**3GPP TSG-RAN WG2 Meeting #112-e R2-20xxxxx**

**Online, 2-13 November 2020**

**Source: Session Chair (MediaTek)**

**AI: 10.5**

**Title: Report from 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.

* [AT112-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 2020-11-13 1000 UTC

* [AT112-e][601][Relay] Status update to SA2 (OPPO)

Scope: Generate a summary of RAN2 status on relaying for SA2

* Report status of both L2 and L3 relaying designs as well as architecture-independent aspects (including issues in R2-2008760), in order to coordinate with SA2 for reaching conclusions
* Capture any points where we assume SA2 will resolve an issue

Intended outcome: Approvable LS in R2-2010862

Deadline: Friday 2020-11-13 0000 UTC

* [AT112-e][602][POS] Rel-16 positioning UE capabilities in RRC (Intel)

Scope: Accommodate any needed updates to the capabilities, taking into account updates to the feature lists during the meeting.

Intended outcome: Endorsable CR for merge into the capabilities mega CR

Deadline: Friday 2020-11-13 0000 UTC

* [AT112-e][603][POS] Positioning stage 2 corrections (Nokia)

Scope: Conclude on the remaining proposals from R2-2010674: P2/P3/P4/P6/P7/P9/P10/P11/P12.

Intended outcome: Agreeable CR in R2-2010863

Deadline: Tuesday 2020-11-10 1200 UTC; extended to Friday 2020-11-13 0000 UTC for CR checking

* [AT112-e][604][POS] Positioning RRC proposals (Ericsson)

Scope: Discuss and resolve proposals 1 and 2 from R2-2010709.

Intended outcome: Agreeable CR in R2-2010864, summary in R2-2010875

Deadline: Tuesday 2020-11-10 1200 UTC

* [AT112-e][605][POS] LPP proposals (Qualcomm)

Scope: Discuss and resolve the remaining proposals from R2-2010975: P1-P5, P7, P8.

Intended outcome: Agreeable CR in R2-2010865, summary in R2-2011055

Deadline: Tuesday 2020-11-10 1200 UTC

* [AT112-e][606][POS] LS to RAN1 on positioning latency (Intel)

Scope: Summarise the latency results and draft an LS to RAN1. Clarify that the attached results are a checkpoint that has not yet been endorsed as a TP.

Intended outcome: Summary of latency results (R2-2010866) and agreeable LS (R2-2010867) with the summary attached

Deadline: Thursday 2020-11-05 1200 UTC

* [AT112-e][607][POS] Gathering of latency enhancement solutions (CATT)

Scope: Describe and discuss the proposed latency enhancements in a format suitable for developing into a TP.

Intended outcome: Text proposal in R2-2010868

Deadline: Friday 2020-11-13 0000 UTC

* [AT112-e][610][Relay] RRC states for L2 relay (vivo)

Scope: Discuss P6-P9 of R2-2011004.

Intended outcome: Summary in R2-2010869

Deadline: Friday 2020-11-13 0000 UTC

* [AT112-e][611][Relay] Open issues on L2 relay (Huawei)

Scope: Discuss the remaining open issues on L2 relay architecture, including:

* PC5 adaptation layer
* RRC procedures (including paging)
* Remaining issues from email discussion [627]
* Remaining open items in the current TR

Intended outcome: Summary in R2-2010870

Deadline: Wednesday 2020-11-11 1200 UTC

* [AT112-e][612][Relay] Open issues on L3 relay (Qualcomm)

Scope: Discuss the remaining open issues on L3 relay architecture, including:

* NAS transport
* Overhead
* QoS
* RRC states
* Remaining open items in the current TR

Intended outcome: Summary in R2-2010871

Deadline: Wednesday 2020-11-11 1200 UTC

* [AT112-e][613][POS] LPP transport without signalling access between LMF and ng-eNB (Huawei)

Scope: Clarify views on the CR in R2-2010274 and determine if it can be agreed.

Intended outcome: Agreed CR in R2-2010874

Deadline: Tuesday 2020-11-10 1200 UTC

* [AT112-e][614][POS] Text proposals on GNSS integrity (Swift)

Scope: Progress the text proposals related to the integrity topics (R2-2009129, R2-2008812, R2-2009331, R2-2010073, R2-2010061, R2-2009333, and the table in R2-2009003) and attempt to reach one or more endorsable TPs. Documents to be split into separately agreeable topics (rapporteur’s judgement on the division).

Intended outcome: Endorsable TP(s)

Deadline: Friday 2020-11-13 0000 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.

# 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.

[R2-2010138](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010138%20REL-15%20CR%2038305%20ECID.docx) Corrections to E-CID positioning Nokia, Nokia Shanghai Bell CR Rel-15 38.305 15.6.0 0042 - F NR\_newRAT-Core

There is no Rel-16 shadow because the affected text is different.

* Agreed

[R2-2010274](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010274%20Correction%20to%20OTDOA%20positioning%20support%20description%20in%20R15.docx) Correction on OTDOA Positioning support in R15 Huawei, HiSilicon CR Rel-16 38.305 16.2.0 0047 - F NR\_newRAT-Core

Qualcomm are not sure the CR is correct; there is no XnAP signalling for OTDOA, but the text only talks about “signalling access”, and they understand that for option 4 the sentence is correct as written. Huawei understand that if there is no signalling access between the LMF and ng-eNB, there is no way for the gNB to connect the ng-eNB to the LMF. Qualcomm think there is generic support on Xn for transport of control plane signalling.

Nokia think in a generic sense such signalling may be possible, but it may not be currently used for any positioning method.

Ericsson would like some extra time to check.

Intel think this change could be made in RAN3. Qualcomm understand that this is related to LPP routing, not NRPPa, so it isn’t a RAN3 issue.

Come back on Thursday 2020-11-05.

Second round of discussion:

Ericsson do not see that it is critical.

Huawei think the LPP message cannot be sent on SRB3, so there is no way to route the message in option 4 without XnAP transport.

Qualcomm think option 4 is supported, and agree with Ericsson that this may not be critical.

Huawei agree option 4 is supported and think it aligns with the current architecture figure, but XnAP does not support transport of an LPP message, and they understand that the current text implies it does.

Qualcomm could accept removing the sentence since it seems to be confusing.

Ericsson still think more time to check would be useful.

Intel understand that the CR is not critical and we could come back next meeting. Huawei think if there is something wrong in the spec we should fix it.

Nokia wonder if the signalling over Xn is needed for option 4, is the stage 3 support there for option 4 to work with this communication path?

Third round of discussion:

Huawei clarify the original CR may be agreeable.

* Agreed
* [AT112-e][613][POS] LPP transport without signalling access between LMF and ng-eNB (Huawei)

Scope: Clarify views on the CR in R2-2010274 and determine if it can be agreed.

Intended outcome: Agreed CR in R2-2010874

Deadline: Tuesday 2020-11-10 1200 UTC

[R2-2011076](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2011076%20%5bOffline-613%5d%5bPOS%5d%20LPP%20transport%20without%20signalling%20access.docx) LPP transport without signaling access between LMF and ng-eNB Huawei discussion Rel-16 NR\_pos-Core

* Noted

R2-2010874 Correction on OTDOA Positioning support in R15 Huawei, HiSilicon CR Rel-15 38.305 16.2.0 0047 1 F NR\_newRAT-Core

* Not provided (original CR in R2-2010274 is agreeable)

[R2-2010275](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010275%20Correction%20to%20OTDOA%20positioning%20support%20description%20in%20R16.docx) Correction on OTDOA Positioning support in R16 Huawei, HiSilicon CR Rel-16 38.305 16.2.0 0048 - A NR\_pos-Core

* Agreed

[R2-2010569](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010569%20Neighbor%20cell.docx) Correction of A-GNSS Periodical retrival of Assistance Data Ericsson CR Rel-15 37.355 15.0.0 0277 - F NR\_newRAT-Core

Qualcomm think the problem scenario is strange; if the serving cell is not known at the LMF, this is bad OAM and the problem is not restricted to periodic assistance data delivery; in their view Rel-15 is not broken.

Ericsson think from the network side there is a problem. Bad OAM may be the root cause in some cases but it still causes problem scenarios, and they see it as easy for the UE to include the neighbour cell information.

CATT think this is an enhancement, not a correction, and it could be discussed in Rel-17.

Intel have the same view as Qualcomm and think if OAM is bad, the solution doesn’t work because the LMF will be unable to identify other cells too.

Qualcomm think this is not free for the UE since it does not normally decode NCGIs of neighbour cells.

Nokia agree it is not a correction.

* Not pursued

[R2-2010570](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010570%20Neighbor%20cell.docx) Correction of A-GNSS Periodical retrival of Assistance Data Ericsson CR Rel-16 37.355 16.2.0 0278 - F NR\_newRAT-Core

[R2-2010571](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010571%20LPP%20ASN1.docx) Correction of hanging ASN.1 code after END Ericsson CR Rel-15 37.355 15.0.0 0279 - F NR\_newRAT-Core

Qualcomm checked with compilers and did not see a syntax error, but agree the change is backward compatible and the signalling should be properly encapsulated.

* Agreed

[R2-2010572](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010572%20LPP%20ASN1.docx) Correction of hanging ASN.1 code after END Ericsson CR Rel-16 37.355 16.2.0 0280 - F NR\_newRAT-Core

Qualcomm think the coversheet should be updated: UE impact and category F. Chair notes the “other affected specs” should be filled out.

* Agreed with these changes as R2-2010860

# 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

Limit: 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.

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

Incoming LSs

[R2-2008746](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008746_R4-2012143.docx) Reply LS on positioning SRS during DRX inactive time (R4-2012143; contact: Apple) RAN4 LS in Rel-16 NR\_pos-Core To:RAN2 Cc:RAN1

* Noted

[R2-2008748](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008748_R4-2012285.doc) LS on new measurement gap patterns for positioning measurements (R4-2012285; contact: Ericsson) RAN4 LS in Rel-16 NR\_pos-Core To:RAN2

* Noted

Summary document

[R2-2010674](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010674%20Summary_for_AI_6_6_1.docx) Summary document for agenda item 6.6.1 - NR Positioning Stage2 Nokia, Nokia Shanghai Bell discussion Rel-16 NR\_pos-Core Late

P5:

Chair thinks this may be more of an enhancement. Ericsson think it is a correction because there are failure modes when the UE is already transmitting. Qualcomm think there is no activation for periodic SRS, and if the network wants “activation” it should use SP. Nokia understand there may be interest from RAN3, but see it as somewhat of an enhancement. Apple generally agree with Qualcomm and think it should be discussed in RAN3 first. CATT share the same understanding. Intel also agree with Qualcomm. Samsung think periodic SRS has less time criticality. Ericsson clarify they do not intend to introduce a new activation command and this would be used when the LMF is configuring the SRS characteristic. Huawei have the same view as Qualcomm. Proposal is noted.

P8:

Qualcomm think this is implementation-dependent and not new in NR; the network can always do this, and they think nothing needs to be captured. Nokia agree with Qualcomm. Intel have the same view and think this was discussed before. Proposal is noted.

P9:

Huawei are not sure the CRs are needed. CATT think they align the text with the figure. To be handled in email.

P10:

Qualcomm think the new text does not quite fit into section 5.2 and some editing is needed. CATT would like the reference for deferred MT-LR clarified. Huawei understand that the flow is already in an SA2 specification and wonder if there is any relation to RAN. To be handled in email.

P11:

Nokia think the change is not essential. Huawei think this text has been there for a long time and it’s not clear what the motivation is to change it now. Ericsson think this is an alignment CR with SA2. Intel do not see the need and think nothing is broken in the current text. To be handled in email.

P12:

Nokia are OK with removing the note. Ericsson think it is there in Rel-15 as well. Qualcomm wonder if this could be merged in another CR. Nokia suggest it could be merged with the aperiodic SRS CR. To be handled in email.

P1:

Agreed to have the CR from R2-2009000.

* [AT112-e][603][POS] Positioning stage 2 corrections (Nokia)

Scope: Conclude on the remaining proposals from R2-2010674: P2/P3/P4/P6/P7/P9/P10/P11/P12.

Intended outcome: Agreeable CR in R2-2010863

Deadline: Tuesday 2020-11-10 1200 UTC; extended to Friday 2020-11-13 0000 UTC for CR checking

Proposal 2: [R2-2010992] RAN2 to discuss the text proposals in R2-2010070 and R2-2010267 and decide on a suitable text to capture the addition of aperiodic SRS support to UL methods in TS 38.305.

Proposal 3: [R2-2010992] RAN2 to discuss and decide whether to add the additional step showing the deactivation of SRS transmission in the call flows for multi-RTT, UL-TDOA and UL-AoA positioning methods.

Proposal 4: [R2-2010992, to merge in editorial changes] RAN2 to agree only the editorial changes proposed in R2-2010266 and use proposal 2 and proposal 3 to decide on updates for the addition of aperiodic SRS support to TS 38.305.

Proposal 6: RAN2 to discuss and decide the level of details to add to Annex A in TS 38.305 for SUPL 2.0 support of NR positioning methods.

Proposal 7: RAN2 to discuss and decide the multiple corrections to E-CID and NR E-CID in R2-2010141 since it is a superset of the changes in R2-2010268.

Proposal 9: RAN2 to discuss and agree the CRs in R2-2008803 and R2-2008804 for corrections to NI-LR/MT-LR and MO-LR call flows in TS 36.305 and TS 38.305.

Proposal 10: RAN2 to discuss and decide whether to update the call flow in Figure 5.2-1 in TS 38.305 to include steps corresponding to deferred MT-LR and whether we should add the new section on deferred MT-LR under Section 7.3.x. Also discuss the minor text clarifications to the MO-LR, MT-LR/NI-LR procedures.

Proposal 11: RAN2 to discuss and decide whether to add clarification that the reported geographical co-ordinates is based on the WGS-84 reference frame.

Proposal 12: RAN2 to discuss and decide whether to delete the Editor’s note in Section 8.2.3.2.2.1 in TS 38.305 which is under the Assistance Data Delivery between LMF and ng-eNB section for OTDOA positioning.

[R2-2010876](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010876%20%5bAT112-e%5d%5b603%5d%20Stage%202%20Corrections_V9_Summary.docx) Offline 603 on NR Positioning Stage 2 Corrections Nokia discussion Rel-16 NR\_pos-Core

P3:

Nokia observe in Ericsson’s TP we don’t mention Note 6, and just capture that the methods are supported in SUPL.

Qualcomm think the proposal about the proprietary interface does not need to go in the Annex, and the potential proprietary interface is not related to the three specific positioning methods discussed here. They understand we indicate in the normative part of the spec what methods are supported and it would be OK not to change the Annex, which after all is informative.

Nokia think another option is to take the Ericsson proposal from R2-2010068, without the reference to Note 6. They understand that there are other sections in the annex that talk about the interface between SLP and LMF. Qualcomm would be OK with this approach.

Ericsson can also accept the proposal.

Agreement:

Adopt the contents of R2-2010068, without the reference to Note 6, and merge into R2-2010863.

P7:

Nokia think there is sufficient information in 38.305 now.

Ericsson have checked and found there is no reference to the 23.032 in the paragraph that specifies the reference frame.

Qualcomm point out this text goes back to Rel-9 and has been OK thus far, and there is a reference to 23.032 in the following paragraph.

Intel agree with Nokia and Qualcomm that this is not essential.

Note R2-2010575.

P4:

Nokia clarify that there was some discussion on which connectivity options support which form of E-CID. The section on information transferred from gNB to LMF was present in the Rel-15 version but removed in Rel-16, and the CR in R2-2010141 puts it back (MCC have confirmed this is OK).

Intel understand that in Rel-15 we allow the UE to use E-CID based on LTE signalling when connected to a gNB. Regarding the voided subclause, they report that this decision was made by RAN3 and we should check with them before restoring it.

Qualcomm think the content was moved by RAN3 into a different section, on information transferred from ng-eNB to LMF. They are not sure what happens if the UE is connected to gNB, but think the current form is aligned with NRPPa; they think restoring the whole section is not the right solution.

Huawei are OK with some time to check with RAN3 colleagues, but understand the original intention for RAN3 to void this paragraph was because it refers to LTE E-CID, which would not involve the LMF.

Nokia are also OK to come back next meeting after checking, and will remove the related changes to section 8.3.2.3 from the CR.

Proposal 3: RAN2 to discuss if R2-2010068 can be agreed as is or with some additional updates, or, if we need to involve SA2 to resolve whether SLP can use the service operations provided by AMF.

Proposal 7: RAN2 to discuss R2-2010575 again and decide whether to clarify that the reported geographical co-ordinates is based on the WGS-84 reference frame.

Proposal 4: Update R2-2010141 to address the review comments and merge it into the common stage 2 CR. In addition, RAN2 to discuss and confirm if E-CID positioning supports gNB as PCell (including option 2 and option 4).

R2-2010863 (CR from discussion [603]) Nokia CR Rel-16 36.305 16.2.0 xxxx - F NR\_pos-Core

Other contributions

[R2-2008803](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\36%20305_CR0093_(Rel-16)_R2-2008803.docx) Minor corrections on TS 36.305 CATT CR Rel-16 36.305 16.2.0 0093 - F NR\_newRAT-Core

[R2-2008804](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\38%20305_CR0035_(Rel-16)_R2-2008804.docx) Minor corrections on TS 38.305 CATT CR Rel-16 38.305 16.2.0 0035 - F NR\_newRAT-Core

[R2-2009000](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009000%20Remove%20the%20NOTE%20in%20architecture%20figure%20in%20TS%2038.305.docx) Remove the NOTE in architecture figure in TS 38.305 Intel Corporation CR Rel-16 38.305 16.2.0 0037 - F NR\_pos-Core

* Agreed

[R2-2010067](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010067%20UL%20SRS%20Periodic%20Activation%20Time.docx) Activation Time for Periodic UL SRS Transmission Ericsson discussion Rel-16

[R2-2010068](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010068%20CRSUPL.docx) Correction to SUPL support for NR positioning methods Ericsson CR Rel-16 38.305 16.2.0 0038 - F NR\_pos-Core

[R2-2010069](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010069%20TS%2038.305.docx) Correction of stage 2 positioning architecture aspects Ericsson CR Rel-16 38.305 16.2.0 0039 - F NR\_pos-Core

[R2-2010070](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010070%20TS%2038.305%20Aperiodic.docx) Missing Updates for Aperiodic UL SRS Support Ericsson CR Rel-16 38.305 16.2.0 0040 - F NR\_pos-Core

[R2-2010092](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010092_(CR%2038305%20SUPL%20support).docx) SUPL support for NR positioning methods Qualcomm Incorporated CR Rel-16 38.305 16.2.0 0041 - F NR\_pos-Core

[R2-2010141](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010141%20REL-16%20CR%2038305%20ECID%20and%20NR%20ECID.docx) Corrections to E-CID and NR E-CID positioning Nokia, Nokia Shanghai Bell CR Rel-16 38.305 16.2.0 0043 - F NR\_pos-Core

[R2-2010266](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010266%20Miscellaneous%20corrections%20for%2038305.docx) Miscellaneous corrections for 38305 Huawei, HiSilicon CR Rel-16 38.305 16.2.0 0044 - F NR\_pos-Core

[R2-2010267](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010267%20Correction%20to%20stage2%20spec%20for%20SRS%20(de-)activaton.docx) Correction to stage2 spec for SRS (de-)activaton Huawei, HiSilicon CR Rel-16 38.305 16.2.0 0045 - F NR\_pos-Core

=> Revised in R2-2010992

[R2-2010992](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010992%20Correction%20to%20stage2%20spec%20for%20SRS%20(de-)activaton.docx) Correction to stage2 spec for SRS (de-)activaton Huawei, HiSilicon, Ericsson CR Rel-16 38.305 16.2.0 0045 1 F NR\_pos-Core

Intel and Nokia would like time to check.

* Handled in email as part of the summary discussion

[R2-2010268](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010268%20Correction%20to%20stage2%20of%20NR%20ECID.docx) Correction to stage2 of NR ECID Huawei, HiSilicon CR Rel-16 38.305 16.2.0 0046 - F NR\_pos-Core

[R2-2010573](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010573%20ECID.docx) Clarification on usage of ECID procedure Ericsson CR Rel-16 38.305 16.2.0 0049 - F NR\_pos-Core

[R2-2010574](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010574%20Deferred.docx) Updates on missing deferred location requests Ericsson CR Rel-16 38.305 16.2.0 0050 - F NR\_pos-Core

[R2-2010575](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010575%20loc%20format%20.docx) Alignment of the position information format with SA2 specification Ericsson CR Rel-16 38.305 16.2.0 0051 - F NR\_pos-Core

* Not pursued

[R2-2010657](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010657%20Miscellaneous.docx) Miscellaneous correction for stage 2 Ericsson CR Rel-16 38.305 16.2.0 0052 - F NR\_pos-Core

Withdrawn/Not available

R2-2008805 Correction on the NOTE in architecture figure in TS 38.305 CATT CR Rel-16 38.305 16.2.0 0036 - F NR\_newRAT-Core Withdrawn

### 6.6.2 RRC corrections

Including impact to 36.331, 38.331, and 38.306.

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

Capabilities update

* [AT112-e][602][POS] Rel-16 positioning UE capabilities in RRC (Intel)

Scope: Accommodate any needed updates to the capabilities, taking into account updates to the feature lists during the meeting.

Intended outcome: Endorsable CR for merge into the capabilities mega CR

Deadline: Friday 2020-11-13 0000 UTC

Summary document

[R2-2010709](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010709%20Summary%20for%20RRC.docx) Summary for RRC Corrections for Positioning Ericsson discussion

P1: Discussed under R2-2008806; to be handled in email.

P2: Ericsson clarify R2-2010991 is an attempt to resolve this issue. Nokia think we could merge the different proposals in some form but think R2-2010991 is confusing. To be handled by email.

P5: Huawei wonder if it is possible for SI messages with and without posSIB to overlap. Chair thinks the current text indicates they cannot. vivo wonder if we use the same SI-RNTI how they could be distinguished if they did overlap. Ericsson understand that this is why they do not overlap. Nokia do not see the need for a change.

* [AT112-e][604][POS] Positioning RRC proposals (Ericsson)

Scope: Discuss and resolve proposals 1 and 2 from R2-2010709.

Intended outcome: Agreeable CR in R2-2010864, summary in R2-2010875

Deadline: Tuesday 2020-11-10 1200 UTC

Proposal 1 RAN2 to agree the posSIB validity inclusion in RRC and review the CR for posSIB validity check provided in R2-2008806 by email discussion.

Proposal 2 RAN2 to provide correction for field description for fields (sfn-Offset and sfn-SSB-Offset) available in SSB-Configuration. The exact changes are captured via email discussion review.

[R2-2010875](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010875%20Offline%20604%20Positioning%20RRC.docx) Offline 604 Positioning RRC proposals Ericsson discussion

* Noted

[R2-2010864](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010864%20RRC%20Pos%20Corrections.docx) Positioning RRC updates for posSIB validity check and field description correction Ericsson CR Rel-16 38.331 16.2.0 2278 - F NR\_pos-Core

Huawei wonder if we should have a parallel CR to LTE, where a similar issue exists. CATT think the area scope is not there in LTE, so the CR cannot be strictly parallel, but would be OK to make similar changes otherwise. Qualcomm think no clarification is needed in LTE because the fields are clearly described in the LPP spec, and the issue with NR is only the area scope. Ericsson have the same view as CATT and Qualcomm, and think the on-demand SI in NR is also a complexifying issue that makes it worthwhile to capture the validity in RRC.

* Agreed

Other contributions

[R2-2008806](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\38.331_CR2014_(Rel-16)_R2-2008806.docx) Corrections on 38.331 to capture agreements of area scope for posSIB validity CATT,Ericsson CR Rel-16 38.331 16.2.0 2014 - F NR\_newRAT-Core

Huawei think this should not be done in RRC, because the value tag and expiration time are defined in LPP. Ericsson think we need some guidance in RRC, but they agree it would be good to avoid specifying cross-layer interactions. CATT think we agreed to reuse the existing area ID, and most companies felt it should be checked in RRC. Intel agree with the background mentioned by CATT and think we decided RRC was a suitable place to handle it. Huawei think there was no agreement to specify this in RRC, but could accept a CR to check it in LPP. Nokia recall that we discussed which layer checks the validity and agreed it was at AS, but they are not totally OK with the proposed text.

* Handled in email [604] and merged into R2-2010864

[R2-2008807](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\38%20331_CR2015_(Rel-16)_R2-2008807.docx) Corrections on description of sfn-Offset and sfn0-Offset in SSB-Configuration in TS 38.331 CATT CR Rel-16 38.331 16.2.0 2015 - F NR\_newRAT-Core

* Handled in email [604] and merged into R2-2010864

[R2-2008808](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\38%20331_CR2016_(Rel-16)_R2-2008808.docx) Correction on the missed description of sfn-SSB-Offset in SSB-Configuration in TS 38.331 CATT CR Rel-16 38.331 16.2.0 2016 - F NR\_newRAT-Core

* Handled in email [604] and merged into R2-2010864

[R2-2010071](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010071%20RRC%20Missing%20field%20.docx) Corrections of field descrption of sfn-Offset and sfn-SSB-Offset Ericsson CR Rel-16 38.331 16.2.0 2172 - F NR\_pos-Core

=> Revised in R2-2010991

[R2-2010991](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010991%20RRCfieldCorrec.docx) Corrections of field descrption of sfn-Offset and sfn-SSB-Offset Ericsson CR Rel-16 38.331 16.2.0 2172 1 F NR\_pos-Core

[R2-2010269](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010269%2038.331%20CR%20on%20SI%20window%20for%20positioning%20SI%20message.docx) CR on SI window for positioning SI message Huawei, HiSilicon CR Rel-16 38.331 16.2.0 2196 - F NR\_pos-Core

* Not pursued

[R2-2010270](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010270%20Correction%20on%20posSRS%20configuration.docx) Correction on posSRS configuration Huawei, HiSilicon CR Rel-16 38.331 16.2.0 2197 - F NR\_pos-Core

[R2-2010273](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010273%20Correction%20on%20posSIB%20broadcastStatus.doc) Correction on posSIB broadcastStatus Huawei, HiSilicon CR Rel-16 38.331 16.2.0 2199 - F NR\_pos-Core

=> Agreed

### 6.6.3 LPP corrections

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

Summary document

[R2-2010975](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010975_(Summary%20of%20AI%206.6.3%20LPP%20Corrections).docx) Summary of LPP corrections agenda item 6.6.3 Qualcomm Incorporated discussion

* [AT112-e][605][POS] LPP proposals (Qualcomm)

Scope: Discuss and resolve the remaining proposals from R2-2010975: P1-P5, P7, P8.

Intended outcome: Agreeable CR in R2-2010865, summary in R2-2011055

Deadline: Tuesday 2020-11-10 1200 UTC

Proposal 1: RAN2 to discuss and decide whether any specification changes are needed to clarify that a DL-PRS-ID can be reused across positioning frequency layers.

Proposal 2: RAN2 to discuss and decide if and how "band combination fallback" is introduced in LPP.

Proposal 3: RAN2 to discuss and decide whether the IEs NR-DL-PRS-ProcessingCapability and NR-DL-PRS-QCL-ProcessingCapability are provided in only one of the IEs NR-DL-TDOA-ProvideCapabilities, NR-DL-AoD-ProvideCapabilities, and NR-Multi-RTT-ProvideCapabilities, in the case of capabilities for multiple NR positioning methods are provided.

Proposal 4: RAN2 to discuss and decide whether the UE is required to provide updated UL SRS capabilities in case of UL CA band combination changes during an LPP session.

Proposal 5: RAN2 to discuss and decide in which RAN2 specification (TS 38.306 and/or TS 37.355) the content of the RAN1 LS in R2-2006103 should be captured.

Proposal 7: RAN2 to agree a correction is required and check the details of the CR in R2-2010263 [3].

Proposal 8: RAN2 to agree a correction is required and check the details of the CR in R2-2010264 [4].

[R2-2011055](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2011055_(Summary_ED605_LPPproposals)_Summary.docx) Summary of Email discussion [AT112-e][605][POS] LPP proposals Qualcomm Incorporated discussion

P3:

Chair understands that companies prefer the backward compatible change in option 2.

* Noted

Proposal 3: Regarding the Common DL-PRS Capabilities, RAN2 to decide on one of the following Options:

Option 1 (NBC): Change the presence of the IEs NR-DL-PRS-ProcessingCapability and the NR-DL-PRS-QCL-ProcessingCapability to optional present in the capabilities for each positioning method, and clarify that in case of capabilities for multiple methods are provided, the two IEs are provided for only one of the methods.

Option 2 (BC): Clarify that in case of capabilities for multiple methods are provided, the IEs NR-DL-PRS-ProcessingCapability and the NR-DL-PRS-QCL-ProcessingCapability shall contain the same values for the indicated capabilities.

NOTE: The draft CR in R2-2010865 assumes Option 2 for the time being.

[R2-2010865](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010865_(CR%2037355%20Miscelaneous%20Corrections)_v2.docx) Miscellaneous LPP corrections Qualcomm Incorporated CR Rel-16 37.355 16.2.0 0281 - F NR\_pos-Core

* Superseded by R2-2011073

[R2-2011073](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2011073_(CR%2037355%20Miscelaneous%20Corrections).docx) Correction on LPP spec Huawei, HiSilicon, Qualcomm CR Rel-16 37.355 16.2.0 0282 - F NR\_pos-Core

Huawei indicate that only the coversheet has been changed from R2-2010865 (sources, impact analysis, and affected clauses).

* Agreed

Other contributions

[R2-2009042](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009042%20Discussion%20on%20whether%20PRS%20ID%20can%20be%20reused%20on%20different%20frequency%20layers.docx) Discussion on whether PRS ID can be reused on different frequency layers vivo Mobile Communication Co., discussion

[R2-2010093](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010093_(CR%2037355%20Quality%20and%20Time%20Stamp).docx) Clarification of quality and time stamp for RSTD measurements Qualcomm Incorporated CR Rel-16 37.355 16.2.0 0274 - F NR\_pos-Core

Nokia think the other quality fields may need similar clarifications, but the proposal is agreeable.

CATT wonder what happens if the RSRP and TOA measurements do not happen at the same time. Without the CR, their understanding was that the timestamp is for the TOA measurement. Qualcomm also wondered this but came to the conclusion that they have to be from a single measurement operation, since there is only one timestamp; they understand that the RSRP is a side effect of the TOA measurement and the UE would not do two correlations. Samsung agree with the proposal. vivo wonder if the change should also apply to other positioning methods or only DL-TDOA. Qualcomm think it is clear for the other methods where there is only one measurement (whereas RSTD is a difference of two measurements).

* Agreed

[R2-2010263](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010263%20Correction%20on%20PRS%20configuration.doc) Correction on PRS configuration Huawei, HiSilicon CR Rel-16 37.355 16.2.0 0275 - F NR\_pos-Core

Qualcomm think this has aspects related to the DL-PRS-Id reuse across frequency layers.

* Handled in email [605]

[R2-2010264](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010264%20Correction%20on%20NR%20E-CID.doc) Correction on NR E-CID Huawei, HiSilicon CR Rel-16 37.355 16.2.0 0276 - F NR\_pos-Core

Ericsson think the CR is not needed. Qualcomm note there is some added text relative to LTE.

* Handled in email [605]

[R2-2010265](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010265%20LPP%20corrections%20on%20UE%20capability%20signaling.docx) LPP corrections on UE capability signaling Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

Not available/withdrawn

R2-2008809 Correction on sfn-SSB-Offset in NR-SSB-Config-r16 in TS 37.355 CATT CR Rel-16 37.355 16.2.0 0273 - F NR\_newRAT-Core Withdrawn

### 6.6.4 MAC corrections

[R2-2010271](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010271%20Correction%20on%20SP%20posSRS%20(de-)activation%20MAC%20CE.docx) Correction on SP posSRS (de-)activation MAC CE Huawei, HiSilicon CR Rel-16 38.321 16.2.0 0970 - F NR\_pos-Core

Qualcomm think the CR is NBC and the coversheet should reflect this in the impact analysis.

* Agreed with revised coversheet in R2-2010861.

[R2-2010066](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010066%20MAC%20Discussion%20paper.docx) SRS for Positioning transmission in Connected mode DRX Ericsson discussion Rel-16

Huawei think in the RAN1 spec, MIMO SRS and positioning SRS are captured together; they doubt if this is really needed. CATT have the same view as Huawei. Samsung also have the same understanding.

* Noted

### 6.6.5 Other

# 7 Rel-16 EUTRA Work Items

Essential corrections

## 7.6 LTE Positioning

(NavIC, LTE TEI16 Positioning)

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

# 8 Rel-17 NR Work Items

## 8.7 NR Sidelink relay SI

(FS\_NR\_SL\_relay; leading WG: RAN2; REL-17; WID: RP-201474)

Time budget: 1.5 TU

Tdoc Limitation: 5 tdocs

Email max expectation: 4 threads

### 8.7.1 Organizational

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

Workplan

[R2-2008939](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008939%20-%20Work%20planning%20of%20R17%20SL%20relay.doc) Work planning of R17 SL relay OPPO Work Plan Rel-17 FS\_NR\_SL\_relay

Qualcomm wonder if we have time to address the ENs/FFSs in the TR.

CATT wonder if the table in the work plan will be sent to SA2. OPPO think not, but we have the email discussion for a status update to SA2 that will reflect progress of this meeting (but not necessarily every component in the TR). Details can be discussed in the email discussion.

CATT think the “studied” entries could be clearer in the table.

Ericsson wonder if we can reply to SA2 from this meeting without reaching completion; they would rather send an LS from the next meeting. Nokia think we should only send the LS if we have something to say, and sending status or a draft TR is not really meaningful. Huawei think we can come back to this after having some progress and see what can be sent to SA2, and it can be discussed offline in the meantime.

* Noted

Incoming LSs

[R2-2008760](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008760_S2-2006587.docx) LS on Direct Discovery and Relay in SA2 (S2-2006587; contact: Oppo) SA2 LS in Rel-17 FS\_5G\_ProSe To:RAN2 Cc:RAN1

* Noted (to reply from discussion [601])

[R2-2010693](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Docs\R2-2010693.zip) LS on SA2 progress on UE-to-Network Relay and UE-to-UE Relay (S2-2007945; contact: OPPO) SA2 LS in Rel-17 FS\_5G\_ProSe To:RAN2, SA3

Ericsson think RAN2 may be affected regarding the reselection criteria, because the criteria may affect the discovery message format; they wonder if we should inform SA2 now or just capture it in the TR. Apple think we are only discussing AS layer selection criteria and the relation to discovery messages has to be discussed later, probably in the WI stage. They see the message formats as a stage 3 issue.

Futurewei note that in the L3 UE-to-NW relay solution, there is no identified solution for service continuity, and a note saying it will be determined by RAN2.

OPPO think we are running into detailed comments about the email discussions and we could note the LS; we use the TR to capture decisions as usual, and decide in the email discussion what we send to SA2.

* Noted

Other contributions

[R2-2008926](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008926%20%5bDraft%5d%20Reply%20LS%20on%20Direct%20Discovery%20and%20Relay.docx) [Draft] Reply LS on Direct Discovery and Relay CATT LS out Rel-17 5G\_V2X\_NRSL-Core To:SA2 Cc:RAN1

[R2-2010676](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010676%20-%20%5bDraft%5d%20Reply%20LS%20on%20Direct%20Discovery%20and%20Relay.docx) [Draft] Reply LS on Direct Discovery and Relay OPPO LS out Rel-17 FS\_NR\_SL\_relay To:SA2 Cc:RAN1

* [AT112-e][601][Relay] Status update to SA2 (OPPO)

Scope: Generate a summary of RAN2 status on relaying for SA2

* Report status of both L2 and L3 relaying designs as well as architecture-independent aspects (including issues in R2-2008760), in order to coordinate with SA2 for reaching conclusions
* Capture any points where we assume SA2 will resolve an issue

Intended outcome: Approvable LS in R2-2010862

Deadline: Friday 2020-11-13 0000 UTC

R2-2010862 (LS from discussion [601]) OPPO LS out Rel-17 FS\_NR\_SL\_relay To:SA2

* [Post112-e][615][Relay] Update TR 38.836 (OPPO)

Scope: Update TR 38.836 with decisions of RAN2#112-e. Rapporteurs of email discussions [Post111-e][627], [Post111-e][621], [Post111-e][622], [Post111-e][623], [AT112-e][610], [AT112-e][611], and [AT112-e][612] are asked to provide input text.

Intended outcome: Endorsed TP

Deadline: Short

### 8.7.2 Scope requirements and scenarios

Refinements to the contents of the TR regarding high-level requirements and assumptions on supported scenarios.

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

Summary document

R2-2010984 Summary for AI\_8.7.2 Scope requirements and scenarios vivo discussion

* Revised in R2-2011004

[R2-2011004](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2011004_Summary_for_AI_8_7_2_Scope%20requirements%20and%20scenario.docx) Summary for AI\_8.7.2 Scope requirements and scenarios vivo discussion

Huawei understand the intention for P2 is that the relay and remote UE are controlled by the same cell, since the remote UE may be OOC.

Futurewei note that all these proposals are specific to L2 and they understand the scenarios and requirements should also be applicable to L3. If the scenarios are important they should be supported by both, otherwise we should not spend the time. vivo note L3 is covered in P3.

ZTE have some concern for P2 because it does not clarify which cell is in control. It should be the “remote UE’s serving cell”.

Intel are not sure if P1 adds anything. They also think the same agreements should hold for L3.

Ericsson think P1 and P2 can be for both L2 and L3. Also think we should address the RRC state of the remote UE (P6-P9).

Nokia think we do not need to introduce any cell restrictions for the L3 case because the remote UE is not visible in the relay UE’s cell.

Agreements:

Proposal 1 [easy]Confirm for L2 U2N Relay that both Case1.1 and Case 1.2 are supported in this SI, i.e.

- Case 1.1: Before remote connection via relay UE, relay UE and remote UE are in same cell;

- Case 1.2: Before remote connection via relay UE, relay UE and remote UE are in different cells.

Proposal 2 [easy]Confirm for L2 U2N Relay that Case 2.1 is supported in this SI as baseline, i.e. after remote UE connection via relay UE, relay UE and remote UE are controlled by the relay UE’s serving cell;

Proposal 3 For L3 U2N Relay, relay UE and remote UE can be in the cell same or different cells, after remote UE connection via Relay UE.

On P4, ZTE understand this should be a L2 CP discussion rather than scenarios.

Lenovo think we should rephrase P8 for clarity.

Ericsson support the proposals and think the idle/inactive relay UE can forward paging messages to the remote UE. Also think the remote UE could send small data via RACH.

MediaTek think we could agree P6 and P7 but we may need more time on the combinations.

Proposal 6 [easy]For L2 U2N Relay, RAN2 to agree support of RRC\_INACTIVE for remote UE.

Proposal 7 [easy]For L2 U2N Relay, RAN2 to agree support of RRC\_INACTIVE for relay UE.

Proposal 8 [easy] For L2 U2N Relay, RAN2 to confirm NOT support the following RRC states combination for remote UE and relay UE:

- (remote RRC\_CONNECTED and relay RRC\_IDLE or RRC\_INACTIVE)

Proposal 9 For L2 U2N Relay, RAN2 to confirm support the following RRC states combination for remote UE and relay UE:

- (remote RRC\_IDLE/RRC\_INACTIVE/RRC\_CONNECTED and relay RRC\_CONNECTED)

- (remote RRC\_IDLE or RRC\_INACTIVE, and relay RRC\_IDLE or RRC\_INACTIVE)

* [AT112-e][610][Relay] RRC states for L2 relay (vivo)

Scope: Discuss P6-P9 of R2-2011004.

Intended outcome: Summary in R2-2010869

Deadline: Friday 2020-11-13 0000 UTC

Ericsson and QC think it is clear that there should be no impact of RRC state for L3. Nokia and ZTE also. Futurewei and Huawei do not understand why the L3 relay will not have state issues.

R2-2010869 (Summary from discussion [610]) vivo discussion Rel-17 FS\_NR\_SL\_relay

Other contributions

[R2-2008779](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008779%20-%20Left%20issues%20on%20Scenarios%20for%20sidelink%20relay.docx) Left issues on Scenarios for sidelink relay OPPO discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008921](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008921%20Further%20Clarification%20on%20the%20Scenarios%20for%20NR%20Sidelink%20Relay.docx) Further Clarification on the Scenarios for NR Sidelink Relay CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009584](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009584_Further%20discussion%20%20on%20scope%20and%20Scenarios%20of%20SL%20relay.docx) Further discussion on scope and scenarios of SL relay vivo discussion Rel-17

[R2-2009693](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009693%20Coverage%20Extension%20Using%20Relays.doc) Coverage Extension using Relays Lenovo, Motorola Mobility discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009694](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009694%20QoS%20support%20for%20Relays.doc) QoS support when using Relays Lenovo, Motorola Mobility discussion FS\_NR\_SL\_relay

[R2-2010658](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010658%20Scope%20and%20scenarios%20for%20NR%20sidelink%20relay.docx) Scenarios for NR sidelink relay LG Electronics Inc. discussion Rel-17

### 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.

#### 8.7.3.1 Protocol stacks and procedures

Including report of [Post111-e][627][Relay] Remaining issues on L2 architecture

Email discussion summary

[R2-2009122](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Docs\R2-2009122.zip) Email Report of Post111-e 627 Relay Remaining issues on L2 architecture MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

Discussion of “green” proposals from summary:

Qualcomm think for P25, it’s not clear if PC5 bearers with different QoS can be multiplexed into one Uu bearer. Would like to add an FFS on this point. Huawei do not think this is needed because it’s a matter of gNB implementation. Qualcomm’s concern is whether e2e QoS can be guaranteed considering that the relay does not have the full capabilities of a gNB. Futurewei agree with Huawei that it is a gNB implementation issue, but think this aspect is not discussed in any contribution and we shouldn’t conclude on it now. Qualcomm think it is not gNB implementation only. OPPO think we should not spend much time on this.

Ericsson think the bracketed part in P32 about discovery message could be removed.

Agreements:

Proposal-1: [Easy] agree the following description for L2 UE-to-NW relay

For L2 UE-to-NW relay, the Uu adaptation layer at Relay UE supports UL bearer mapping between ingress PC5 RLC channels for relaying and egress Uu RLC channels over the Relay UE Uu path.

Proposal-2: [Easy] agree the following description for L2 UE-to-NW relay

The different RBs of the same Remote UE and/or different Remote UEs can be subject to N:1 mapping and data multiplexing over Uu RLC channel

Proposal-3: [Easy] agree the following description for L2 UE-to-NW relay

For L2 UE-to-NW relay, Uu adaptation layer is used to support Remote UE identification for the UL traffic (multiplexing the data coming from multiple Remote UE).

Proposal-6: [Easy] agree the following description for L2 UE-to-NW relay

The Uu adaptation layer can be used to support DL bearer mapping at gNB to map end-to-end Radio Bearer (SRB, DRB) of Remote UE into Uu RLC channel over Relay UE Uu path

Proposal-15: [Easy] agree the following description for L2 UE-to-UE relay

For L2 UE-to-UE relay, the second hop PC5 adaptation layer can be used to support bearer mapping between the ingress RLC channels over first PC5 hop and egress RLC channels over second PC5 hop at Relay UE.

Proposal-25 [Easy]: agree the following description for L2 UE-to-NW relay

gNB implementation can handle the QoS breakdown over Uu and PC5 for the end-to-end QoS enforcement of a particular session established between Remote UE and network in case of L2 based UE to Network relaying. Details of handling in case PC5 RLC channels with different e2e QoS are mapped to the same Uu RLC channel can be discussed in WI phase.

Proposal-26 [Easy]: agree the following description for L2 UE-to-UE relay

QoS handling for L2 UE-to-UE Relay is subject to upper layer, e.g. solution 31 within TR23.752 studied by SA2.

Proposal-32 [Easy] [merging P31]: agree the following description for L2 UE-to-NW relay

Relay UE can forward the system information to Remote UE via broadcast, groupcast, or dedicated PC5-RRC signalling. The detailed mechanisms of broadcast, groupcast and PC5-RRC signalling design can be discussed in WI stage.

Proposal-35 [Easy]: agree the following access control check principles for L2 UE-to-NW relay

 The Relay UE may provide UAC parameters to Remote UE

 The access control check is performed at Remote UE using the parameters of the cell it intends to access.

 The UE-to-Network Relay UE does not perform access control check for the Remote UE's data.

Ericsson wonder about the wording “particular Remote UE” in P5 and P7. Would prefer to delete “particular”. On P22, they wonder if it identifies the source or the destination. MediaTek intended that it informs the relay UE of which destination to forward to. Ericsson think we have agreement only to include the source ID. MediaTek understand that this aspect is in a later proposal (P20a).

Apple think we should just say “identify traffic” in P22.

Interdigital agree with Apple.

ZTE would like to keep the phrasing “by relay UE” in P5, to align with P10 and P19.

Agreements:

Proposal-5 (merging P4): agree the following description for L2 UE-to-NW relay

The identity information of Remote UE Uu Radio Bearer and Remote UE is included in the Uu adaptation layer at UL in order for gNB to correlate the received data packets for the specific PDCP entity associated with the right Remote UE Uu Radio Bearer of a Remote UE.

Proposal-7: agree the following description for L2 UE-to-NW relay

The Uu adaptation layer can be used to support DL N:1 bearer mapping and data multiplexing between multiple end-to-end Radio Bearers (SRBs, DRBs) of a Remote UE and/or different Remote UEs and one Uu RLC channel over the Relay UE Uu path

Proposal-8: agree the following description for L2 UE-to-NW relay

The Uu adaptation layer needs to support Remote UE identification for Downlink traffic

Proposal-10 (merging P9): agree the following description for L2 UE-to-NW relay

The identity information of Remote UE Uu Radio Bearer and the identity information of Remote UE needs be put into the Uu adaptation layer by gNB at DL in order for Relay UE to map the received data packets from Remote UE Uu Radio Bearer to its associated PC5 RLC channel.

Proposal-21: agree the following description for L2 UE-to-UE relay

Support the N:1 mapping by first hop PC5 adaptation layer between Remote UE SL Radio Bearers and first hop PC5 RLC channels for relaying.

Proposal-22: agree the following description for L2 UE-to-UE relay

Support the adaptation layer over first hop PC5 between Source Remote UE and Relay UE in order to identify traffic destined to different Destination Remote UEs.

On P27, Qualcomm think steps 3 and 6 should have the RLC channel established potentially by the remote UE, since the relay UE does not know whether the remote UE has received the RRCSetup.

Ericsson think the proposed figure is not self-explanatory, and would rather see a full call flow with exchange of individual messages. Intel agree.

MediaTek think it is a bit difficult to describe this flow as individual messages due to some messages occurring simultaneously or in arbitrary sequence.

OPPO agree with MediaTek and think time is a problem for going into details. Ericsson think we have message names in the text description. Chair suggests we take the text description now and the rapporteur will generate an agreeable figure.

Agreement:

Proposal-27: agree the following description for connection establishment procedure of L2 UE-to-NW relay:

Step 1. The Remote and Relay UE perform discovery procedure, and establish PC5-RRC connection using the legacy Rel-16 procedure as a baseline.

Step 2. The Remote UE sends the first RRC message (i.e. RRCSetupRequest) for its connection establishment with gNB via the Relay UE, using a default L2 configuration on PC5. The gNB responds with an RRCSetup message to Remote UE. The RRCSetup delivery to the Remote UE uses the default configuration for L2 on PC5. If the relay UE had not started in RRC\_CONNECTED, it would need to do its own connection establishment as part of this step. The details for Relay UE to forward the RRCSetupRequest/RRCSetup message for Remote UE at this step can be discussed in WI phase.

Step 3. The gNB and Relay UE perform relaying channel setup procedure over Uu. According to the configuration from gNB, the Relay/Remote UE establishes an RLC channel for relaying of SRB1 towards the Remote UE over PC5. This step prepares the relaying channel for SRB1.

Step 4. Remote UE SRB1 message (e.g. an RRCSetupComplete message) is sent to the gNB via the Relay UE using SRB1 relaying channel over PC5. Then the Remote UE is RRC connected over Uu.

Step 5. The Remote UE and gNB establish security following legacy procedure and the security messages are forwarded through the Relay UE.

Step 6. The gNB sets up additional RLC channels between the gNB and Relay UE for traffic relaying. According to the configuration from gNB, the Relay/Remote UE sets up additional RLC channels between the Remote UE and Relay UE for traffic relaying. The gNB sends an RRCReconfiguration to the Remote UE via the Relay UE, to set up the relaying SRB2/DRBs. The Remote UE sends an RRCReconfigurationComplete to the gNB via the Relay UE as a response.

* [AT112-e][611][Relay] Open issues on L2 relay (Huawei)

Scope: Discuss the remaining open issues on L2 relay architecture, including:

* PC5 adaptation layer
* RRC procedures (including paging)
* Remaining issues from email discussion [627]
* Remaining open items in the current TR

Intended outcome: Summary in R2-2010870

Deadline: Wednesday 2020-11-11 1200 UTC

* [AT112-e][612][Relay] Open issues on L3 relay (Qualcomm)

Scope: Discuss the remaining open issues on L3 relay architecture, including:

* NAS transport
* Overhead
* QoS
* RRC states
* Remaining open items in the current TR

Intended outcome: Summary in R2-2010871

Deadline: Wednesday 2020-11-11 1200 UTC

[R2-2010870](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010870%20Summary%20of%20%5bAT112-e%5d%5b611%5d%5bRelay%5d%20Open%20issues%20on%20L2%20relay_summary.doc) (Summary from discussion [611]) Huawei discussion Rel-17 FS\_NR\_SL\_relay

Proposal 1a: Capture both the protocol stacks with and without PC5 adaptation layer for L2 UE-to-Network relay as candidate solutions in the TR, leave the down selection to WI phase (assuming down-selection first before studying too much on the detailed PC5 adaptation layer functionalities).

Proposal 1b: In the TR sec. 4.5.1.1, remove the Editor Note: “It is FFS if the adaptation layer is also supported at the PC5 interface between Remote UE and Relay UE.”. Add normal text “Whether the adaptation layer is also supported at the PC5 interface between Remote UE and Relay UE is left to WI phase.”

Proposal 2a: For L2 UE-to-UE relay, adaptation layer support the N:1 bearer mapping between multiple ingress PC5 RLC channels over first PC5 hop and one egress PC5 RLC channel over second PC5 hop and support the Remote UE identification function.

Proposal 2b: In the TR sec. 5.5.1, remove the Editor Note: “It is 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 Destination UE) at Relay UE.”

Proposal 2c: For L2 UE-to-UE relay, the identity information of Remote UE end-to-end Radio Bearer is included in the adaptation layer in first and second PC5 hop.

Proposal 2d: In addition, the identity information of Source Remote UE and/or the identity information of Target Remote UE are candidate information to be included in the adaptation layer, which is decided in WI phase.

Proposal 3: For L2 UE-to-UE relay connection establishment procedure, capture in the TR that “R2 consider the SA2 solution in TR 23.752 as baseline”. Further R2 impacts can be discussed in WI phase, if any.

Proposal 4: For L2 UE-to-NW relay, relay UE can support the relaying of the system information to the Remote UE(s) and what system information can be relayed to Remote UEs can be discussed at normative phase. On-demand SI request is supported for Remote UE for all RRC states (Idle/Inactive/Connected state).

Proposal 5: In L2 U2N relay, the paging relaying solution apply to both CN paging and RAN paging via option 2.

Proposal 6a: For L2 UE-to-Network relay, the RRC reconfiguration and RRC connection release procedures can reuse the legacy RRC procedure, with the message content/configuration design left to WI phase.

Proposal 6b: For L2 UE-to-Network relay, the RRC connection re-establishment and RRC connection resume procedures can reuse the legacy RRC procedure as baseline, by considering the agreed “connection establishment procedure of L2 UE-to-NW relay” to handle the relay specific part, with the message content/configuration design left to WI phase.

Proposal 7: In the TR sec. 4.5.5.1, remove the Editor Note: “It is FFS if this PC5 L2 configuration is a default configuration that can be overridden.”

Proposal 8: In the TR sec. 5.5.1, remove the Editor Note: “It is FFS if the adaptation layer is also supported over the first PC5 link (i.e. the PC5 link between the transmitting Remote UE and Relay UE).”

Proposal 9: In the TR sec. 4.5.1.2, remove the Editor Note: “It is FFS if N-to-1 bearer mapping from PC5 RLC channels to Uu interface RLC channel is supported for this case.”

[R2-2010871](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010871%20-%20Email%20discussion%20summary%20%5b612%5d%5bRelay%5d%20Open%20issues%20on%20L3%20relay%20(Qualcomm)%20-%20Summary.doc) (Summary from discussion [612]) Qualcomm discussion Rel-17 FS\_NR\_SL\_relay

MediaTek wonder about P3-P4 if we should include CT1 in the LS to speed up the potential work for the evaluation. Qualcomm understand that CT1 do not have a TU allocation for this and think the LS may confuse them. Qualcomm also understand that the overhead is a common issue for all N3IWF uses and SA2 can make a decision by themselves.

Ericsson agree with Qualcomm that SA2 can make the evaluation.

Samsung think SA2 should decide if CT1 help is needed.

vivo think we had proposals on the RRC state of the remote and relay UEs that were removed during the discussion, and would like to understand what the conclusion is in this respect. Qualcomm clarify that the proposal to have the two UE states independent was removed due to concerns from Huawei and MediaTek that the relay UE would need to be in RRC\_CONNECTED for active relaying of unicast data as previously agreed.

Apple understood that the concern about the state was for the relay UE, but the proposal that was removed was about the remote UE.

Futurewei think in P5, the second EN is only about PC5-RRC, and the overall QoS issue for the relay is not confined to PC5-RRC since some of the QoS metrics will not be able to be enforced at the RAN; they think we should note somewhere that there may be some QoS metrics that are supported in the direct connection which may not be able to be enforced in the L3 relay. Qualcomm think this was discussed in SA2 related to their solutions 24 and 25 and we cannot handle it here. Futurewei do not see this in the SA2 TR, and think QoS enforcement traditionally is a RAN function and SA2 may not be able to resolve it.

Ericsson agree with Qualcomm that the QoS issue should be handled in SA2, and think we do not need to capture an EN or FFS on it now although related contributions could be considered.

Futurewei think we could raise this issue in the LS we are sending to SA2, and ask them whether they think the QoS metrics can be enforced. Qualcomm think this can be handled in drafting of the SA2 LS, but RAN2 should not decide what SA2 should do.

Intel think on P8, it is not clear why we should remove the ENs in the second bullet. Qualcomm indicate the discussion concluded there was no RAN2 impact identified.

Ericsson think on the QoS question above, it can be discussed in the context of the LS being sent to SA2; SA2 will get the TR and can take the related decision without an explicit question.

Nokia agree with Ericsson and Qualcomm on the QoS issue. About the ENs, they think we should only have ENs where we want to resolve a problem, and we could have a NOTE saying something depends on SA2 or SA3 but it should not be an EN.

Huawei have some sympathy for Futurewei’s concern and think we could remove the ENs at the next meeting when we do the evaluation; for now maybe we could change it to “RAN2 can consider SA2 conclusion” on these points.

Interdigital agree with Huawei’s suggestion and think it’s a bit strange that we remove an EN saying RAN2 will do some work when we have not done the work.

ENs from P5 can be replaced in the TR by an agreement “RAN2 can consider in WI phase SA2 conclusions on QoS solutions, including whether it is sufficient to enforce E2E QoS via legacy PC5-RRC reconfiguration of SLRB and resource allocation”.

Proposal 1: In L3 relay N3IWF solution (solution#23 in TR 23.752), RAN2 understanding is that remote UE’s NAS is sent over PC5/Uu-DRB. Include it in the status report LS to SA2 (discussed in email discussion [601]).

Proposal 2: If any AS impact of NAS transport in solution#23 is identified by SA2, RAN2 can further discuss it in WI phase.

Proposal 3: For the IP header overhead of L3 U2N relay with N3IWF, RAN2 conclude that outer IP header on each hop can be compressed by ROHC "ESP/IP profile”, but the inner IP header can’t be compressed by the AS layer, whose impact could be evaluated by SA2.

Proposal 4: Include conclusion of IP header overhead of L3 U2N relay with N3IWF in the status report LS to be sent to SA2 (discussed in email discussion [601]).

Proposal 5: No AS impact is identified for SA2 QoS solution#24 and #25, for which legacy PC5-RRC procedure can be reused. Capture this conclusion in Section 4.6.2 of TR 38.836, and remove the following 2 Editor Notes:

Editor note: RAN2 can discuss AS impacts related to SA2 specified QoS solutions.

Editor note: RAN2 further discuss whether it is sufficient to enforce E2E QoS via legacy PC5 RRC reconfiguration of SLRB and resource allocation.

ENs above can be replaced in the TR by an agreement “RAN2 can consider in WI phase SA2 conclusions on QoS solutions, including whether it is sufficient to enforce E2E QoS via legacy PC5-RRC reconfiguration of SLRB and resource allocation”.

Proposal 6: For L3 relay QoS management, RAN2 don’t intend to study the forward compatibility solution for multi-hop support.

Proposal 7: Both relay and remote UE can be in RRC\_INACTIVE state.

Proposal 8: For security of L3 U2N relay:

1) Capture “Solution#23 of TR 23.752 with N3IWF is feasible to meet end-to-end security requirements.” in Section 4.6.3 of TR 38.836.

2) Remove the below Editor notes in Section 4.6.3 of TR 38.836

“Editor note: whether other security solution is introduced depends on SA2.”

“Editor note: RAN2 will evaluate any impact in RAN2 scope from these solutions”.

Proposal 9: For control plane procedure of L3 U2N relay, remove the following two Editor Notes in Section 4.6.5 of TR 38.836. Further AS impacts (if any) can be discussed in WI phase.

“Editor note: FFS if there is RAN2 impact to support the related control plane procedures.”

“Editor note: RAN2 will further consider procedures with RAN2 impact.”

Proposal 10: No RAN2 impact of SA2 solutions on L3 U2U relay (Solution#10/ Solution#31/ Solution#32) is identified and the design is in the scope of SA2

Proposal 11: For L3 U2U relay, capture below conclusions in TR 38.836:

1) In Section 5.6.2, capture that “No RAN2 impact of the solution captured in SA2 TR 23.752 (solution#31) is identified and the design is in the scope of SA2”

2) In Section 5.6.3, capture below conclusions in TR 38.836:

a. Capture that “security protection of L3 U2U relay is in the scope of SA2 and SA3. No RAN2 impact is identified”;

b. Capture an Editor-note: “whether the SA2 captured solutions can satisfy the security requirement depends on SA3.”

3) In Section 5.6.4, capture “No RAN2 impact of the solutions captured in SA2 TR 23.752 (e.g. solution#10 and solution#32) is identified and the design is in the scope of SA2”

Ericsson wonder if we should have a post-meeting discussion on the L2/L3 evaluation since it may be difficult to handle via contributions. OPPO think it would also be difficult to have a single email discussion on this controversial point and would prefer to handle it via contributions. Futurewei think the LS to SA2 identifies quite a few issues with L3 for SA2 to resolve, and it is difficult for us to conclude on L3 before SA2 have handled these topics.

Other contributions

[R2-2008777](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008777%20-%20Left%20issues%20on%20CP%20procedure%20for%20L2%20U2N%20Relay.docx) Left issues on CP procedure for L2 U2N Relay OPPO discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008922](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008922%20On-demand%20SI%20Delivery%20for%20Remote%20UE.docx) On-demand SI Delivery for Remote UE CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008962](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008962%20-%20Discussion%20on%20remaining%20issues%20of%20L3%20relay.doc) Discussion on remaining issues of L3 relay Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008964](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008964%20-%20Discussion%20on%20remaining%20issues%20on%20L2%20relay.docx) Discussion on remaining issues of L2 relay Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008966](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008966%20-%20RRC%20state%20and%20essential%20RRC%20procedures%20in%20L2%20U2N%20relay.doc) RRC state and essential RRC procedures in L2 U2N relay Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008983](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008983_L2RelayOpenAspects_Intel.docx) Open aspects of L2 relaying Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009030](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009030%20Discussion%20on%20remaining%20issues%20on%20L2%20Relay.doc) Discussion on remaining issues on L2 relay architecture ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009033](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009033%20Discussion%20on%20remaining%20issues%20of%20L3%20relay.doc) Discussion on Remaining issues on L3 relay ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009123](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009123.docx) Adaptation layer for PC5 at L2 UE-to-Network Relay MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009124](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009124.docx) Overhead in N3IWF based L3 relaying architecture MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009144](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009144.doc) Remaining issues on the adaptation layer for Layer-2 Relay Spreadtrum Communications discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009202](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009202%20(R17%20SL%20Relay%20SI_A8731%20CP%20Aspects).doc) Control Plane Aspects for UE to NW Relays InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009203](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009203%20(R17%20SL%20Relay%20SI_A8731%20Connection%20Establishment).doc) Connection Establishment and Maintenance for L2 Relays InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009206](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009206%20(R17%20SL%20Relay%20SI%20AI8731).doc) Discussion on L2 Relay Architecture and QoS InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009230](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009230%20-%20RAN2%20impacts%20introduced%20by%20Layer%202%20SL%20relay.docx) RAN2 impacts introduced by Layer 2 SL relay Ericsson discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009302](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009302%20QoS.docx) QoS Control with Sidelink Relay Futurewei discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009525](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009525%20UE%20to%20UE%20relay%20data%20forwarding.doc) Discussion on data forwarding mechanisms for Layer 2 UE-to-UE Relay Apple discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009526](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009526%20Support%20of%20RRC_Inactive%20remote%20UE.doc) Discussion on RRC\_INACTIVE remote UE Apple discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009585](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009585_Open%20issues%20on%20Layer-2%20relay.doc) Open issues on Layer-2 relay vivo discussion Rel-17

[R2-2009660](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009660%20L2%20relaying%20open%20issues%20v2.doc) L2 relaying open issues Samsung Electronics GmbH discussion

[R2-2009661](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009661%20Need%20for%20relaying%20of%20on-demand%20SI%20v2.doc) Need for relaying of on-demand SI Samsung Electronics GmbH discussion

[R2-2009720](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009720-%20Discussion%20on%20L3%20UE-to-NW%20relay%20architecture.docx) Discussion on L3 UE-to-NW relay architecture Ericsson discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009891](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009891.doc) SL L2 architectrure Sony discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009901](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009901.doc) Protocol stack design for U2N relay and U2U relay case Lenovo, Motorola Mobility discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009939](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009939%20Discussion%20on%20L2%20based%20UE-to-Network.docx) Discussion on L2 based UE-to-Network Nokia, Nokia Shanghai Bell discussion FS\_NR\_SL\_relay

[R2-2010129](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010129%20Sidelink%20Relay%20Adaptation%20Layer%20Header.docx) Needed Information in Adaptation Layer Header for L2 UE-to-UE Relay Convida Wireless discussion Rel-17

[R2-2010344](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010344.doc) Remaining issues on protocol stacks and procedures for L2 relay Huawei, HiSilicon discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010345](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010345.doc) NAS transmission and QoS management in L3 U2N relay Huawei, HiSilicon discussion Rel-17 FS\_NR\_SL\_relay

#### 8.7.3.2 Service continuity

Including report of [Post111-e][621][Relay] Service continuity

Email discussion summary

[R2-2010346](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010346%20Summary%20email%20discussion%20%5b621%5d%5bRelay%5d%20of%20Service%20continuity_final.doc) Summary email discussion [621][Relay] of Service continuity Huawei, HiSilicon report Rel-17 FS\_NR\_SL\_relay

Ericsson think on P2-1 we should avoid the “path switch like” HO, since we do not have the RAN3 procedures similar to a HO. They would prefer a different term than “handover” and do not consider that we are taking the NR HO procedure as a baseline.

LG want to clarify on P1-3 if we deprioritise this, how we would think about the OOC case where the remote UE has only the indirect path. Huawei understand that this could be supported with indirect to indirect but at lower priority.

For Ericsson’s comment, Huawei think we can correct the terminology in the TR capture phase. Chair suggests “RAN2 aspects of” HO; Ericsson are sceptical that a HO command is needed and think this could be done with a reconfiguration message with no HO command.

Futurewei understand that for P1-3, the OOC case can still be supported but we deprioritise study of it in the SI phase. On Ericsson’s comment on P2-1, they understand the proposal means that the relay uses the HO procedure as a baseline, not that we will call it a handover, and they think this could be resolved during the work item phase.

Ericsson suggest that we determine not to send INMs over Uu in P2-1. Futurewei point out that the original proposal had quite some support and think this is a WI issue. Huawei indicate that these details are discussed in later proposals.

InterDigital think on P1-3 the intent is that we do not prioritise any extra work that would be different from the direct-to-indirect case, but this case may also solve indirect-to-indirect.

Proposal 1-1 (20/22): The requirement of service continuity is only for U2N relay, but not for U2U relay, during mobility in this release.

Proposal 1-2 (22/22): R2 should study the mobility scenario of “between direct (Uu) path and indirect (via the relay) path” for U2N relay.

Proposal 1-3 (22/22): R2 deprioritize work specific to the mobility scenario of “between indirect (via a first relay UE) and indirect (via a second relay UE)” for path switching in the SI phase, which can be studied in the WI phase, if needed.

Proposal 1-5 (13+/22): R2 deprioritize the group mobility scenario in the SI phase, which may be discussed in WI phase, if needed.

Proposal 2-1 (19+/22): L2 U2N relay uses the RAN2 aspects of the R15 NR HO procedure as the baseline AS layer solution to guarantee service continuity (i.e. gNB hands over the remote UE to a target cell or target relay UE, including HO preparation type of procedure between gNB and relay UE (if needed), RRCReconfiguration to remote UE, remote UE switching to the target, and HO complete message, similar to the legacy procedure). Exact content of the messages (e.g. HO command) can be discussed in WI phase. This does not imply that we will send INM over Uu.

Discussion of the second set of “majority” proposals:

On P1-4, Nokia have a concern about leaving the RAN3 aspects to WI phase explicitly.

LG are generally fine with the proposals but wonder when the remote UE and relay UE are in the same cell at path switch, what will happen when the path switch fails. Huawei understand that we could discuss this in WI phase and it is not affected by the proposals.

Huawei think the FFS items should be indicated as “whether X will be done” to be discussed in WI phase. Ericsson thinks they should be captured in the TR.

In P2-3, step 1, LG think we should have a different description for the case that the remote UE has already selected the relay UE, and the serving cell ID should be included in the reporting. Huawei note on the first point that the current wording is a compromise to allow either remote UE or gNB selection, and on the second point the relay UE ID implies that the serving cell ID would also be needed.

Proposal 1-4 (18+/22): R2 focus on the mobility scenarios of intra-gNB cases in the study phase. R2 assume the inter-gNB cases will also be supported. For the inter-gNB cases, compared to the intra-gNB cases, potential different parts on R2 Uu interface in details can be studied either in SI phase or in WI phase.

Proposal 2-2 (21/22): For service continuity of L2 U2N relay, the following baseline procedure is used, in case of remote UE switching to direct Uu cell.

 Step 1: Measurement configuration and reporting

 Step 2: Decision of switching to a direct cell by gNB

 Step 3: RRC Reconfiguration message to remote UE

 Step 4: Remote UE performs RA to the gNB

 Step 5: Remote UE feedback the RRCReconfigurationComplete to gNB via target path, using the target configuration provided in the RRC Reconfiguration message.

 Step 6: RRC Reconfiguration to relay UE

 Step 7: The PC5 link is released between remote UE and the relay UE, if needed.

 Step 8: The data path switching.

The order of step 6/7/8 is not restricted. Followings are further discussed in WI phase, including:

 Whether Remote UE suspends data transmission via relay link after step 3.

 Whether Step 6 can be before or after step 3 and its necessity.

 Whether Step 7 can be after step 3 or step 5, and its necessity/replaced by PC5 reconfiguration.

 Whether Step 8 can be after step 5.

Capture Figure 2-2 in the TR.

Figure 2-2: Procedure for remote UE switching to direct Uu cell

Proposal 2-3 (21/22): For service continuity of L2 U2N relay, the following baseline procedure is used, in case of remote UE switching to indirect relay UE:

 Step 1: Remote UE reports one or multiple candidate relay UE(s), after remote UE measures/discoveries the candidate relay UE(s).

 Remote UE may filter the appropriate relay UE(s) meeting higher layer criteria when reporting, in step 1.

 The reporting may include the relay UE’s ID and SL RSRP information, where the measurement on PC5 details can be left to WI phase, in step 1.

 Step 2: Decision of switching to a target relay UE by gNB, and target (re)configuration on relay UE optionally (like preparation).

 Step 3: RRC Reconfiguration message to remote UE

 Step 4: Remote UE establishes PC5 connection with target relay UE, if the connection has not been setup yet.

 Step 5: Remote UE feedback the RRCReconfigurationComplete to gNB via target path, using the target configuration provided in RRCReconfiguration.

 Step 6: The data path switching.

Following are further discussed in WI phase, including:

 Whether Step 2 should be after relay UE connects to the gNB (e.g. after step 4), if not yet before.

 Whether Step 4 can be before step 2/3.

Capture Figure 2-3 in the TR.

Figure 2-3: Procedure for remote UE switching to indirect relay UE

Proposal 2-4 (21/22): For L2 U2N relay, following information may be included in the RRC Reconfiguration message from gNB to remote UE, in case remote UE switching to indirect relay UE: 1) Identity of the target relay UE; 2) Target Uu and PC5 configuration.

Proposal 3-1 (16+/22): Working Assumption: For service continuity in L3 U2N relay, R2 assume no AS layer solution will be studied to guarantee the service continuity, and leave it to the upper layer (e.g. application layer) solution. This does not exclude studying some enhancements in mobility scenario for other purposes.

Other contributions

[R2-2008780](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008780%20-%20Left%20issues%20on%20Service%20continuity%20for%20L2%20U2N%20relay.docx) Left issues on Service continuity for L2 U2N relay OPPO discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008923](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008923%20Further%20Clarification%20on%20the%20L2%20Service%20Continuity.docx) Further Clarification on the L2 Service Continuity CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008967](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008967%20-%20Remaining%20issues%20for%20mobility%20procedures%20of%20L2%20relay.docx) Remaining issues on the mobility procedures for L2 relay Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009031](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009031%20Discussion%20on%20service%20continuity.doc) Discussion on Service continuity ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009068](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009068%20L3EnhancementsForFastPathSwitch.docx) L3 relay enhancements to improve path switching Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009125](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009125.docx) Service Continuity for L2 Relay and L3 Relay MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009145](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009145.doc) Discussion on service continuity for Layer-2 UE-to-Network Relay Spreadtrum Communications discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009171](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009171%20Service%20continuity%20via%20L3%20U2N%20relay.doc) Service continuity via L3 UE-to-Network relaying Samsung Electronics discussion Rel-17

[R2-2009177](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009177.docx) Service Continuity Scenarios and AS-Layer Procedures Fraunhofer HHI, Fraunhofer IIS discussion Rel-17

[R2-2009271](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009271_ServiceContinuity_Intel.docx) Further details on Service Continuity for Relaying Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009301](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009301%20service%20continuity.docx) Service Continuity with Sidelink Relay Futurewei discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009476](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009476%20Service%20continuity%20in%20SL%20relay.doc) Discussion on service continuity for layer 2 UE to NW relay Apple discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009586](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009586_Service%20continuity%20for%20L2%20and%20L3%20relay.docx) Service continuity for L2 and L3 relay vivo discussion Rel-17

[R2-2009721](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009721-%20Service%20continuity%20procedure%20and%20scenarios%20for%20sidelink%20relay.docx) Service continuity procedure and scenarios for sidelink relay Ericsson discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009938](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009938%20Service%20Continuity%20for%20UE2UE%20Relay.docx) Service Continuity for UE2UE Relay Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010329](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010329-Clarification%20of%20remote%20UE%20mobility.doc) Clarification of remote UE mobility ETRI discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010469](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010469.doc) Discussion on service continuity Xiaomi communications discussion

[R2-2010588](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010588%20Service%20continuity%20for%20SL%20relay.docx) Service continuity for SL relay LG Electronics Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010659](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010659%20service%20continuity%20for%20Remote%20UE.DOCX) Service continuity for Remote UE LG Electronics Inc. discussion Rel-17

#### 8.7.3.3 Relay selection

Including report of [Post111-e][622][Relay] Relay selection and reselection

Email discussion summary

[R2-2009523](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009523%20Summary%20Report%20of%20%5bPost111-e%5d%5b622%5d%5bRelay%5d%20Relay%20selection%20and%20reselection%20(rapporteur)_final.doc) Summary Report of [Post111-e][622][Relay] Relay selection and reselection Apple discussion Rel-17 FS\_NR\_SL\_relay

Apple indicate on P3, the intention is that we could use link quality measurements in addition to the discovery messages, so that the UE is not always required to broadcast discovery messages.

Ericsson think P1-P7 are OK but have some concern for P8: It may be useful also to decide if we need an early “before RLF” event.

Intel want to clarify on P3, whether the understanding is that the discovery message serves as a baseline and the SL-RSRP measurements of the unicast link are also considered. Apple confirm this is the intention. In this light Intel think we could rely on the discovery message, and wonder what happens with P3 if there is no data transmission on the unicast link. Apple intend P3 to keep the option open and it would not be used if not available. Details can be discussed in WI phase.

Qualcomm support P3 and think for the scenario mentioned by Intel, the relay UE can broadcast discovery messages. If the UE measures only the discovery message, the remote UE needs to keep doing measurements on the discovery messages of a relay to which it is already connected.

vivo agree with Apple that P3 provides an alternative mechanism, and think there was a majority view in the discussion for using SL-RSRP; also, they think SL-RSRP could be used for relay selection as well in case the two UEs already have an established unicast link for some other service, which was not covered in the email. Apple think this case does not need to be prioritised in the study.

MediaTek wonder if for P3, we can do a direct comparison between discovery-based measurement quality and unicast-link-based measurement quality. Apple indicate that this was not covered in the email and can be left to WI phase.

Proposal 1 [Easy]: Radio measurements at PC5 interface are considered as part of relay (re)selection criteria.

Proposal 2 [Easy]: Remote UE at least use “Radio signal strength measurements of Sidelink Discovery Messages” to evaluate whether PC5 link quality of a relay UE satisfies relay selection and reselection criterion.

Proposal 3: Remote UE may also use SL-RSRP measurements on the SIdelink unicast link to evaluate whether PC5 link quality with a relay UE satisfies relay reselection criterion. Details e.g. in case of no transmission on the unicast link can be discussed in WI phase.

Proposal 4 [Easy]: For relay (re)selection, remote UE compares the PC5 radio measurements of a relay UE with the threshold which is configured by gNB or preconfigured.

Proposal 5 [Easy]: “higher layer criteria” needs to be considered by remote UE for relay (re)selection, but details can be left to SA2 to decide.

Proposal 6 [Easy]: Relay (re)selection can be triggered by upper layers of remote UE.

Proposal 7 [Easy]: Relay reselection should be triggered if the NR Sidelink signal strength of current Sidelink relay is below a (pre)configured threshold.

Proposal 8: Relay reselection may be triggered if RLF of PC5 link with current relay UE is detected by remote UE.

Proposal 9 [Easy]: P1-P8, as a baseline for relay (re)selection, apply to both U2N and U2U scenarios, and for both Layer 2 and Layer 3 solutions.

ZTE on P10 have a concern about the wording and want to clarify if the remote UE is connected via the remote UE or directly via Uu. If the latter, they think L3 should also be considered.

Ericsson have some concern with taking this decision (original wording of P10) because they think gNB decision should be the only option for UE in RRC\_CONNECTED.

OPPO think ZTE have a point and understand that P10 is mainly for the reselection case. Apple understand that it covers both: selection for the direct Uu case, and reselection for the indirect case. ZTE would like to include L3 for the direct Uu case, but Apple consider that this is more in service continuity scope.

Proposal 10: For CONNECTED remote UE in Layer 2 U2N scenario, gNB decision on relay selection/reselection is considered in WI phase under the above baseline (P1-P9).

LG think on P15, there may be situations where we need to consider gNB selection instead. Apple understand this relates more to service continuity and we don’t cover these cases in this discussion.

Kyocera would like to clarify if P15 is only applicable for U2N or also U2U. Apple indicate it applies to both.

vivo wonder if P12 and P14 are needed without agreeing any new AS layer criteria: Are we agreeing that any future criteria will be applicable to both?

Qualcomm are OK with the proposals and think we need to move forward.

OPPO agree with vivo that P12 and P14 are not so meaningful without additional criteria being identified. They agree with P15 and would also like to take P10 as a clarification of P1-P9.

Proposal 12 [Easy]: Additional AS layer criteria can be considered in WI phase for both Layer 2 and layer 3 U2N relay solutions.

Proposal 14 [Easy]: Additional AS layer criteria can be considered in WI phase for both Layer 2 and layer 3 U2U relay solutions.

Proposal 15 [Easy]: For relay selection and reselection, when remote UE has multiple suitable relay UE candidates which meet all AS-layer & higher layer criteria and remote UE need to select one relay UE by itself, it is up to UE implementation to choose one relay UE. This does not exclude gNB involvement in service continuity for U2N.

Other contributions

[R2-2008924](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008924%20Further%20Discussion%20on%20NR%20Sidelink%20Relay%20Selection%20and%20Reselection.docx) Further Discussion on NR Sidelink Relay Selection and Reselection CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008987](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008987.docx) Further details on relay reselection Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009029](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009029%20Discussion%20on%20relay%20initiation%20and%20relay%20(re-)selection.doc) Discussion on Relay initiation and (re-)selection ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009069](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009069%20RelaySelection.docx) Discussion on relay selection and reselection Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009148](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009148.doc) Discussion on relay selection and reselcetion Spreadtrum Communications discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009172](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009172%20Consideration%20on%20relay%20reselection%20criteria.doc) Consideration on relay reselection criteria Samsung Electronics discussion Rel-17

[R2-2009176](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009176.docx) Relay (re)selection enhancement MediaTek Inc. discussion Rel-17

[R2-2009205](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009205%20(R17%20SL%20Relay%20SI%20A8733%20Relay%20selection).doc) Relay Selection and Reselection InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009229](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009229%20-%20Remaining%20aspects%20for%20relay%20selection%20and%20reselection.docx) Remaining aspects for relay selection and reselection Ericsson discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009588](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009588_SL-RSRP%20and%20SD-RSRP%20comparison%20and%20additional%20criterion%20for%20relay%20(re-)selection.doc) SL-RSRP and SD-RSRP comparioson and additional criterion for relay (re-)selection vivo discussion Rel-17

[R2-2009634](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009634.docx) Considerations on relay selection and reselection KT Corp. discussion

[R2-2009857](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009857%20Relay%20reselection%20in%20the%20failure%20case%20v1.0.doc) Relay reselection in the failure case Lenovo, Motorola Mobility discussion Rel-17

[R2-2009892](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009892.doc) SL Relay selection Sony discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009972](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009972%20NR%20Sidelink%20Relay%20(Re-)Selection%20Criterion%20and%20Procedure.docx) NR Sidelink Relay (Re-)Selection Criterion and Procedure Fraunhofer IIS, Fraunhofer HHI discussion Rel-17

[R2-2010005](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010005_relay_reselection.doc) Relay reselection based on discovery Kyocera discussion

[R2-2010347](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010347.docx) Remaining issues on relay selection and reselection Huawei, HiSilicon discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010652](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010652%20PC5%20link%20failure%20handling%20for%20NR%20sidelink%20relay.docx) PC5 link failure handling for NR sidelink relay LG Electronics Inc. discussion Rel-17

#### 8.7.3.4 Other

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

[R2-2008778](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008778%20-%20Left%20issues%20on%20QoS,%20Security%20and%20L23%20comparison.docx) Left issues on QoS, Security and L23 comparison OPPO discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009650](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009650.docx) View on Paging Option 2 in L2 relay ITL discussion Rel-17

[R2-2009858](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009858%20Considerations%20on%20the%20UE-to-Network%20relay%20and%20UE-to-UE%20relay%20case%20v2.0.doc) Considerations on the UE-to-Network relay and UE-to-UE relay case Lenovo, Motorola Mobility discussion Rel-17

[R2-2010104](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010104_SLRelayRelease_Intel.docx) Release procedure for SL Relaying support Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

### 8.7.4 Discovery model and procedure for sidelink relaying

Including report of [Post111-e][623][Relay] Remaining issues on relay discovery

Email discussion summary

[R2-2008815](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008815%20Summary%20of%20%5bPost111-e%5d%5b623%5d%5bRelay%5dRemaining%20issues%20on%20relay%20discovery%20(rapporteur).doc) Summary of [Post111-e][623][Relay]Remaining issues on relay discovery (rapporteur) OPPO discussion Rel-17 FS\_NR\_SL\_relay Revised

[R2-2010661](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010661%20Summary%20of%20%5bPost111-e%5d%5b623%5d%5bRelay%5dRemaining%20issues%20on%20relay%20discovery%20(rapporteur).doc) Summary of [Post111-e][623][Relay]Remaining issues on relay discovery (rapporteur) OPPO discussion Rel-17 FS\_NR\_SL\_relay R2-2008815 Late

On P11, CATT are confused about the relevance to the gNB capability. They understand that whether the UE can transmit discovery message is only related to Uu and PC5 interface quality. Chair wonders what would then happen in a gNB that does not give a SL configuration; it seems the UE would have to transmit discovery based on preconfiguration.

OPPO understand that CATT’s question is not related to the proposal, since the proposal allows such a UE to transmit discovery messages. They think companies understood that this UE might need to switch to a relay connection using the SL carrier.

Huawei have some concern on P9-P12 that we do not have a clear definition of “non-SL-capable” for the gNB; from the discovery perspective they think that L2 and L3 relay UEs should behave the same, so they do not see why P9 and P10 should be different. OPPO indicate on the definition, during the discussion some companies wanted to clarify, and there was convergence that we discuss a gNB that can support SL relay operation (not only SL operation). To the difference between the L2 and L3 cases, OPPO understand that for the L2 relay, it does not make sense to connect as a relay to a gNB that cannot support the feature, but the L3 relay could do this.

Qualcomm consider that the non-SL-capable gNB is a valid scenario and think we already had some discussion of the definition. Details may need to be discussed in the WI phase but we should not repeat the discussion.

LG think in P16, the discovery message could also be triggered based on SL radio condition. OPPO wonder which scenario would require this. LG indicate it could be used for a reselection scenario and the remote UE would send discovery signals if its SL-RSRP dropped below a threshold. OPPO indicate this is outside the email discussion.

Intel are OK with the proposals but also agree with Huawei that we need some clarity on the definition of the non-SL-relay-capable gNB. They agree that the details can be discussed in the WI phase but think we at least need to capture the relation to discovery. OPPO suggest that a SL-relay-capable gNB is a gNB that is capable of SL relay operation. Intel understand that it is coupled with the discovery configuration, i.e. a SL-relay-capable gNB must at least provide a discovery configuration.

Qualcomm think we can just capture the current RAN2 understanding and suggest that a SL-relay-capable gNB is a gNB that is capable of SL relay operation.

Ericsson prefer the description that the gNB does not provide discovery configuration. On P11, they think when the remote UE camps on a non-SL-capable gNB, it can only do discovery based on preconfiguration.

ZTE think P15 can be reworded to indicate that “additional” means “in addition to basic SL configuration”, and for P3-P4 they would like to mention that the separate and shared resource pools are with respect to the sidelink data transmission resource pool.

Proposal1: To send a LS to SA2 to consult whether discovery message could be taken as PC5-S signalling or other new signalling in upper layer. This can be included in R2-2010862 (offline discussion [601]).

Proposal2: Solution to differentiate discovery message in AS layer is also applicable for U2U relay

Proposal3: Both solutions of separate and shared resource pool (compared to data transmission resource pool) are captured in TR. They can be discussed in WI phase.

Proposal4: Discovery messages should be treated equally in terms of channel prioritization in LCP within the separate resource pool.

Proposal 5: For shared resource pool, to introduce a new LCID for discovery message i.e. it is taken as a new SL SRB

Proposal 9: L3 U2N relay UE is allowed to transmit discovery message based on at least pre-configuration when it is connected to a non\_SL Relay\_Capable gNB whose serving carrier is not shared with SL carrier. Detailed definition of non\_SL Relay\_Capable gNB can be left for WI phase but at least should include the case that the gNB does not provide SL relay configuration, e.g. no discovery configuration.

Proposal 10: L2 U2N relay UE should be always connected to a SL Relay Capable gNB for relay operation including transmission of discovery message

Proposal11: Remote UE supporting L2 relay is allowed to transmit discovery message (at least by preconfiguration) when it is directly connected to a non\_SL Relay\_Capable gNB whose serving carrier is not shared with SL carrier.

Proposal 12: Remote UE supporting L3 relay is allowed to transmit discovery message on its own based on at least pre-configuration when it is connected to a non-SL Relay\_Capable gNB whose serving carrier is not shared with SL carrier. Detailed definition of non\_SL Relay\_Capable gNB can be left for WI phase.

Proposal 14: for L3 solution, it is not feasible for serving gNB to configure an out of coverage remote UE with radio configuration for transmission of discovery message

Proposal15: No additional network configuration is needed for measurement by remote UE in RRC\_IDLE or RRC\_INACTIVE.

Proposal16: For U2U relay operation, relay UE or remote UE is allowed to transmit discovery message when it is triggered by upper layer.

Proposal 17: Both remote UE and relay UE in U2U relay can rely on pre-configuration unless relevant radio configuration is provided by network, either via system information or dedicated signalling

Other contributions

[R2-2008802](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008802%20Discussion%20on%20AS%20layer%20protocol%20of%20discovery%20message%20for%20SL%20relay.docx) Discussion on AS layer protocol of discovery message for SL relay OPPO discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008925](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008925%20Discussion%20on%20Discovery%20Message.docx) Discussion on discovery message CATT discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008965](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008965%20-%20Discussion%20on%20remaining%20issues%20of%20discovery%20and%20relay%20(re)selection.doc) Remaining issues on discovery and relay (re)selection Qualcomm Incorporated discussion Rel-17 FS\_NR\_SL\_relay

[R2-2008977](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008977.docx) Further details on SL discovery for relaying Intel Corporation discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009032](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009032%20Discussion%20on%20sidelink%20relay%20discovery.doc) Discussion on relay discovery and link management ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009149](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009149.doc) Discussion on remaining issues on relay discovery Spreadtrum Communications discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009173](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009173%20Sidelink%20relay%20discovery%20open%20issue.doc) Sidelink relay discovery open issue Samsung Electronics discussion Rel-17

[R2-2009204](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009204%20(R17%20SL%20Relay%20SI%20A874%20Discovery).doc) Discovery Procedure for SL Relays InterDigital discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009228](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009228%20-%20Remaining%20aspects%20for%20discovery.docx) Remaining aspects for discovery Ericsson discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009524](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009524%20SL%20relay%20discovery_remaining_issues.doc) Discussion on remaining issues on NR Sidelink Relay discovery Apple discussion Rel-17 FS\_NR\_SL\_relay

[R2-2009587](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009587%20Remaining%20issues%20of%20sidelink%20relay%20discovery%20procedure.doc) Remaining issues of sidelink relay discovery procedure vivo discussion Rel-17

[R2-2009633](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009633.docx) Considerations on discovery for sidelink relay KT Corp. discussion

[R2-2009638](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009638%20Discussion%20on%20differentiation%20of%20discovery%20message.doc) Discussion on differentiation of discovery message SHARP Corporation discussion Rel-17

[R2-2009970](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009970%20NR%20SL%20Relaying%20Discovery.docx) NR Sidelink Relaying Discovery Fraunhofer IIS, Fraunhofer HHI discussion Rel-17

[R2-2009994](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009994_disc_pool.doc) Discovery resources for sidelink relaying Kyocera discussion

[R2-2010046](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010046%20Discussion%20on%20SL%20relay%20discovery%20model%20and%20procedure.docx) Discussion on relay discovery model and procedure Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010331](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010331%20On%20relay%20discovery.docx) On relay discovery MediaTek Inc. discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010348](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010348.docx) Remaining issues on relay discovery Huawei, HiSilicon discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010349](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010349.docx) Discussion on the discovery aspects related to SA2 LS S2-2006587 Huawei, HiSilicon discussion Rel-17 FS\_NR\_SL\_relay

[R2-2010467](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010467.doc) Discussion on scenario regarding non SL relay capable gNB Xiaomi communications discussion

[R2-2010660](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010660%20Remaining%20issues%20on%20discovery%20for%20NR%20sidelink%20relay.docx) Remaining issues on discovery for NR sidelink relay LG Electronics Inc. discussion Rel-17

## 8.11 NR positioning enhancements SI

(FS\_NR\_pos\_enh; leading WG: RAN1; REL-17; WID: RP-202094)

Time budget: 1 TU

Tdoc Limitation: 4 tdocs

Email max expectation: 3 threads

### 8.11.1 Organizational

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

Incoming LSs

[R2-2008707](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008707_R1-2007264.doc) LS on Latency of NR Positioning Protocols (R1-2007264; contact: Intel) RAN1 LS in Rel-17 FS\_NR\_pos\_enh To:RAN2 Cc:RAN3, SA2

Qualcomm note that the LS asks for end-to-end latency, not just of the positioning procedures (and the SID and SA1 requirements also talk about end-to-end); so in their view it is misleading to focus only on the positioning procedures. Nokia think this was discussed as part of the email discussion on latency after RAN2#111-e, and we decided to focus on the RAN2 protocol contribution to the delay. Ericsson agree with Nokia. Huawei have the same view and think the tasking for RAN2 is clear, but we can discuss further under the email discussion. Intel agree this was covered in the email discussion.

* Noted (will reply from the discussion of R2-2009001)

[R2-2008766](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008766_S6-200269.doc) LS on Requirements on positioning for UAS (S6-200269; contact: InterDigital)   SA6     LS in    Rel-17 FS\_UASAPP   To:SA1            Cc:SA2, RAN2

* Noted

TR maintenance

[R2-2010577](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010577%20TP%20for%20Positioning%20SI.docx) TP for TR 38.857 Study on NR Positioning Ericsson, Swift Navigation report Rel-17 38.857

[R2-2010576](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010576%20draft%20LS%20to%20capture%20TP.doc) draft LS to capture TP for TR 38.857 Ericsson LS out Rel-17 To:RAN1

Ericsson think we can wait for the next meeting to send an update.

Nokia think any related issues can be discussed under the integrity agenda item.

* 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 efficiency for commercial use cases.

Including report of [Post111-e][625][POS] End-to-end latency analysis

This agenda item will use a summary document.

Email summary

[R2-2009001](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009001%20Report%20of%20625%20E2E%20latency%20v01.docx) Report of [Post111-e][625][POS] End-to-end latency analysis (Intel) Intel Corporation discussion Rel-17 FS\_NR\_pos\_enh

Discussion of P1-P3:

Qualcomm think it does not make sense to focus only on the positioning procedures. It would mean 0 ms latency for deferred MT-LR. They also think the RAN2 scope in this discussion has gotten a bit confused and we are making arbitrary distinctions between interfaces in our scope and out of our scope. They are concerned that we give misleading information if we claim latency numbers that only account for the positioning procedures. In particular, they think enhancements going beyond the positioning procedures should not be excluded.

Huawei have a comment on P1: If this is agreed, there is some overlap between the RAN1 and RAN2 analyses of latency, so they would prefer if RAN2 excludes this part. To Qualcomm’s comments, they think RAN1 have already shown what parts of the procedures RAN2 needs to analyse: from reception of PDSCH to transmission of PUSCH, for certain messages; and they don’t see that we need to cover anything outside that range.

Intel clarify that the reason the AMF-LMF interface has to be analysed is because it relates to transfer of LPP/NRPPa messages, whereas the GMLC and UDM interfaces transfer messages that are not in RAN2 scope. Regarding Huawei’s comment, Intel understand that we do not need to restrict ourselves to strictly exclude things that have been looked at by RAN1.

Nokia think lack of time for the SI is the big issue. They understand that RAN1 are focussing only on L1 latency, and we as the stage 2 owner could try to coordinate looking at all the signalling delays, but we would need a lot of time. They understand that we are looking at the interfaces that underly transport of LPP and NRPPa.

Qualcomm think there is no contradiction between RAN1 looking at L1 and RAN2 looking at end-to-end. They see not so much time effort to extrapolate from the conclusions of the email discussion to cover the end-to-end aspects, and think the SID calls for end-to-end. They think we should at least capture some guidance in the TR about what we have analysed, and wonder how we will evaluate enhancements such as idle/inactive without considering procedures outside the positioning procedures.

Ericsson agree with Intel and others that what we have set out to do is enough. They agree readers should be careful but think this is true anyway, as deployment and implementation aspects will also affect the latency.

CATT understand that the purpose of the latency analysis is to find enhancements to reduce the latency; they are fine with considering enhancements that go outside the bounds of the positioning procedures.

vivo agree with Qualcomm that RAN1 is asking for end-to-end latency, and think if no one takes responsibility for end-to-end latency we have no way to judge the enhancements.

Intel agree with Qualcomm that we should note clearly in the minutes or TR what we have analysed.

Agreements:

1: For latency analysis of Rel.16 solutions, RAN2 only consider the latency of positioning procedure, i.e. step 5 in MO-LR/step 12 in MT-LR (involving RRC, LPP, NRPPa, MAC). A note is added to the TR and in our response to RAN1 to clarify this is what we covered. We can clarify to RAN1 that more time would be needed for an end-to-end analysis.

2: For latency analysis of Rel.16 solutions, RAN2 only consider the latency caused by UE, gNB, AMF and LMF.

3: For latency analysis of Rel.16 solutions, RAN2 consider both UE-based and UE-assisted.

Handling of call flows in P4-P8:

Qualcomm note that the multi-RTT procedure is not in agreement with the stage 2; it takes DL and UL in sequence, and they think we should use the stage 2 flow as the baseline with some steps in parallel. Nokia think we need a separate document showing the call flows and latencies.

Intel indicate that they have updated the multi-RTT to account for the UL and DL measurements in parallel, and they wonder if Qualcomm are commenting on the latest version. Qualcomm find different numbers when checking the multi-RTT in the email discussion.

Call flows from P4-P8 are used as baseline in offline discussion.

Handling of tables in P9-P18:

Tables and contents from P9-P18 are used as baseline in offline discussion.

Qualcomm wonder if we will capture the results as a TP or just provide them to RAN1 for capturing. Intel suggest that we have a summary of the results and a separate TP. Nokia would like to see the reply LS and associated document first and then decide on a TP.

Ericsson would like to see the document aligned with an appropriate structure for the TR. Nokia think we should focus on the content and format it later considering the short time to send the LS. Intel agree with Nokia and understand that there will be a separate email discussion for a TP in due course.

* [AT112-e][606][POS] LS to RAN1 on positioning latency (Intel)

Scope: Summarise the latency results and draft an LS to RAN1. Clarify that the attached results are a checkpoint that has not yet been endorsed as a TP.

Intended outcome: Summary of latency results (R2-2010866) and agreeable LS (R2-2010867) with the summary attached

Deadline: Thursday 2020-11-05 1200 UTC

[R2-2010866](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010866%20Summary%20of%20latency%20results%20-%20V06.docx) (Summary of latency from discussion [606]) Intel discussion Rel-17 FS\_NR\_pos\_enh

Huawei have a concern about steps that can be skipped in uplink positioning; the steps are not deducted from the total latency, although there are notes saying they can be skipped. They would prefer to have the numbers deducted from the totals to give an accurate lower bound.

Intel agree the latency can be reduced by skipping steps and this is indicated in the current version; they assume RAN1 can understand the resulting numbers.

Qualcomm agree with Intel, and think in all procedures we could save some steps (e.g. if AD are broadcasted). They understand that we will keep RAN1 updated and this is an accurate snapshot of our status.

Nokia think the assumptions made are clear, and we need to draw the line for where to stop.

Huawei are not comfortable sending this to RAN1 because we need to give them a clear lower bound for the achievable latency. They think there is no blocking issue for us to include this.

Intel want to avoid providing different tables for different cases and complexifying the document.

Qualcomm think there is not full agreement yet on which steps can be skipped.

Ericsson think we could clarify more explicitly that we are still considering the call flows. They would prefer to capture this in the document since it may be read alone without the context of the LS.

Huawei suggest we leave the total values empty and have RAN1 do the arithmetic taking into account their own procedures’ contributions.

vivo think table 1 is necessary to meet the RAN1 request and wonder if it can be used directly by RAN1 as it is; if not, we should clarify that.

Chair suggests we could add “Results in this document are the status as of RAN2#112-e and are not final decisions.” in the introduction.

Huawei think the total values for uplink positioning are in question. They also think the gNB-UE transmission time of 0-0.5 ms may not be realistic, but assume RAN1 can resolve this. Qualcomm think we should remove the totals everywhere or nowhere.

Intel think all companies in the email discussion were clear that we show the worst-case times, and we could also clarify this in the introduction. We could also indicate that we are discussing which steps can be skipped.

CATT wonder why we do not mention that we are still discussing other potential solutions. Intel clarify this is in the LS.

* Endorsed to be sent to RAN1, with the addition to the introduction: “Results in this document are the status as of RAN2#112-e and represent the worst-case values. RAN2 are still discussing which steps can be skipped for optimal cases.”
* Revised in R2-2010872 and endorsed with the change above.

[R2-2010867](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010867%20Draft%20Reply%20LS%20on%20Latency%20of%20NR%20Positioning%20Protocols_v3.doc) (LS from discussion [606]) Intel discussion Rel-17 To:RAN1

* Approved as R2-2010873

Summary document

[R2-2010669](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010669%20Summary%20of%208.11.2%20Enhancements%20for%20commercial%20use%20cases.docx) Summary of 8.11.2 Enhancements for commercial use cases CATT discussion Rel-17 FS\_NR\_pos\_enh Late

Discussion of P2:

Qualcomm think we cannot simply skip the capability procedure, because the LMF needs it. They understand that deferred MT-LR addresses this issue by avoiding unnecessary sending of the capabilities. They see no benefit to storing the capabilities in the AMF since the LMF will still need to fetch them. Huawei have generally the same view: The LMF cannot blindly configure a UE, and they do not see storage in the AMF as necessary since anyway the LMF can keep the capability.

ZTE have the same view as Huawei and Qualcomm, and on P3 they think this may reduce network efficiency and is only applicable to RRC\_CONNECTED.

Intel think we should collect and clarify solutions before doing too much down-selection.

Latency enhancements to be discussed further by email.

* [AT112-e][607][POS] Gathering of latency enhancement solutions (CATT)

Scope: Describe and discuss the proposed latency enhancements in a format suitable for developing into a TP.

Intended outcome: Text proposal in R2-2010868

Deadline: Friday 2020-11-13 0000 UTC

Discussion of P8/P9:

Chair understands that RAN1 have agreed positioning support in RRC\_INACTIVE. CATT have the same understanding. Intel wonder about the relationship to SDT.

Nokia think the support for measurement in a particular state is more a RAN1 decision, and RAN2 do not need to agree on it; we can focus on reporting enhancements.

Huawei have the same view as Nokia, and think there is a concern about SDT since it only carries MO user-plane data, so it may not support our uses. But they think we have the motivation to resolve these issues and the question should be discussed in this WI.

Qualcomm understand the RAN1 agreement also considers UL and UL+DL methods. They agree measurement is not really in RAN2 scope, but configuration and reporting are. On SDT, they think CIoT resolved this same basic issue in Rel-16. They also see a bit of a disconnect since the state transition aspects are outside the sequences that we agreed to analyse for latency.

CATT think support of idle/inactive is not primarily for latency reduction but for network efficiency. The reason for proposing DL-PRS as the first priority in RRC\_INACTIVE is that for DL-PRS measurement, RAN1 already agreed to support it, and it is valuable for RAN2 to evaluate how to support the DL measurement report in inactive.

Ericsson think we are broadening the scope of the discussion a bit by involving SDT and related subject; do we believe that positioning will drive work to enhance these features? If so, we should involve additional people.

ZTE agree with CATT and think the main advantage of idle/inactive is for network efficiency and maybe power saving. About SDT, they think a lot of aspects of this subject still need to be discussed and they would prefer that we discuss this after SDT have progressed.

Qualcomm think we had similar overlap for on-demand SI in connected mode, and we should observe what SDT are doing and see if it’s useful for us. They consider RRC\_INACTIVE as clearly an enhancement for latency, since measurement reports can be piggybacked on RACH and state transitions can be avoided—but this is outside the positioning procedures that we agreed to consider for latency evaluation.

Huawei think we should also consider if the LCS request in an MO-LR can be transmitted in idle/inactive. They do not see relevance to latency reduction, because the state transitions could be avoided by staying in RRC\_CONNECTED all the time. They point out that the CIoT solution is for LTE and we would need to look at the impact for supporting CP data transmission.

CATT think we should clarify that support of positioning in idle/inactive does not mean all procedures would be supported. Considering the time budget they would prefer to focus first on DL-PRS case, but also consider other potential solutions besides SDT.

Ericsson are not sure that positioning reports are “small” in the sense of SDT. We can discuss SDT but they think we do not need to single it out. They agree with Huawei that this is not for latency reduction.

Intel report that the RAN1 agreement is broad (all positioning methods, UE-based+UE-assisted) and also includes e.g. AD delivery, but does not include the details of how to enable transfer of the signalling; this is all for the WI phase.

Agreements:

Positioning measurement reporting (including location estimates for UE-based) should be supported in RRC\_INACTIVE; involvement of SDT is FFS. Reporting of specific measurements is pending RAN1 decision.

Discussion of P14/P15:

Ericsson think P15 needs some discussion as an LMF may not be able to fulfil the requirement for every UE.

Intel think RAN1 already agreed P14 and we would just be aligning with them.

Intel and CATT clarify RAN1 have not agreed on UE-based multi-RTT. Nokia understand that they took agreements that imply UE-based multi-RTT would be supported. Qualcomm have the same understanding as Nokia.

Ericsson think we need to discuss the feasibility of the signalling.

Agreements on on-demand PRS

RAN2 study on-demand PRS mechanism for DL-based, UL&DL-based methods (e.g. multi-RTT), and UE-Based and UE-assisted positioning methods in this SI.

* [Post112-e][608][POS] Support of on-demand PRS (Ericsson)

Scope: Discuss potential solutions for on-demand PRS: signalling aspects, which node requests the PRS, which node the request is directed to. Rapporteur is asked to provide update on RAN1 agreements.

Intended outcome: Report to next meeting

Deadline: Long

* [Post112-e][609][POS] Positioning support in RRC\_IDLE/RRC\_INACTIVE (Huawei)

Scope: Discuss potential solutions for positioning support in RRC\_IDLE/RRC\_INACTIVE, distinguishing clearly between what can be supported in idle and what can be supported in inactive. Rapporteur is asked to provide update on RAN1 agreements.

Intended outcome: Report to next meeting

Deadline: Long

R2-2010868 (TP from discussion [607]) CATT discussion Rel-17 FS\_NR\_pos\_enh

Other contributions

[R2-2008775](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008775%20-%20Discussion%20on%20on-demand%20DL-PRS.doc) Discussion on on-demand DL-PRS OPPO discussion Rel-17 FS\_NR\_pos\_enh

[R2-2008776](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008776%20-%20Positioning%20in%20RRC_IDLE%20and%20RRC_INACTIVE%20state.docx) Positioning in RRC\_IDLE and RRC\_INACTIVE state OPPO discussion Rel-17 FS\_NR\_pos\_enh

[R2-2008810](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008810%20Further%20discussion%20on%20ehancements%20for%20commercial%20use%20cases.doc) Further discussion on ehancements for commercial use cases CATT discussion Rel-17 FS\_NR\_pos\_enh

[R2-2008885](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008885%20(R17%20NR%20POS%20A8112).doc) Discussion on Positioning in Idle/Inactive mode InterDigital, Inc. discussion Rel-17 FS\_NR\_pos\_enh

[R2-2008886](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008886%20(R17%20NR%20POS%20A8112).doc) Discussion on End-to-End Latency Reduction for DL/UL Positioning InterDigital, Inc. discussion Rel-17 FS\_NR\_pos\_enh

[R2-2008887](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008887%20(R17%20NR%20POS%20A8112).doc) Discussion on On Demand Reference Signals for Positioning InterDigital, Inc. discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009002](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009002%20Support%20of%20positioning%20in%20idle&inactive%20mode.docx) Support of positioning in idle/inactive mode Intel Corporation discussion Rel-17

[R2-2009023](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009023%20Solution%20directions%20to%20reduce%20end-to-end%20latency.docx) Solution directions to reduce end-to-end latency Intel Corporation discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009039](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009039%20Discussion%20on%20potential%20positioning%20enhancement.docx) Discussion on positioning enhancement vivo Mobile Communication Co., discussion FS\_NR\_pos\_enh

[R2-2009040](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009040%20Procedure%20of%20on%20demand%20PRS.docx) Procedure of on-demand PRS vivo Mobile Communication Co., discussion FS\_NR\_pos\_enh

[R2-2009041](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009041%20Positioning%20measurement%20transport%20in%20RRC%20idle%20and%20inactive.docx) Positioning in RRC idle and inactive state vivo Mobile Communication Co., discussion FS\_NR\_pos\_enh

[R2-2009137](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009137-Discussion%20on%20positioning%20enhancements%20for%20commercial%20use%20cases.docx) Discussion on positioning enhancements for commercial use cases Spreadtrum Communications discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009286](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009286_MovementModel.docx) Reporting movement models Fraunhofer IIS discussion R2-2007238 Revised

[R2-2009287](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009287_SituationalQuality.docx) Reporting the situational quality of RAT and RAT-independent technologies Fraunhofer IIS, Fraunhofer HHI discussion R2-2007246

[R2-2009574](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009574%20Discussion%20on%20PRS%20enhancements.doc) Discussion on PRS enhancements Beijing Xiaomi Electronics discussion Rel-17

[R2-2009577](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009577%20Positioning%20enhancements%20on%20RRC%20idle%20inactive%20UE%20and%20latency%20reduction.doc) Positioning enhancements on RRC idle/inactive UE and latency reduction Beijing Xiaomi Electronics discussion Rel-17

[R2-2009897](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009897_Pos_Tech_Final.docx) Considerations on potential positioning enhancements Sony discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010072](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010072%20Enhancements.docx) Enhancements for commercial use cases Ericsson discussion Rel-17

[R2-2010095](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010095_(Positioning%20Enhancements).docx) NR Positioning Enhancements Qualcomm Incorporated discussion

[R2-2010096](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010096_(PosLatency).docx) NR Positioning Latency Analysis and Enhancements Qualcomm Incorporated discussion

[R2-2010097](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010097_(On-Demand%20PRS).docx) On-Demand PRS Qualcomm Incorporated discussion

[R2-2010131](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010131_MovementModel.docx) Reporting movement models Fraunhofer IIS, Fraunhofer HHI discussion R2-2009286

[R2-2010161](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010161%20On-demand%20PRS.docx) On-demand PRS transmission and dynamic PRS resource allocation Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_pos\_enh R2-2007128

[R2-2010276](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010276%20Discussion%20on%20IDLE%20INACTIVE%20pos%20on-demand%20PRS%20and%20latency%20analysis.docx) Discussion on IDLE INACTIVE pos, on-demand PRS and latency analysis Huawei, HiSilicon discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010277](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010277%20Discussion%20on%20R17%20positioning%20enhancement.docx) Discussion on R17 positioning enhancement Huawei, HiSilicon discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010472](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010472_IDLE_INACTIVE_mode_positioning.docx) Disucssion on IDLE/INACTIVE mode positioning ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010473](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010473%20Discussion%20on%20on%20demand%20PRS.docx) Discussion on on-demand PRS ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010627](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010627%20Discussion%20on%20enhancement%20for%20commercial%20use%20cases.doc) Discussion on enhancement for commercial use cases Samsung R&D Institute UK discussion

[R2-2010648](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010648%20Support%20for%20positioning%20in%20idle%20inactive%20mode.doc) Support for positioning in idle/inactive mode Samsung R&D Institute UK discussion

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

#### 8.11.3.1 KPIs and use cases

Including report of [Post111-e][626][POS] Integrity use cases and specification impacts

Email discussion summary

[R2-2009129](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009129%20-%20Email%20Summary%20%5bPost111-e%5d%5b626%5d%20(Swift).docx) Summary of [Post111-e][626][POS] Email Discussion on integrity use cases and specification impacts Swift Navigation discussion

Discussion of the text proposal:

Qualcomm think there is a reference 6 that may not be publicly available, and an EN in section 2 saying the definitions are in the definition section (which may not be necessary). They wonder also what is the intention of the table of impacted specs, which would anyway be listed in the WI; more interesting would be to understand the impact to each spec. E.g. listing 38.331 suggests there would be a new posSIB, but we haven’t agreed at this level of detail yet. Finally, they note that in the error categories there is a section for UE faults, and they think this may be a misnomer since a “faulty” UE should not appear in an operator’s network; any UE in the field should meet the requirements.

Swift clarify the reference in [6] is public. On the EN in section 2, they indicate that this was added in the email discussion when some definitions were moved. On the table of impacted specs, they consider it a placeholder for specs that may potentially be impacted, including specifications outside of RAN. On the UE faults, they consider that the potential faults are implementation-dependent and this is necessary for a comprehensive picture of the integrity concept, but there are related contributions proposing that they would be handled in implementation rather than in specified behaviour.

ZTE think clause 9.3.1.1 should be called “network-assisted GNSS” or “A-GNSS” rather than “GNSS”. Swift think this can be discussed under the error source topic.

Nokia have some concerns with wording and terminology in the TP. E.g., they do not think “feared events” is a 3GPP-friendly term, and they wonder if we could change it to something like “uncertainty factors”. For the definition of alert limit, they think the word “hazardous” is not clear and we should say “when PL>AL, the system becomes unavailable”. Finally, they understand that the LCS client consuming the information may be in the UE or the network, so identifying the UE as a separate consumer may be unnecessary.

Swift think the definitions were significantly discussed, and “feared event” and “hazardous” are normal terms in the integrity concept. If we mix this with terms like “uncertainty” they have a concern that the meaning will become unclear (e.g. we already have other concepts called uncertainty and accuracy). They think it is important to use precise language and we should keep the typical terms of the integrity field, but definitions could be added for clarity.

Qualcomm found that downloading reference 6 required registration.

Ericsson think reference 6 is not needed and reference 5 for the concerned figure is sufficient. On the “feared event” terminology, they agree with Swift that we should not use common terms for something that has a precise definition; already the reuse of the term “integrity” risks some confusion (but that seems to be unavoidable). Since “feared event” is established they would prefer to keep it.

* [AT112-e][614][POS] Text proposals on GNSS integrity (Swift)

Scope: Progress the text proposals related to the integrity topics (R2-2009129, R2-2008812, R2-2009331, R2-2010073, R2-2010061, R2-2009333, and the table in R2-2009003) and attempt to reach one or more endorsable TPs. Documents to be split into separately agreeable topics (rapporteur’s judgement on the division).

Intended outcome: Endorsable TP(s)

Deadline: Friday 2020-11-13 0000 UTC

Other contributions

[R2-2008811](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008811%20Discussion%20on%20integrity%20service%20level.docx) Discussion on integrity service level CATT discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009760](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009760%20Pos_integrity_IIoT.docx) Positioning integrity for Industrial IoT use cases Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009898](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009898__Pos_Integrity_Final.docx) Discussion on Integrity of positioning information Sony discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010074](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010074%20Industrial%20IoT%20use-case.docx) Industrial IoT use-case Ericsson discussion Rel-17

[R2-2010090](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010090_IIoT_Positioning_Integrity.docx) Integrity and reliability for IIoT positioning use cases Convida Wireless discussion Rel-17 38.857 FS\_NR\_pos\_enh

[R2-2010098](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010098%20Discussion%20on%20including%20PL%20Availability%20as%20an%20additional%20integrity%20KPI.docx) Discussion on including PL Availability as an additional integrity KPI ESA discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010475](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010475%20Discussion%20on%20integrity&error%20source%20factor%20transmission.docx) Discussion on integrity&error source factor transmission ZTE Corporation, Sanechips discussion Rel-17 FS\_NR\_pos\_enh

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

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

Summary document

[R2-2010700](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010700%20summary%20of%20AI%208.11.3.2.docx) Summary of 8.11.3.2 Error sources threat models occurrence rates and failure modes Intel Corporation discussion Rel-17 FS\_NR\_pos\_enh

P3:

Qualcomm think spoofing and jamming are illegal in most places and prevention cannot be standardised; they assume we do not take any actions in 3GPP to standardise response to it. They are also unsure that GNSS receiver design issues and reception/decoding issues of AD should be described as a “UE fault”; in the latter case, the reception requirements should guarantee that UEs do not fail.

Fraunhofer agree that spoofing and jamming are illegal, but they are also widespread and can affect the integrity of the receiver; so the question is whether the network supports some integrity monitoring to respond to them. They understand that detection of these issues would be up to implementation, and so would the response to it, but the signalling to indicate that there is a problem could be standardised.

Intel understand that some companies propose that handling of spoofing and jamming is out of 3GPP scope (this was indicated in a proposal for further discussion in the summary).

Swift agree with Fraunhofer about the handling of spoofing and jamming; e.g., the UE may detect spoofing and indicate it to the LMF, or vice versa. On the UE faults, they consider that “fault” is well-defined in the integrity field and we could clarify in the definitions. They also think that the tolerance level for UE faults can be more stringent than what we test to in 3GPP, and there may be “faults” that impact positioning in real operation. They think perhaps LMF faults should be considered as well.

ESA have the same understanding as Swift about the UE faults: This does not mean failure of conformance or performance tests, but e.g. imperfections in measurement that have to be considered in critical applications. They suggest that receiver design could be omitted from the list or merged into receiver noise. For jamming and spoofing, they agree that these events do happen and cannot be ignored. Objective 2 in the WI is to identify error sources and they understand that these are error sources, although we don’t determine now what to do about them.

ZTE think spoofing and jamming are error sources, and how to address them is out of 3GPP scope; we can discuss how to respond to error sources later.

CATT understand that there are lots of error sources and we do not need to enumerate them all; from RAN2 perspective they think we need to focus on the network/UE interaction, and they do not think that LMF faults should be considered in RAN2. They think we can leave these feared events as FFS and not take an agreement on which ones should be captured in the TR. So they would prefer that we not capture any table of feared events.

u-blox would like to capture the table of feared events while leaving the implementation FFS. They also point out that not all jamming is illegal; some level of unintentional jamming occurs from environmental factors such as other equipment, and it may fall within 3GPP remit to determine a response to these cases.

Intel think there is benefit to capturing the feared events, and we can leave how to handle it as FFS.

Qualcomm agree that “unintentional jamming”, i.e. interference, is a feared event. They would prefer to remove the sub-bullets under “UE faults” and understand that the receiver design is not exactly an event. They consider that receiver noise is also an aspect of design: The receiver has a particular noise figure. And reception and decoding should not fail unless something is wrong in the spec.

ESA think we could remove “UE faults” and replace with “GNSS receiver noise” or “GNSS receiver measurement error”. Qualcomm agree this makes more sense. Swift think we also need to consider the robustness of the actual computing platform, so other types of “UE faults” are important, e.g. glitches in the computing environment.

Ericsson would like to capture a second example of a UE fault.

Agreements:

1 RAN2 to agree following additional sub-feared events:

3. External feared events, e.g.

- Spoofing

- Jamming/interference

4. UE faults

- GNSS receiver measurement error

- Hardware faults

2 RAN2 to confirm the need to capture the table on feared events and corresponding assistance data in the TR; the actual handling of these events is FFS.

* Text proposals in R2-2008812/R2-2009331/R2-2010073/R2-2010061 to be taken into account in discussion [614], and aligned with the agreements above.

Other contributions

[R2-2008812](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008812%20Discussion%20on%20error%20sources%20threat%20models%20occurrence%20rates%20and%20failure%20modes.docx) Discussion on error sources, threat models, occurrence rates and failure modes CATT discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009282](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009282_Integrity.docx) Error sources, threat models, occurrence rates and failure modes Fraunhofer IIS discussion Revised

[R2-2009331](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009331%20GNSS%20Integrity%20Error%20Sources.docx) Discussion on GNSS Integrity Errors Swift Navigation, Ericsson, Intel Corporation, u-blox discussion

[R2-2010061](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010061%20Text%20Proposal%20on%20GNSS%20position%20integrity%20error%20sources.docx) Text Proposal on GNSS position integrity error sources ESA discussion Rel-17 38.857 FS\_NR\_pos\_enh

[R2-2010073](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010073%20error%20sources.docx) GNSS position integrity error sources Ericsson discussion Rel-17

[R2-2010135](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010135_Integrity.docx) Error sources, threat models, occurrence rates and failure modes Fraunhofer IIS, Fraunhofer HHI discussion R2-2009282

[R2-2010278](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010278%20Discussion%20on%20threat%20models%20and%20failure%20modes.docx) Discussion on threat models and failure modes Huawei, HiSilicon discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010642](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010642%20Introduction%20of%20Integrity%20monitoring%20for%20GNSS%20and%20its%20error.doc) Introduction of Integrity monitoring for GNSS and its error Samsung R&D Institute UK discussion

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

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

Summary document

[R2-2010675](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010675_(NR%20POS%20A81133)_Summary_Integrity_Methodologies.docx) Summary of 8.11.3.3: Methodologies for network-assisted and UE-assisted integrity InterDigital discussion Rel-17 FS\_NR\_pos\_enh

Ericsson think the TPs from P3 and P7 could be taken into account in email discussion.

* Text proposals from R2-2009333 and R2-2009003 (the table) to be taken into account in discussion [614].

Other contributions

[R2-2008774](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008774%20-%20Discussion%20on%20Methodology%20for%20Integrity.docx) Discussion on methodology for integrity OPPO discussion Rel-17 FS\_NR\_pos\_enh

[R2-2008813](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008813%20Discussion%20on%20methodologies%20for%20network-assisted%20and%20UE-assisted%20integrity.docx) Discussion on methodologies for network-assisted and UE-assisted integrity CATT discussion Rel-17 FS\_NR\_pos\_enh

[R2-2008888](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2008888%20(R17%20NR%20POS%20A81133).doc) Discussion on methodologies for network-assisted and UE-assisted integrity InterDigital, Inc. discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009003](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009003%20Methodologies%20for%20integrity.docx) Methodologies for network-assisted and UE-assisted integrity Intel Corporation, Swift Navigation discussion Rel-17

[R2-2009043](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009043%20integrity%20signaling%20and%20procedures.docx) Integrity signaling and procedures vivo Mobile Communication Co., discussion

[R2-2009138](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009138-Discussion%20on%20integrity%20methodologies%20for%20network-assisted%20and%20UE-assisted%20integrity.docx) Discussion on integrity methodologies for network-assisted and UE-assisted integrity Spreadtrum Communications discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009333](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009333%20GNSS%20Integrity%20Methods.docx) TP for GNSS Integrity Methodologies Swift Navigation, Ericsson, Intel Corporation, u-blox discussion

[R2-2009530](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009530%20NR%20Positioning%20Integrity%20methodology.doc) Discussion on Positioning Integrity Apple discussion Rel-17 FS\_NR\_pos\_enh

[R2-2009578](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009578%20Discussion%20on%20methodologies%20for%20positioning%20integrity.doc) Discussion on methodologies for positioning integrity Beijing Xiaomi Electronics discussion Rel-17

[R2-2009761](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2009761%20Pos_integrity_Signalling.docx) Signalling for Positioning Integrity Support Nokia, Nokia Shanghai Bell discussion Rel-17 FS\_NR\_pos\_enh

[R2-2010075](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010075%20methodologies.docx) Methodologies for network-assisted and UE-assisted integrity Ericsson discussion Rel-17

[R2-2010279](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010279%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

[R2-2010474](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202011%20-%20RAN2_112-e,%20Online\Extracts\R2-2010474%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