokia think P6/P7 could be more general than just the header.
* Samsung are not sure if N-to-1 bearer mapping is possible in UE-to-NW. Would we have multiple transmitting remote UEs mapping to the same uplink Uu bearer? vivo think this could happen with multiple remote UEs on the same relay. Interdigital note it was agreed previously in FeD2D and they do not see why it would be a source of confusion now. Samsung understand that data are transmitted only when we have a PC5 unicast link. Convida have the same understanding as Interdigital.’
* Interdigital understand that the concern for N-to-1 mapping in UE-to-UE is only about the destination ID.
* Block of proposals is agreed other than P11

Proposed Easy Agreements:

Proposal-1: agree the following description for L2 UE-to-NW relay (also reflected by TP)

 For L2 UE-to-NW relay, the adaptation layer is put over RLC sublayer for both CP and UP between Relay UE and gNB.

 Uu SDAP/PDCP and RRC are terminated between Remote UE and gNB, while RLC, MAC and PHY are terminated in each link.

 Remote UE needs to establish its own PDU sessions/DRBs with the network before user plane data transmission.

Proposal-3: agree the following description for L2 UE-to-UE relay (also reflected by TP)

 An adaptation layer is supported over PC5 link (between Relay UE and receiving Remote UE) for L2 UE-to-UE relay.

 For L2 UE-to-UE relay, the adaptation layer is put over RLC sublayer for both CP and UP between Relay UE and receiving Remote UE for L2 UE-to-UE relay.

 Sidelink SDAP/PDCP and RRC are terminated between two Remote UEs, while RLC, MAC and PHY are terminated in each PC5 link.

Proposal-6: Working assumption: Agree to put the needed information within the header of adaptation layer to enable Bearer mapping for L2 UE-to-Network relay and the details can be discussed at WI phase. FFS if N-to-1 (PC5-to-Uu) bearer mapping is supported for this case.

Proposal-7: Working assumption: Agree to put the needed information within the header of adaptation layer (for the receiving remote UE in UE-to-UE) to enable Bearer mapping for L2 UE-to-UE relay and the details can be discussed at WI phase. FFS on the details to support the N-to-1 mapping between the ingress RLC channels from multiple transmitting remote UEs to egress RLC channels (going to the same receiving Remote UE) at Relay UE.

Proposal-8: Agree that “PC5-RRC aspects of Rel-16 NR V2X PC5 unicast link establishment procedures can be reused to setup a secure unicast link between Remote UE and Relay UE for L2 relaying (before Remote UE establishes a Uu RRC CONNECTION with the network via Relay UE)”

Proposal-9: Agree the following bullets for IC/OOC Remote UE connection establishment with gNB for L2 UE-to-NW Relay (reflected within TP also):

 Use “first RRC message for connection establishment from Remote UE with gNB” to replace “Remote UE SRB0” to resolve the terminology issue.

 The PC5 L2 configuration for transmitting “first RRC message for connection establishment from Remote UE with gNB” at Remote UE can be based on the PC5 RLC/MAC configuration defined in specs. FFS if this is a default configuration that can be overridden.

 The description above applies to both OOC and IC Remote UEs.

Proposal-10: Agree the following for Remote UE connection establishment with gNB for L2 UE-to-NW Relay (reflected within TP also):

The establishment of Uu SRB(1/2) and DRB of the Remote UE is subject to legacy configuration procedures for L2 UE-to-NW Relay.

Proposal-12: Agree to capture the following for the paging aspect for L2 UE-to-NW Relay into TR (reflected within TP also):

The Option 2 as studied in TR36.746 for FeD2D paging is selected as the baseline paging relaying solution for L2 based UE-to-Network relaying case (i.e. Relay UE monitors the Remote UE's PO in addition to its own PO.)

* The foregoing proposals are agreed.

Email discussion [605] can continue to Thursday 2020-08-27 1200 UTC.

Proposal-11: Agree to capture the following for the security aspect for L2 UE-to-NW Relay and L2 UE-to-UE relay into TR (reflected within TP also):

The end-to-end security (confidentiality and integrity protection) is enforced at the PDCP layer between the remote UE and gNB and then there is no data exposure to Relay UE for L2 UE-to-Network relay.

The end-to-end security (confidentiality and integrity protection) is enforced at the PDCP layer between the two remote UEs, then there is no data exposure to Relay UE for L2 UE-to-UE relay.

Editor Note: RAN2 needs to take SA3 input to confirm the understanding.

Proposals with clear majority:

Proposal-2: RAN2 to further discuss the following description for L2 UE-to-NW relay (TP needs to update based on the agreement)

For L2 UE-to-NW relay, adaptation layer over PC5 is supported between Remote UE and Relay UE for L2 UE-to-Network Relay.

Proposal-4: agree the following description for L2 UE-to-UE relay (also reflected by TP)

For L2 UE-to-UE relay, adaptation layer over PC5 is supported between transmitting Remote UE and Relay UE for L2 UE-to-UE Relay.

Proposal-13: Agree to capture the following for the system information aspect for L2 UE-to-NW Relay into TR (reflected within TP also):

For L2 UE to Network Relaying, it is assumed that Relay UE supports relaying of system information for its Remote UEs with the system information delivery mechanism studied by TR36.746 for FeD2D as the starting point. FFS for the detailed procedures.

Proposal-14: Agree to capture the following for the system information aspect for L2 UE-to-NW Relay into TR (reflected within TP also):

On-demand SI delivery is supported for Remote UEs in RRC Idle/Inactive and RRC Connected for L2 UE to Network Relaying.

Other Proposals (e.g. slightly majority):

Proposal-5: agree the following description for L2 relay (also reflected by TP)

In L2 relay, the adaptation layer supports functions of both bearer mapping and packet routing.

Packet routing is supported for the purpose of remote UE identification.

From bearer mapping perspective for L2 UE-to-Network Relay, traffic of one or multiple Remote UEs may be mapped to a single DRB of Uu interface of the Relay UE. Multiple Uu DRBs may be used to carry traffic of different QoS characteristics, for one or multiple Remote UEs. In the PC5 between Remote UE and Relay UE, the support of many to one mapping between different bearers and sidelink RLC channels is dependent on decision on adaptation layer on PC5 interface.

From bearer mapping perspective for L2 UE-to-UE Relay, traffic of one or multiple Remote UEs from ingress RLC channel may be mapped to a single egress sidelink RLC channel of the Relay UE. Multiple egress RLC channel may be used to carry traffic of different QoS characteristics, for one or multiple Remote UEs.

Proposal-15: Agree to continue to discuss the following issues for L2 Relay mechanism (covering Remote UEs within IC and OOC) as post-meeting disc until next meeting:

 Any leftover(s) from this email disc.

 QoS handling

 Further aspect for CP procedures (e.g. Connection establishment, CN registration)

[R2-2008269](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008269%20Summary%20on%20Phase%203%20Discussion%20for%20%5bAT111-e%5d%5b605%5d%5bRelay%5d%20L2%20Relay%20Mechanism.docx) [AT111-e][605][Relay] L2 Relay Mechanism (MediaTek) MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

* CATT wonder if taking P11 means we should notify SA3. MediaTek understand that if there is a RAN2 issue for SA3 it could be brought next meeting.
* Intel are not sure how the optional support in P2/P4 would work: Would we not specify the details of how the adaptation layer would work and leave the UE free to implement another solution? They are not sure it is really a compromise and would prefer the first way with taking WA. MediaTek understand that the optionality means if the UE indicates support for the adaptation layer it can be configured with it.
* Nokia would like to postpone the decision on P2/P4. On P11, they think no LS is needed unless we have an issue.
* vivo think we could follow the majority view on P2/P4, and think there may be L2ID issues with the UE-to-UE design. They wonder if we should send an LS to SA2 asking about the feasibility of bearer mapping. MediaTek understand bearer mapping is a different issue.
* Lenovo think we should decide now on P2/P4, but think optionality is not a good solution.
* Qualcomm cannot accept the WA for P2/P4, only the optional version. On P11, they think it is a late change and think we could add “as indicated in 23.752”.
* Samsung agree with Nokia that we should postpone the decision on P2/P4. They are not convinced that there is a need for the adaptation layer on PC5, and find the optionality to be unclear.
* Futurewei think the expressed concern on the adaptation layer is more about having a separate layer than about having an adaptation function. They think we could agree to have an adaptation function, and FFS if it is a new protocol layer or RRC configuration. Samsung think this would not address their concerns and think there may be no need for any adaptation functions.
* [Post111-e][627][Relay] Remaining issues on L2 architecture (MediaTek)

Scope: Discuss the remaining issues from [AT111-e][605], including the functionality of the adaptation layer and control plane procedures.

Intended outcome: Summary to next meeting

Deadline: Long

Scope and work organisation

[R2-2006604](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006604%20-%20Protocol%20stack%20and%20CP%20procedure%20for%20sidelink%20relay.docx) Protocol stack and CP procedure for SL relay OPPO discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007292](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007292-%20Considerations%20on%20L2%20and%20L3%20SL%20relay%20protocol%20design.docx) Considerations on L2 and L3 SL relay protocol design Ericsson discussion Rel-17 FS\_NR\_SL\_relay

General architecture and procedures

[R2-2007608](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007608_SLRelay_ProtocolStack_Intel.docx) Impact on user plane protocol stack and control plane procedure for Sidelink Relay Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008047](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008047.doc) Study aspects of UE-to-Network relay and solutions for L2 relay Huawei, HiSilicon discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006722](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006722%20protocol%20stack%20and%20connection%20setup.docx) Protocol Stack and Connection Setup Procedure of Sidelink Relay Futurewei discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007181](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007181.doc) Overview of Layer-2 and Layer-3 sidelink relay mechanisms Sony discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006555](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006555%20-%20UE-to-network%20relay%20architecture%20and%20prcoedures.docx) UE-to-network relay architecture and procedures Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006572](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006572.docx) Architecture Options for Sidelink Relay MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006610](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006610.docx) User and Control Plane Procedures for L2 UE-to-NW Relay CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006718](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006718_SLRelay_Intel.docx) Characteristics of L2 and L3 based Sidelink relaying Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006737](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006737%20Discussion%20on%20NR%20SL%20Relay%20Architecture.doc) Discussion on NR SL Relay Architecture ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006759](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006759%20(R17%20SL%20Relay%20SI%20A873%20UEtoNW).doc) Discussion and TP on UE to NW Relay Based on L2 Relay Architecture InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006760](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006760%20(R17%20SL%20Relay%20SI%20A873%20UEtoUE).doc) Discussion and TP on UE to UE Relay Based on L2 Relay Architecture InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006855](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006855-L3RelayIssues.docx) Considerations for L3 UE-to-Network Relays Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006962](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006962.docx) Mechanisms for supporting L2-based Sidelink Relays AT&T discussion

[R2-2007044](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007044.doc) Discusssion on architecture for NR sidelink relay Spreadtrum Communications discussion

[R2-2007100](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007100%20SL%20relay%20user%20plane%20procedures.doc) Discussion on User Plane mechanisms for Layer 2 Relay Apple discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007101](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007101%20SL%20relay%20control%20plane%20procedures.doc) Discussion on Control Plane mechanisms for Layer 2 Relay Apple discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007460](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007460%20Protocol%20stack%20design%20for%20L2%20relay%20v1.1.doc) Protocol stack design for L2 relay Lenovo, Motorola Mobility discussion Rel-17

[R2-2007461](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007461%20Relayed%20connection%20management%20v1.1.doc) Relayed connection management Lenovo, Motorola Mobility discussion Rel-17

[R2-2008019](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008019%20Relaying%20mechanism%20for%20NR%20sidelink.docx) Relaying mechanism for NR sidelink LG Electronics Inc. discussion Rel-17 FS\_NR\_SL\_relay

Re/selection

[R2-2006736](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006736%20Discussion%20on%20relay%20initiation%20and%20relay%20UE%20(re-)selection.doc) Discussion on relay initiation and relay UE (re-)selection ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007040](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007040_Selection,%20Authorization%20and%20Security%20for%20L2%20and%20L3%20relay.doc) Selection/Authorization and Security for L2 and L3 relay vivo discussion Rel-17

[R2-2006557](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006557%20-%20Discussion%20on%20NR%20sidelink%20relay%20selection%20and%20reselection.doc) Discussion on NR sidelink relay selection and reselection Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006770](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006770%20-%20Discussion%20on%20SL%20relay%20(re)selection%20and%20authorization.doc) Discussion on SL relay (re)selection and authorization OPPO discussion Rel-17

[R2-2006861](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006861_NR_SL_Relaying.docx) NR Sidelink Relay (Re-)Selection Criterion and Procedure Fraunhofer IIS, Fraunhofer HHI discussion Rel-17

[R2-2006867](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006867_8_7_3_Mechanisms%20and%20their%20characteristics%20in%20sidelin%20relaying.doc) Mechanisms and Characteristics in NR Sidelink Relaying Fujitsu discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008043](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008043%20Consideration%20of%20Relay%20characteristics.docx) Consideration of Relay characteristics LG Electronics Inc. discussion Rel-17 FS\_NR\_SL\_relay

Service continuity

[R2-2008048](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008048.docx) Service continuity for L2 UE-to-Network relay Huawei, HiSilicon discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006723](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006723%20service%20continuity.docx) Service Continuity with Sidelink Relay Futurewei discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007041](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007041_Protocol%20stack%20and%20service%20continuity%20for%20L2%20and%20L3%20relay.docx) Protocol stack and service continuity for L2 and L3 relay vivo discussion Rel-17

[R2-2007816](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007816-Consideration%20on%20UE-to-NW%20Relay-v0806.doc) Considerations on UE-to-NW Relay ETRI discussion FS\_NR\_SL\_relay

[R2-2008066](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008066.doc) Discussion on service continuity from Uu to relay Xiaomi communications discussion

QoS

[R2-2006724](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006724%20QoS.docx) QoS Control with Sidelink Relay Futurewei discussion Rel-17 FS\_NR\_SL\_relay

RRC states

[R2-2007462](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007462%20RRC%20state%20and%20CN%20registration%20of%20remote%20UE%20v1.1.doc) RRC state and CN registration of the remote UE Lenovo, Motorola Mobility discussion Rel-17

[R2-2006571](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006571.docx) RRC States for Relaying MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

Architecture comparison

[R2-2006611](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006611.docx) L2/L3 UE-to-NW Relay Comparison CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006639](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006639.docx) L2 vs L3 - Relay (re-)Selection, Quality of Service (QoS) Fraunhofer HHI, Fraunhofer IIS discussion

[R2-2006641](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006641.docx) L2 vs L3 - Relay/Remote UE Authorization, Service Continuity Fraunhofer HHI, Fraunhofer IIS discussion

[R2-2006843](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006843.docx) View on L2/L3 SL relay ITL discussion

[R2-2007203](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007203%20L3%20vs%20L2%20relaying%20-cln.doc) L3 vs L2 relaying Samsung Electronics GmbH discussion

* [Post111-e][621][Relay] Service continuity (Huawei)

Scope: Determine agreeable requirements and scenarios for service continuity, and progress the understanding of service continuity procedures for L2 and L3 relays.

Intended outcome: Summary to next meeting

Deadline: Long

* [Post111-e][622][Relay] Relay selection and reselection (Apple)

Scope: Discuss proposals for relay selection/reselection with the following goals:

* Determine a baseline for selection/reselection criteria
* Confirm if there is any dependency on L2/L3 relay design
* Determine if there is different selection/reselection behaviour for UE-to-network and UE-to-UE cases
* Discuss possible enhancements to the baseline selection/reselection criteria

Intended outcome: Summary to next meeting

Deadline: Long

### 8.7.4 Discovery model/procedure for sidelink relaying

* [AT111-e][606][Relay] Discovery model and procedure (OPPO)

Scope: Discuss proposals on the discovery model and procedures, including:

* Protocol stacks for discovery
* Potential reuse of discovery models from LTE
* Resource pool for discovery
* Visibility of discovery signalling in AS layers
* Conditions for discovery
* Authorisation related aspects

Intended outcome: Summary with potential agreeable TP, in R2-2008255

Deadline: Wednesday 2020-08-26 1200 UTC

[R2-2008255](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008255%20-%20%5b606%5d%5bRelay%5d%20discovery%20model%20and%20procedure_summary_v3.doc) Discovery model and procedure OPPO discussion Rel-17 FS\_NR\_SL\_relay

Discussion on block of “easy” proposals (P1-P6, P10-P18 and P18a):

* OPPO clarify the proposals are common for L2/L3. UE-to-NW and UE-to-UE are marked with coloured highlighting in the document.
* LG think P15 needs some clarification on whether it means connected to the same or different gNB than the relay. OPPO clarify this was not addressed in the discussion and the proposal takes no position.
* Lenovo wonder about P5 if it means we will containerise the discovery information in PC5-S message, which would impact SA2. On P16, they think it only applies when the remote UE has no end-to-end connection. OPPO clarify that the case of a remote UE connected through the relay was not discussed, and this is the reason for the FFS in the proposal.
* CATT think on P14 there are two motivations for discovery: coverage enhancement and power efficiency. They think for the power efficiency motivation, the remote UE might perform discovery even with high Uu RSRP.
* Interdigital have some wording comments on P1-P3. OPPO clarify there are some issues in the copied proposals where changes were not accepted.
* Huawei share Lenovo’s concern on P16, and think we should add a qualifier that it is only for the initial access case. OPPO do not fully understand the concern.
* vivo want to clarify the wording on P15: Does “up to serving gNB” mean “fully controlled by serving gNB”? OPPO think this is covered by saying “detail is FFS”.
* MediaTek think the wording of P5 suggests that there could be other discovery messages carried by another sidelink SRB other than the one we use for PC5-S. Qualcomm clarify that the FFS means we have an existing SL-SRB for PC5-S, and the wording is intended to leave open whether we need a new one for discovery signalling. Qualcomm think we cannot reuse the PC5-S protocol stack exactly, and think we could say “protocol stack similar to PC5-S”. OPPO understand that the stack was discussed in email but agree that the actual discovery signalling will be defined in SA2. This is also related to the discussion of whether PC5-S signalling is identifiable in lower layers. Qualcomm think the current terminology may cause confusion about whether the signalling is the same content as PC5-S.
* Intel think we should not remove the details of the protocol stack in P5, and the real RAN2 impact is the FFS point. They also think P13 is a bit superfluous as P14-P16 seem to cover all cases. For P14-P16, they think the focus was on how the configuration is provided, and they wonder if the threshold from P14 would also apply to P15 and P16. OPPO agree if P14-P16 are agreed, it covers P13. On the threshold, OPPO understand that the network would configure the parameters for the UE in idle/inactive and the remote UE makes the decision in that case, but for the RRC\_CONNECTED remote UE, the serving gNB will make the decision. Whether there is a further threshold could be discussed later. Ericsson agree that P13 can be deleted.
* vivo think we should remove the details of the protocol stack in P5.
* Ericsson think for P14, the UE needs to compare the Uu RSRP to a threshold, and they wonder what the measurement will be given that the UE does not normally perform measurements when idle/inactive. OPPO think the same principle is used in LTE. Lenovo point out we have idle measurements for reselection.
* Nokia think we do not need to send an LS to RAN3 as in P18a to say they should not do something. They agree that there is no identified RAN3 impact but we don’t need to say so. OPPO think there is some RAN3 impact for the UE-to-NW case and we would like them to work on it in the WI phase. Samsung somewhat agree with Nokia that it would be strange to send this LS.
* Qualcomm think P12 and P15 assume that the gNB is SL-capable.
* Kyocera think P14 should only apply to transmission.

[Easy] Proposal1: Model A/ B discovery model similar to LTE is reused for U2N relay

[Easy]Proposal2: Model A/ B discovery model similar to LTE is reused for U2U relay also

[Easy]Proposal3: Send a LS to inform SA2 of RAN2’s assumption on discovery models for both U2N relay and U2U relay.

[Easy]Proposal4: RAN2 take agreed discovery model for U2N relay and U2U relay as working assumption while waiting for SA2’s response

[Easy]Proposal5: Discovery message is carried over SL SRB with control plane protocol stack similar or identical to PC5-S (PC5-S/PDCP/RLC/MAC/PHY). FFS whether new SL SRB is introduced for discovery message.

[Easy]Proposal6: Solution is needed to differentiate discovery message in AS layer from existing SL signalling or traffic

[Easy]Proposal10: For U2N relay, relay UE is allowed to transmit/receive discovery message when it is in coverage and relevant control parameters including e.g. Uu signal quality thresholds and communication configuration are provided by network

[Easy]Proposal11: For U2N relay, LTE principle i.e. one lower threshold and one upper threshold can be reused for relay UE in IDLE/INACTIVE state to decide whether it is allowed to transmit/receive discovery message

[Easy]Proposal12: For U2N relay, relay UE in CONNECTED state is allowed to transmit/receive discovery message if sidelink communication configuration is provided from network. FFS for the case that the serving gNB is not SL-capable (if applicable).

[Easy]Proposal14: for U2N relay, remote UE in IDLE/INACTIVE state is allowed to transmit/receive discovery message when signal strength of Uu interface is lower than one configured threshold by network. FFS the details of the idle measurements and possible additional network configuration.

[Easy]Proposal15: for U2N relay, whether remote UE in CONNECTED state is allowed to transmit/receive discovery is based on configuration provided by serving gNB and detail is FFS. FFS for the case that the serving gNB is not SL-capable (if applicable).

[Easy]Proposal16: for U2N relay, remote UE out of coverage is always allowed to transmit/receive discovery message based on pre-configuration in the initial access case (i.e. not already connected through relay). FFS whether based on configuration from network in case the remote UE is already connected through a relay.

[Easy]Proposal17: RAN2 concludes that authorization of both relay UE and remote UE has no RAN2 impact

[Easy]Proposal18: RAN2 concludes that limited impact on RAN3 for UE-to-Network relay can be left for normative work item phase

* The foregoing proposals are agreed
* LS to SA2 (P3 above) to be treated in a short post-meeting discussion.

Bunches of proposal for further discussion or not easy.

Proposal 7: MAC layer solution maybe needed to differentiate discovery message from other signalling or data. Detail solution is FFS.

Proposal7a: PHY layer solution (other than option4 i.e. separate resource pool) is not needed if RAN2 can agree on separate resource pool i.e. proposal8. Otherwise PHY layer (other than option4) is needed and detail solution is FFS.

Proposal8: RAN2 is kindly asked to discuss whether separate resource is needed for discovery message

Proposal9: in case proposal8 is agreed then both RX/TX resource pool should be separated for discovery message.

Proposal15a: RAN2 is kindly asked to discuss whether serving gNB of remote UE or relay UE in CONNECTED state is always SL capable.

* [Post111-e][620][Relay] LS to SA2 on relay discovery assumptions (OPPO)

Scope: Draft an LS to SA2 indicating RAN2 assumptions on the reuse of LTE discovery models for UE-to-network and UE-to-UE relay.

Intended outcome: Approved LS, in R2-2008270

Deadline: Friday 2020-09-04 1200 UTC

* [Post111-e][623][Relay] Remaining issues on relay discovery (OPPO)

Scope: Discuss the remaining issues on relay discovery:

* Need for MAC and/or PHY solution to differentiate discovery messages
* Need for separate resource pool for discovery messages
* Handling of potential cases where the serving gNB is not sidelink-capable
* Conditions for discovery for UE-to-UE relay
* FFS points in the discovery conclusions from RAN2#111-e

Intended outcome: Summary to next meeting

Deadline: Long

[R2-2007098](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007098%20SL%20relay%20discovery_v1.doc) Discussion on NR Sidelink Relay Discovery Apple, Convida Wireless discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006556](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006556%20-%20Discussion%20on%20relay%20discovery.doc) Discussion on relay discovery model / procedure Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006761](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006761%20(R17%20SL%20Relay%20SI%20A874%20Discovery).doc) Discovery Procedure for SL Relaying InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006573](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006573.docx) Initiation of relaying operation MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006612](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006612.docx) Discovery Model/Procedure for NR Sidelink Relay CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006738](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006738%20Discussion%20on%20relay%20discovery%20and%20link%20management.doc) Discussion on relay discovery and link management ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006771](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006771%20-%20Discussion%20on%20SL%20relay%20discovery%20procedure.doc) Discussion on SL relay discovery procedure OPPO discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006862](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006862_NR_SL_Relaying_Discovery.docx) NR Sidelink Relaying Discovery Fraunhofer IIS, Fraunhofer HHI discussion Rel-17

[R2-2006868](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006868_8_7_4_Discovery%20modelprocedure%20in%20sidelink%20relaying.doc) Discovery Model and Procedure in NR Sidelink Relaying Fujitsu discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006931](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006931.docx) On Sidelink Discovery for Relaying Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

[R2-2006969](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006969%20Sidelink%20relay%20discovery%20model%20and%20procedure.doc) Sidelink relay discovery model and procedure Samsung Electronics Co., Ltd discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007042](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007042_Discussion%20of%20Relay%20UE%20discovery.doc) Discussion of Relay UE discovery vivo discussion Rel-17

[R2-2007045](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007045-%20Discussion%20on%20discovery%20procedure%20for%20sidelink%20relay.doc) Discussion on discovery procedure for sidelink relay Spreadtrum Communications discussion

[R2-2007291](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007291-%20Discovery%20aspects%20for%20NR%20sidelink%20relay.docx) Discovery aspects for NR sidelink relay Ericsson discussion Rel-17 FS\_NR\_SL\_relay

[R2-2007476](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007476%20Considerations%20on%20discovery%20procedure%20for%20sidelink%20relay-v1.0.doc) Considerations on discovery procedure for sidelink relay Lenovo, Motorola Mobility discussion Rel-17

[R2-2008045](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008045%20Consideration%20of%20discovery%20model%20procedure%20for%20sidelink%20relay.docx) Consideration of discovery model/procedure for sidelink relay LG Electronics Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008049](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008049.docx) Common aspects for L2 and L3 UE-to-Network relay Huawei, HiSilicon discussion Rel-17 FS\_NR\_SL\_relay

## 8.11 NR positioning enhancements SI

(FS\_NR\_pos\_enh; leading WG: RAN1; REL-17; WID: RP-200928)

Time budget: 2 TU

Tdoc Limitation: 4 tdocs

Email max expectation: 4 threads

### 8.11.1 Organizational

Rapporteur inputs and other organizational documents. Documents in this AI do not count towards the tdoc limitation.

Workplan

[R2-2006670](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006670.docx) Updated Work Plan for R17 SI NR Positioning Enhancements CATT, Intel Corporation, Ericsson discussion Rel-17 FS\_NR\_pos\_enh

* Noted

TR skeleton

[R2-2006958](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006958%20skeleton%20for%20TR38857.docx) skeleton for TR38857 Ericsson TS or TR cover Rel-17 38.857 0.0.1 FS\_NR\_pos\_enh

* ESA wonder where we would capture the error sources for different positioning methods. Ericsson think it can be captured within section 9, which will anyway need to be expanded.
* Nokia note there is a section related to NR impacts, and think we need to identify these aspects early for the integrity portions.
* Intel understand that this skeleton has been discussed in RAN1. For the NR impact section, they think it is more of a summary section that doesn’t need to be filled in now.
* Noted

[R2-2006671](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006671.docx) Skeleton proposals for TR38.857 CATT draftCR Rel-17 38.857 0.0.1 FS\_NR\_pos\_enh

* Intel think there is not a clear boundary between 9.3 and 9.4 and they could be combined.
* Huawei are not sure why RAT-dependent and RAT-independent sections are separate; they understand that the two only differ in terms of error source and threat model, but should have the same methodology.
* Ericsson think the KPIs should be common between RAT-independent and RAT-independent, but the methodologies could differ.
* CATT think we should separate the two at first, and if there is a common part we can merge in the future.

[R2-2006542](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006542%20-%20Proposed%20table%20of%20contents%20-%20Section%209%20-%20TR%2038.857.docx) Proposed table of contents - Section 9 (positioning integrity) - TR 38.857 Swift Navigation, Ericsson, Intel Corporation discussion Rel-17

* ESA wonder if it is necessary to mention specific other industry standards, and think the error sources are missing. This is also a bit related to the separation between RAT-dependent and RAT-independent, and they wonder what Swift’s intention is on capturing the errors. Swift understand that we can extend the skeleton as we progress the SI, e.g. for the error sources.
* Qualcomm think this embeds assumptions about the scope of study that should be introduced later when we develop the related concepts. E.g. there are specific techniques identified that we may not study. They would prefer to stick to the skeleton proposed by CATT.
* Huawei generally agree with ESA and Qualcomm, and think the TR should only include the outcome of our study, not the full background. CATT share the view and think we should focus on 3GPP scope and capturing our agreements.
* Nokia think the TR should serve as a guideline for a future WI, and from this point of view we should focus more on the impact we will have on the current 3GPP protocol and architectures. They find this proposal a bit unfocussed in this respect.
* Intel think we should not spend too much time on the skeleton and it can be driven by the content.
* Swift agree the detail could be reduced, but think this is a new topic for 3GPP and the underlying principles need some development. They agree that a taxonomy of error sources is needed.
* Skeleton to be addressed in the continuation of email discussion [607] (to be discussed later).

Coordination and organisation

[R2-2006749](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006749%20Handling%20on%20Rel-16%20leftover%20issue%20in%20Rel-17-v01.doc) Handling on Rel-16 leftover issue in Rel-17 Intel Corporation discussion Rel-17 FS\_NR\_pos\_enh

* Qualcomm think there are no Rel-16 “leftovers” in the sense of unaddressed issues in the WI, and not everything that is proposed needs to be captured. They see the issues in this document as more TEI17 related. Huawei have the same view that there are no leftovers, and new issues can be proposed individually.
* Intel intended to capture issues that were discussed but not agreed in Rel-16. They think we should conclude in the SI on whether we would have these aspects in the WI.
* Noted

[R2-2006669](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006669.docx) Summary on Rel-17 positioning enhancement discussion in RAN1 CATT, Intel Corporation, Ericsson discussion Rel-17 FS\_NR\_pos\_enh

* Huawei are OK with the intention of P1, but are not sure how much latency analysis we can do in RAN2.
* Qualcomm think the scope implied by the proposals is already there in the SI objectives. We should not pre-restrict which sections we contribute to; it depends on contributions and consensus.
* Intel clarify the intention is to check for common understanding, and if companies have the same view we may not need to capture anything.
* CATT indicate the document is largely for information to understand the RAN1 progress.
* Nokia think we do not need to do any latency evaluation until and unless we receive guidance from RAN1; we should focus on integrity which is a RAN2 objective.
* Intel agree integrity is a high priority in RAN2 but think it is difficult for RAN1 to analyse end-to-end latency of the whole procedure. Qualcomm think we have a SID and we do not need to take a prioritisation decision; we have to fulfil all objectives, and they see RAN2 relevance also in the higher accuracy and lower latency objective.
* Noted

### 8.11.2 Enhancements for commercial use cases

Scope and general discussion related to the RAN2 objective on enhancements to support high accuracy, low latency, network efficiency, and device efficienty for commercial use cases. Detailed discussions may need to wait until RAN1 have progressed.

Goals and work planning for commercial objective

[R2-2006672](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006672.docx) Discussion on ehancements for commercial use cases CATT discussion Rel-17 FS\_NR\_pos\_enh

* Huawei understand that RAN1 will send an LS asking RAN2 to evaluate latency from the higher layer perspective. They think P4 needs to be discussed in RAN1 first, and are supportive of P5.
* CATT think P4 requires coordination with RAN1 and we can define the procedures.
* CATT clarify in P2 they intend for RAN2 to align on a specific latency model for company analyses.
* Intel agree with Huawei that P4 should be discussed first in RAN1. For P2, they think RAN2 should have a common understanding of what procedures are involved and what parts we consider regarding the latency, e.g. do we consider latency between RAN and CN? But they do not really consider this as a formal model.
* CATT think we could have an email discussion on the latency analysis model.
* [AT111-e][612][POS] Assumptions for analysis of commercial use cases (Ericsson)

Scope: Align understanding of the RAN2 scope and assumptions for accuracy, latency, and efficiency objectives for commercial use cases. Attempt to capture a summary of proposals to this meeting that can be discussed in RAN2 directly.

Intended outcome: Summary in R2-2008261

Deadline: Wednesday 2020-08-26 1200 UTC

[R2-2008261](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008261%20%5bAT111-e%5d%5b612%5d%5bPOS%5d%20Commercial%20use%20cases%20Summary.docx) [AT111-e][612][POS] Assumptions for analysis of commercial use cases (Ericsson) Ericsson discussion Rel-17 FS\_NR\_pos\_enh

P1:

* Qualcomm think this proposal is outside the scope of the email discussions and we intended to capture a summary of proposals rather than prioritise. They understand that so far we do not have agreed criteria for prioritisation.
* CATT generally agree with the proposal, but understand that RAN1 have deprioritised on-demand SRS. They agree that a latency analysis is necessary.
* Intel understand that RAN1 will send an LS to RAN2 asking us to analyse latency from high-layer perspective. Regarding idle/inactive and on-demand, they think these aspects should be more best-effort and take into account RAN1 discussion. They agree with Qualcomm that we should target what we can discuss in RAN2 directly.
* Huawei generally agree with Qualcomm that we should not be prioritising at this meeting. For a latency analysis they also understand that RAN1 will send an LS, and this should be a priority item for RAN2.
* ZTE would prefer to agree to the proposal and think it is hard to conclude due to the diversity of use cases. They think we need to prioritise the topics with the most interest.
* Nokia would rather “study” than “prioritise” these items, but think generally we should be contribution-driven, and foresee input from RAN2 on integrity and RAT-dependent enhancements.
* vivo think the meaning of on-demand SRS is unclear.

P3:

* Qualcomm think the local LMF proposal is only related to latency and think we could discuss it in RAN2.

RAN2 to study positioning in idle/inactive mode, on-demand PRS and latency analysis in the study phase.

* [Post111-e][625][POS] End-to-end latency analysis (Intel)

Scope: Discuss which nodes and which procedures are involved in a positioning latency analysis, and capture expected latency values where possible.

Intended outcome: Summary to next meeting with agreeable TP

Deadline: Long

[R2-2006578](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006578%20Discussion%20on%20R17%20positioning%20enhancement_v1.docx) Discussion on R17 positioning enhancement Huawei, HiSilicon discussion Rel-17 FS\_NR\_pos\_enh

[R2-2006956](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006956%20Enhancements.docx) Enhancements for commercial use cases Ericsson discussion Rel-17

[R2-2006567](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006567%20Discussion%20on%20potential%20positioning%20enhancement.docx) Discussion on potential positioning enhancement vivo discussion FS\_NR\_pos\_enh

[R2-2007049](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007049-Discussion%20on%20positioning%20enhancements%20for%20commercial%20use%20cases.docx) Discussion on positioning enhancements for commercial use cases Spreadtrum Communications discussion

[R2-2007629](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007629_(Positioning%20Enhancements).docx) NR Positioning Enhancements Qualcomm Incorporated discussion

Latency reduction

[R2-2006750](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006750%20Consideration%20on%20the%20support%20of%20low%20latency%20requirement%20v01.doc) Consideration on the support of low latency requirement Intel Corporation discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007587](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007587%20(R17%20NR%20POS%20A8112).doc) End-to-end latency reduction for DL/UL positioning InterDigital, Inc. discussion Rel-17

On-demand PRS

[R2-2007128](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007128.docx) On-demand PRS transmission and dynamic PRS resource allocation Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007159](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007159%20-%20Discussion%20on%20on-demand%20DL-PRS.doc) Discussion on on-demand DL-PRS OPPO discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007170](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007170%20Discussion%20on%20PRS%20enhancements.doc) Discussion on PRS enhancements Beijing Xiaomi Electronics discussion

Idle/inactive state positioning

[R2-2007157](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007157-%20Positioning%20for%20UE%20in%20RRC%20IDLE%20and%20inactive%20state.doc) Positioning for UE in RRC Idle and Inactive state OPPO discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007173](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007173%20Positioning%20enhancements%20for%20RRC%20IDLE%20and%20RRC%20INACTIVE%20state%20UE.doc) Positioning enhancements for RRC IDLE and RRC INACTIVE state UE Beijing Xiaomi Electronics discussion

Withdrawn

R2-2007694 On-demand PRS transmission and dynamic PRS resource allocation Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_pos\_enh Withdrawn

### 8.11.3 Integrity and reliability of assistance data and position information

[R2-2006541](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006541%20-%20TP%20Study%20on%20Positioning%20Integrity.docx) TP for Study on Positioning Integrity and Reliability Swift Navigation, Deutsche Telekom, u-blox, Ericsson, Mitsubishi Electric, Intel Corporation, CATT, UIC discussion Rel-17

#### 8.11.3.1 KPIs and use cases

* [AT111-e][607][POS] Integrity definitions, KPIs, and use cases (Swift)

Scope: Discuss proposals and attempt to reach consensus on definitions, KPIs, and use cases for positioning integrity.

Intended outcome: Summary with potential agreeable TP, in R2-2008256. Extension to further converge and produce a text proposal in R2-2008262, with attention to anticipated specification impact.

Deadline: Thursday 2020-08-20 1100 UTC – extended to Thursday 2020-08-27 1200 UTC

[R2-2008256](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008256%20Summary%20of%20%5bAT111-e%5d%5b607%5d.docx) [AT111-e][607][POS] Summary of email discussion on Integrity definitions, KPIs, and use cases (Swift) Swift Navigation discussion Rel-17 FS\_NR\_pos\_enh

* Qualcomm think there are definitions in the proposed baseline that are not clearly needed, and think it is strange that we start from the definitions. They think we could take definitions now of the four KPIs, and for other terms we should define them when we use them.
* Nokia think P2 and P5 are a bit contradictory since P5 uses the term PL. They understand that PL is something that the system should evaluate in real time, not a requirement from the application that could be described as a KPI.
* vivo have the same understanding as Nokia about the PL and think it needs to be decoupled from TTA.
* CATT agree with Qualcomm that we could capture just the four KPIs in the definitions now, and agree that PL is calculated so we should clarify its relation to KPIs.
* Swift understand that some additional definitions are useful to clarify the principles of integrity. On the PL, they agree we may need to revisit the definition of PL in relation to TIR and further discussion may be needed.
* Apple agree with Qualcomm and CATT on P1, and think some names could be changed to be more 3GPP-friendly.
* Huawei think in the literature, PL is treated as a KPI. In terms of the requirements, they think PL may not be a quantity we would capture in an SA1 spec; from that perspective only TTA, IR, and AL should be the quantities.
* ZTE are willing to include PL as a KPI, but wonder if we will separate AL into vertical and horizontal parts.
* ESA think the PL aspects can be further discussed offline. They think it is important to clarify the meaning of the KPIs further, and think the question of horizontal and vertical AL should be considered.
* Futurewei want to understand the RAN2 impact. They understand that PL can be defined but is calculated based on measurements, different from the other candidate KPIs, and wonder if RAN2 would derive the equation for calculating PL for different positioning methods. They also wonder about defining the new Positioning Integrity Function in RAN2 and what the impact would be. Swift think the PL equation would be implementation-defined.
* Intel understand that we will not define how AL, PL, etc. will be calculated, and the main work should be on what is forwarded between entities and applicability to use cases. They agree the definitions could be reduced but think the explanation of integrity concepts is needed.
* CATT think IR, AL, and TTA are related to QoS and could be used in SA1, and we need to consider whether to send an LS to SA1 asking them to define the service level for integrity.
* ESA think there are impacts on protocol and architecture that need to be considered, including potential impact to latency. They think we may have LPP impact to support users to derive PL or other KPIs on the device, and we should not spend too much time on the definitions.

Agreements:

* Start from the definitions of the four candidate KPIs. Additional definitions can be added when needed.

Proposal 1: Agree to the definitions provided in [1] as an initial baseline.

Proposal 2: Protection Level (PL) and Positioning System definitions should be FFS.

Proposal 3: Adopt the following definition of Positioning Integrity Function as a baseline,

taking into consideration the comments:

a. Positioning Integrity Function

Function within the Positioning System that, using the positioning measurements and other data, is able to generate the integrity-related data contained within the Positioning Information (e.g. Protection Level) so it can be employed by the positioning system to provide its service to the user application.

Proposal 4: Agree to discuss incorporating additional definitions from [2], including but not limited to Authentication, Confidence Level, Integrity Risk.

Proposal 5: Agree to the four KPIs: Target Integrity Risk (TIR), Alert Limit (AL), Protection Level (PL), Time-to-Alert (TTA).

Proposal 6: Agree that the four KPIs are common to RAT-Dependent and RAT-Independent positioning methods.

Proposal 7: KPI Performance interpretations are FFS.

Proposal 8: Agree to address safety-critical and liability-critical applications, including Automotive, Industrial IOT and Rail.

Proposal 9: Agree that other use cases can be considered case-by-case.

Proposal 10: Agree that use cases should be informational and illustrative in the TR with the goal of producing a use-case agnostic specification.

[R2-2008262](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008262%20Integrity%20Summary%20%5bAT111-e%5d%5b607%5d_Final.docx) [AT111-e][607][POS] Summary of email discussion on Integrity definitions, KPIs, and use cases (Swift) Swift Navigation discussion Rel-17 FS\_NR\_pos\_enh

Agreements:

1. Agree to adopt the Target Integrity Risk (TIR), Alert Limit (AL) and Time-to-Alert TTA) as the Integrity KPIs.

2. Agree to the following definitions of the KPIs:

Target Integrity Risk (TIR)

The probability that the positioning error exceeds the Alert Limit (AL) without warning the user within the required Time-to-Alert (TTA).

NOTE: The TIR is usually defined as a probability rate per some time unit (e.g. per hour, per second or per independent sample).

Alert Limit (AL)

The maximum allowable positioning error such that the positioning system is available for the intended application. If the positioning error is beyond the AL, operations are hazardous and the positioning system should be declared unavailable for the intended application to prevent loss of integrity.

NOTE: When the AL bounds the positioning error in the horizontal plane or on the vertical axis then it is called Horizontal Alert Limit (HAL) or Vertical Alert Limit (VAL) respectively.

Time-to-Alert (TTA)

The maximum allowable elapsed time from when the positioning error exceeds the Alert Limit (AL) until the function providing position integrity annunciates a corresponding alert.

3. Agree to include the PL integrity definition with the following baseline; FFS if updates are needed.

Protection Level:

The PL is a statistical upper-bound of the positioning error that ensures that, the probability per unit of time of the true error being greater than the AL and the PL being less than or equal to the AL, for longer than the TTA, is less than the required TIR.

NOTE: When the PL bounds the positioning error in the horizontal plane or on the vertical axis then it is called Horizontal Protection Level (HPL) or Vertical Protection Level (VPL) respectively.

4. The additional definitions are FFS on a ‘need-to-define’ basis.

5. Agree to study the Automotive, IIoT and Rail use cases as illustrative examples.

6. Agree to the Skeleton for Section 9 of TR 38.857.

* [Post111-e][626][POS] Integrity use cases and specification impacts (Swift)

Scope: Capture any additional integrity use cases and open issues on integrity, and draft a TP incorporating the existing agreements and any further progress.

Intended outcome: Summary to next meeting

Deadline: Long

Use cases

[R2-2006754](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006754%20Consideration%20on%20positioning%20integrity%20v01.doc) Consideration on positioning integrity Intel Corporation discussion Rel-17 FS\_NR\_pos\_enh

[R2-2006673](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006673.docx) Discussion on integrity KPIs and use cases CATT discussion Rel-17 FS\_NR\_pos\_enh

[R2-2006564](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006564%20Identify%20positioning%20integrity%20use%20case%20and%20KPIs.docx) Identify positioning integrity use case and KPIs vivo discussion FS\_NR\_pos\_enh

[R2-2006579](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006579%20Discussion%20on%20positioning%20integrity%20KPIs%20and%20relevant%20use%20cases.docx) Discussion on positioning integrity KPIs and relevant use cases Huawei, HiSilicon discussion Rel-17 FS\_NR\_pos\_enh

[R2-2006954](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006954%20%20KPIs.docx) Positioning integrity KPIs and support for RAT dependent use cases Ericsson discussion Rel-17

[R2-2007050](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007050.docx) Discussion on positioning integrity KPIs and use cases Spreadtrum Communications discussion

[R2-2007646](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007646%20Discussion%20on%20use%20cases%20and%20KPIs%20for%20position%20integrity.docx) Discussion on use cases and KPIs for position integrity ESA discussion Rel-17 FS\_NR\_pos\_enh

KPI selection

[R2-2007102](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007102%20NR%20Positioning%20Integrity.doc) Discussion on Positioning Integrity Apple discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007158](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007158-%20Discussion%20on%20the%20KPIs%20of%20integrity.doc) Discussion on the KPIs of integrity OPPO discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007936](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007936%20Discussion%20of%20the%20positioning%20integrity%20definition.docx) Discussion of the positioning integrity definition ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_pos\_enh

Other

[R2-2007073](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007073_Positioning_SEI.docx) Discussion on integrity and reliability for positioning based on an IIoT use case Sumitomo Elec. Industries, Ltd discussion Rel-17

[R2-2007187](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007187__Pos_Integrity_v1.0.docx) Discussion on Integrity of positioning information Sony discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007937](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007937%20Discussion%20of%20the%20integrity%20events%20and%20integrity%20failure.docx) Discussion of the integrity events and integrity failure ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_pos\_enh

#### 8.11.3.2 Error sources, threat models, occurrence rates and failure modes

* [AT111-e][613][POS] Integrity error sources (Huawei)

Scope: Categorise the identified error sources and develop a way forward, considering RAT-dependent and RAT-independent methods, with the understanding that the use of specific positioning methods may be use-case-dependent.

Intended outcome: Summary in R2-2008263

Deadline: Thursday 2020-08-27 1200 UTC

[R2-2008263](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008263%20%5bAT111-e%5d%5b613%5d%5bPOS%5d%20Integrity%20Error%20Sources_final.docx) [AT111-e][613][POS] Integrity Error Sources (Huawei) Huawei, HiSilicon discussion Rel-17 FS\_NR\_pos\_enh

Agreements:

Proposal 2: Error source for RAT-dependent positioning methods should be studied under RAN1. Send an LS to RAN1 to trigger the study on error sources for RAT-dependent positioning methods for positioning integrity

Proposal 3: RAN2 can independently study the error sources for RAT-independent positioning methods.

Proposal 5: RAN2 confirms that 4 possible sources of feared events are applicable for RAT-independent positioning in 3GPP system.

1. Faults in the correction data e.g.

a. Incorrect computation by the provider

b. External feared event impacting the provider

2. Faults in transmitting the data to the UE, e.g.

a. Data integrity faults

3. External feared events, e.g.

a. Satellite feared events

b. Atmospheric feared events

c. Multipath

4. UE faults

[R2-2008613](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2008613%20LS%20to%20RAN1%20on%20the%20error%20source%20for%20RAT-dependent%20positioning.doc) LS on the error source for RAT-dependent positioning Huawei, HiSilicon LS out FS\_NR\_pos\_enh To:RAN1

* [Post111-e][628][POS] LS to RAN1 on integrity error sources for RAT-dependent positioning (Huawei)

Scope: Check the LS in R2-2008613 and confirm sending it to RAN1

Intended outcome: Approved LS

Deadline: Friday 2020-09-04 1200 UTC

[R2-2006580](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006580%20Discussion%20on%20positioning%20integrity%20validation%20and%20reporting.docx) Discussion on positioning integrity validation and reporting Huawei, HiSilicon discussion Rel-17 FS\_NR\_pos\_enh

[R2-2006674](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006674.docx) Discussion on error sources, threat models, occurrence rates and failure modes CATT discussion Rel-17 FS\_NR\_pos\_enh

[R2-2006565](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006565%20Identify%20Error%20sources%20for%20postioning%20integrity.docx) Identify Error sources for positioning integrity vivo discussion FS\_NR\_pos\_enh

[R2-2006955](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006955%20Factors.docx) Factors impacting positioning integrity Ericsson discussion Rel-17

[R2-2007647](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007647%20Discussion%20on%20GNSS%20position%20integrity%20error%20sources.docx) Discussion on GNSS position integrity error sources ESA discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007938](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007938%20Discussion%20of%20the%20positioning%20error%20sources,%20threat%20models%20and%20failure%20modes.docx) Discussion of the positioning error sources, threat models and failure modes ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_pos\_enh

#### 8.11.3.3 Methodologies for network-assisted and UE-assisted integrity

[R2-2006566](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006566%20Discussion%20on%20positioning%20integrity%20methodologies.docx) Discussion on positioning integrity methodologies vivo discussion FS\_NR\_pos\_enh

[R2-2006675](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006675.docx) Discussion on methodologies for network-assisted and UE-assisted integrity CATT discussion Rel-17 FS\_NR\_pos\_enh

[R2-2006581](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006581%20Discussion%20for%20network-assisted%20and%20UE-assisted%20integrity.docx) Discussion for network-assisted and UE-assisted integrity Huawei, HiSilicon discussion Rel-17 FS\_NR\_pos\_enh

[R2-2006957](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2006957%20LPP.docx) LPP signalling for integrity support of RAT dependent positioning Ericsson discussion Rel-17

[R2-2007160](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007160%20-%20Discussion%20on%20%20methodologies%20for%20UE-based%20and%20UE-assisted%20integrity.doc) Discussion on methodologies for UE-based and UE-assisted integrity OPPO discussion Rel-17 FS\_NR\_pos\_enh

[R2-2007238](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007238.docx) Reporting movement model Fraunhofer IIS, Fraunhofer HHI discussion Rel-17

[R2-2007246](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007246.docx) Reporting the situational quality of RAT and RAT-independent technologies Fraunhofer IIS, Fraunhofer HHI discussion

[R2-2007588](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007588%20(R17%20NR%20POS%20A81133).doc) Methodologies for network-assisted and UE-assisted integrity InterDigital, Inc. discussion Rel-17

[R2-2007656](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007656%20Discussion%20on%20methodologies%20for%20position%20integrity.docx) Discussion on methodologies for position integrity ESA discussion Rel-17

[R2-2007939](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202008%20-%20RAN2_111-e,%20Online\Extracts\R2-2007939%20Discussion%20of%20the%20methodologies%20for%20network-assisted%20and%20UE-assisted%20integrity.docx) Discussion of the methodologies for network-assisted and UE-assisted integrity ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_pos\_enh

# Post-Meeting Email Discussions

* [Post111-e][620][Relay] LS to SA2 on relay discovery assumptions (OPPO)

Scope: Draft an LS to SA2 indicating RAN2 assumptions on the reuse of LTE discovery models for UE-to-network and UE-to-UE relay.

Intended outcome: Approved LS, in R2-2008270

Deadline: Friday 2020-09-04 1200 UTC

* [Post111-e][621][Relay] Service continuity (Huawei)

Scope: Determine agreeable requirements and scenarios for service continuity, and progress the understanding of service continuity procedures for L2 and L3 relays.

Intended outcome: Summary to next meeting

Deadline: Long

* [Post111-e][622][Relay] Relay selection and reselection (Apple)

Scope: Discuss proposals for relay selection/reselection with the following goals:

* Determine a baseline for selection/reselection criteria
* Confirm if there is any dependency on L2/L3 relay design
* Determine if there is different selection/reselection behaviour for UE-to-network and UE-to-UE cases
* Discuss possible enhancements to the baseline selection/reselection criteria

Intended outcome: Summary to next meeting

Deadline: Long

* [Post111-e][623][Relay] Remaining issues on relay discovery (OPPO)

Scope: Discuss the remaining issues on relay discovery:

* Need for MAC and/or PHY solution to differentiate discovery messages
* Need for separate resource pool for discovery messages
* Handling of potential cases where the serving gNB is not sidelink-capable
* Conditions for discovery for UE-to-UE relay
* FFS points in the discovery conclusions from RAN2#111-e

Intended outcome: Summary to next meeting

Deadline: Long

* [Post111-e][624][Relay] Update of TR 38.836 (OPPO)

Scope: Update the TR to take account of agreements of RAN2#111-e. Email discussion rapporteurs for [AT111-e][603], [AT111-e][604], [AT111-e][605], and [AT111-e][606] are asked to provide initial input text.

Intended outcome: Endorsed TR, in R2-2008272

Deadline: Friday 2020-09-04 1200 UTC

* [Post111-e][625][POS] End-to-end latency analysis (Intel)

Scope: Discuss which nodes and which procedures are involved in a positioning latency analysis, and capture expected latency values where possible.

Intended outcome: Summary to next meeting

Deadline: Long

* [Post111-e][626][POS] Integrity use cases and specification impacts (Swift)

Scope: Capture any additional integrity use cases and open issues on integrity, and draft a TP incorporating the existing agreements and any further progress.

Intended outcome: Summary to next meeting

Deadline: Long

* [Post111-e][627][Relay] Remaining issues on L2 architecture (MediaTek)

Scope: Discuss the remaining issues from [AT111-e][605], including the functionality of the adaptation layer and control plane procedures.

Intended outcome: Summary to next meeting

Deadline: Long

* [Post111-e][628][POS] LS to RAN1 on integrity error sources for RAT-dependent positioning (Huawei)

Scope: Check the LS in R2-2008613 and confirm sending it to RAN1

Intended outcome: Approved LS

Deadline: Friday 2020-09-04 1200 UTC

* [Post111-e][634][POS] Positioning measurement gaps (Huawei)

Scope: Handle any input received from RAN4 on new measurement gap patterns for Rel-16.

Intended outcome: Agreed CR if necessary

Deadline: Friday 2020-09-04 1200 UTC