3GPP TSG-RAN WG2 Meeting #109 electronic R2-20xxxxx

**24 Feb – 6 Mar 2020**

Source: Session Chair (Mediatek)

Title: Report from session on Rel-15 and 16 LTE and NR positioning

# Organisational Notes

This subclause is not an Agenda Item. It contains general guidance for the organisation of the meeting.

1. LSs: As noted under AI 6.8.2.1, LSs will be treated only if flagged by the presenting company. Otherwise they will be noted without presentation.
2. Running CRs: For each specification, a running CR will be endorsed as baseline and sent to email discussion (unless it can be agreed immediately). Where there is a separate running CR for a feature (e.g. SSR), the “secondary” running CR will be endorsed for a merge into the main CR as part of the email discussion. The last web conference session (second week) should agree a running CR for each specification.
3. CRs handled by email: For the agenda items indicated to be treated only by email, an approval email thread will be launched from the beginning of the meeting. For CRs that have been previously endorsed and are independent of the main running CRs (i.e. those that do not introduce new posSIBs), the discussion deadline is short, to allow for online discussion in case any unexpected issues are raised. For the main running CRs, and others that interact with them (i.e. those that introduce new posSIBs), the deadline is during the second meeting week to allow time for the posSIB harmonisation discussion to conclude.
4. Output of email discussions: Where possible, the email discussion should conclude with an agreed document. Discussions requiring a comeback will be treated in an available slot (expected during the second meeting week, but early-concluding email discussions could be handled in the first week if needed).
5. Organisational information and updates: Information related to the organisation of the sessions will be shared under email discussion **[AT109e][600][POS] Organizational Nathan - Positioning (MediaTek)** (see list below).

# 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.

* [AT109e][600][POS] Organizational Nathan - Positioning (MediaTek)

 **Status:** Started

 **Scope:** Organisational discussions and announcements, as needed throughout the meeting weeks

 **Intended Outcome:** Approval of report from positioning session

 **Deadline:** Friday 2020-03-06 1200 CET

* [AT109e][601][POS] Harmonise posSIB numbering across CRs (Intel)

 **Status:** Concluded

 **Scope:** Align posSIB numbering between the following CRs:

* R2-2001333 (38.331 running CR)
* R2-2001216 (36.331 CR to introduce PPP-RTK)
* R2-2001255 (38.331 CR to introduce on-demand SI request in connected mode)
* R2-2001230 (37.355 CR to introduce PPP-RTK)
* R2-2001234 (TPs to 37.355 to introduce UE-based DL positioning)
* R2-2000006 (37.355 CR to introduce barometric pressure broadcast)
* R2-2000188 (36.331 CR to introduce barometric pressure broadcast)
* R2-2000396 (36.331 CR to introduce TBS AD broadcast)
* R2-2000426 (37.355 CR to introduce TBS AD broadcast)
* R2-2000153 (37.355 CR to introduce NavIC)
* R2-2000157 (36.331 CR to introduce NavIC)

**Intended Outcome:** Agreed document listing the posSIB numbers, for reference by individual CR authors

**Deadline: Thursday** 2020-02-27 1200 CET

* [AT109e][602][NR TEI] BDS B1C signal CRs (CATT)

 **Status:** Concluded

 **Scope:** Agree to the CRs in R2-2000238, R2-2000239, and R2-2000240

**Intended Outcome:** Agreed CRs

 **Deadline:** Wednesday 2020-02-26 1200 CET

* [AT109e][603][NR TEI] GNSS integer ambiguity level indication CR (Ericsson)

 **Status:** Concluded

 **Scope:** Agree to the CR in R2-2001256

**Intended Outcome:** Agreed CR

 **Deadline:** Wednesday 2020-02-26 1200 CET

* [AT109e][604][LTE TEI] Broadcast of barometric pressure assistance data CRs (Polaris)

 **Status:** Concluded

 **Scope:** Agree to the CRs in R2-2000006 and R2-2000188. Note: Updates to the CRs will be needed to align with the output of [AT109e][601].

**Intended Outcome:** Agreed CRs

 **Deadline:** Tuesday 2020-03-03 1200 CET

* [AT109e][605][LTE TEI] Barometric pressure sensor bias CR (Polaris)

 **Status:** Concluded

 **Scope:** Agree to the CR in R2-2000007

**Intended Outcome:** Agreed CR

 **Deadline:** Wednesday 2020-02-26 1200 CET

* [AT109e][606][LTE TEI] Broadcast of TBS assistance data CRs (NextNav)

 **Status:** Concluded

 **Scope:** Agree to the CRs in R2-2000396 and R2-2000426. Note: Updates to the CRs will be needed to align with the output of [AT109e][601].

**Intended Outcome:** Agreed CRs

 **Deadline:** Tuesday 2020-03-03 1200 CET

* [AT109e][607][NAVIC] NavIC CRs (Reliance Jio)

 **Status:** Concluded

 **Scope:** Agree to the CRs in R2-2000153, R2-2000157, and R2-2000158. Note: Updates to the CRs will be needed to align with the output of [AT109e][601].

**Intended Outcome:** Agreed CRs

 **Deadline:** Tuesday 2020-03-03 1200 CET

* [AT109e][608][POS] Corrections to location measurement indication (Lenovo)

 **Status:** Concluded

 **Scope:** Update the CR from R2-2000762

 **Intended outcome:** Agreed CR in R2-2001932

 **Deadline:** Wednesday 2020-03-04 1200 CET

* [AT109e][609][POS] Reply LS to R2-2000010 (Nokia)

**Status:** Concluded

**Scope:** Reply to R2-2000010 indicating if the working assumption is feasible

 **Intended outcome:** Agreeable draft LS in R2-2001933

 **Deadline:**  Wednesday 2020-03-04 1300 CET

* [AT109e][610][POS] Revision of running CR to 38.305 (Intel)

**Status:** Concluded

**Scope:** Update the CR from R2-2000473

 **Intended outcome:** Agreeable CR taking into account decisions of this meeting, in R2-2001934

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][611][POS] Support of non-periodic SRS cases (Huawei)

**Status:** Concluded

**Scope:** Progress the discussion of semi-persistent and aperiodic SRS for positioning

 **Intended outcome:** Summary of agreements on support of aperiodic SRS including triggering by gNB or LMF, and progress towards design of a MAC CE for SP activation/deactivation. Summary in R2-2001935.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][612][POS] Spatial relationship configuration (Huawei)

**Status:** Concluded

**Scope:** Progress the discussion of spatial relationship determination and configuration for positioning

 **Intended outcome:** Summary of agreements on how the spatial relationship is determined for UL-involved cases and how SSB configuration is signalled. Summary in R2-2001936.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][613][POS] PPP-RTK CR to 36.331 (Qualcomm)

**Status:** Concluded

**Scope:** Update the CR in R2-2001216

 **Intended outcome:** Agreeable CR in R2-2001937

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][614][POS] Running CR to 38.331 on positioning (Ericsson)

**Status:** Concluded

**Scope:** Update the CR in R2-2002112

 **Intended outcome:** Agreeable CR in R2-2001938

 **Deadline:**  Wednesday 2020-03-04 1300 CET

* [AT109e][615][POS] Update RAN1 parameters part of 37.355 CR (Intel)

 **Status:** Concluded

**Scope:** Update the aspects of the running CR related to RAN1 parameters

 **Intended outcome:** Agreeable draft CR that can be merged with the other running CRs. Updated draft CR in R2-2001941, report in R2-2001959.

 **Deadline:**  Wednesday 2020-03-04 1300 CET

* [AT109e][616][POS] 37.355 running CR merge (Intel)

 **Status:** Superseded by discussion #627

**Scope:** Merge the 37.355 running CRs.

 **Intended outcome:** Agreeable updated CR in R2-2001942

 **Deadline:** Thursday 2020-03-05 1200 CET

* [AT109e][617][POS] Single positioning method (Ericsson)

 **Status:** Concluded

**Scope:** Discuss the possible restructuring of 37.355 to use a single NR positioning method.

 **Intended outcome:** Summary of discussion and potential agreements. Summary in R2-2001943.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][618][POS] Supported frequency/band list (Intel)

 **Status:** Concluded

**Scope:** Determine if it is needed to provide a supported frequency list or band list to the LMF.

 **Intended outcome:** Summary of agreements on use cases, band vs. frequency list, and what is needed to provide to the LMF. Summary in R2-2001944.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][619][POS] Draft LS to RAN3 on uplink additional path reporting (Ericsson)

 **Status:** Concluded

**Scope:** Draft an LS to RAN3 in accordance with the agreements on additional path reporting.

 **Intended outcome:** LS recommending to RAN3 that they include additional path reporting in NRPPa. Draft LS in R2-2001945.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][620][POS] Text proposal for merge into 37.355 CR (Ericsson)

 **Status:** Concluded

**Scope:** Develop a text proposal reflecting the agreements on additional path reporting.

 **Intended outcome:** Agreeable TP in R2-2001946, to be merged into 37.355, including number of additional paths.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][621][POS] Open issues on broadcast assistance data (CATT)

**Status:** Concluded

**Scope:** Discuss the following issues on broadcast assistance data:

* whether to have a separate positioning system information area ID or reuse the existing area ID;
* whether to support the UE including GNSS ID/SBAS ID in the on-demand SI request;
* whether to include segment number in NRPPa metadata.

 **Intended outcome:** Summary of agreements on the identified issues. Summary in R2-2001950.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][622][POS] Uplink capability for positioning (Huawei)

 **Status:** Concluded

**Scope:** Determine if LPP needs to contain delivery of uplink capability, and if so what the contents should be.

 **Intended outcome:** Summary of agreements on whether/what UL capability is needed at LMF. Summary in R2-2001947.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][623][POS] LS to RAN4 on measurement range and granularity (Intel)

 **Status:** Concluded

**Scope:** Draft an LS to RAN4 requesting their input on the range and granularity for measurements as needed in the running CR to 37.355.

 **Intended outcome:** Draft LS in R2-2001948 to RAN4 (Cc: RAN1) providing our measurements from the running CR and asking for range and granularity.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][624][POS] Open issues on UE-based downlink positioning assistance data (Qualcomm)

 **Status:** Concluded

**Scope:** Discuss the open issues and update the related text proposal on UE-based downlink positioning.

 **Intended outcome:** Updated TP reflecting agreement where possible on the open issues:

 (a) whether beamwidth information can be provided in the assistance data in Rel-16 or should be deferred to e.g. Rel-17;

 (b) whether to support LCS-to-GCS translation parameter for the spatial direction information;

 (c) whether to include RTD drift rate in the assistance data;

 (d) whether to include RTD per DL-PRS Resource.

 Updated TP in R2-2001949.

 **Deadline:** Wednesday 2020-03-04 1300 CET

* [AT109e][625][POS] Final check of running CR to 38.305 (Intel)

**Status:** Started

**Scope:** Finalise checking of the running CR to 38.305

 **Intended outcome:** Agreed CR in R2-2002241

 **Deadline:** Friday 2020-03-06 1200 CET

* [AT109e][626][POS] Final check of running CR to 38.331 (Ericsson)

**Status:** Started

**Scope:** Finalise checking of the running CR to 38.331

 **Intended outcome:** Agreed CR in R2-2002242

 **Deadline:** Friday 2020-03-06 1200 CET

* [AT109e][627][POS] Final check of running CR to 37.355 (Intel)

**Status:** Started

**Scope:** Finalise checking of the running CR to 37.355

 **Intended outcome:** Agreed CR in R2-2002243

 **Deadline:** Friday 2020-03-06 1200 CET

* [AT109e][628][POS] MAC CE design for activation/deactivation of SP SRS for positioning (Huawei)

**Status:** Started

**Scope:** Agree on a design for the MAC CE to activate/deactivate semi-persistent SRS for positioning

 **Intended outcome:** Agreed CR in R2-2002246, based on R2-2002330

 **Deadline:** Friday 2020-03-06 1200 CET

# 4 EUTRA corrections Rel-15 and earlier

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

No documents should be submitted to 4. Please submit to 4.x

NOTE For R2 109e for R15 and earlier releases, only documents on important and urgent issues shall be submitted and treated. No text enhancements without behavioural or functional change.

## 4.4 Positioning corrections Rel-15 and earlier

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

# 5 WI: New Radio (NR) Access Technology

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

NOTE For R2 109e for R15 and earlier releases, only documents on important and urgent issues shall be submitted and treated. No text enhancements without behavioural or functional change.

## 5.2 Stage 2

### 5.2.3 Positioning

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.

**This document will be treated in the first session the week of February 24**

[R2-2000762](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5C38331_CR1454_%28Rel-15%29_R2-2000762_Corrections%20to%20NR%20LocationMeasurementIndication.docx) Corrections to the Location measurement indication procedure Lenovo, Motorola Mobility CR Rel-15 38.331 15.8.0 1454 - F NR\_newRAT-Core

Intel have some detailed comments to be taken offline. Some tidying up can be done and they think the condition should be kept for clarity.

Ericsson also think the condition on RSTD measurement is OK to keep.

Huawei think the CR is not essential. Lenovo think we should ensure that the spec is correct.

* We have the correction of the field but do not restructure the condition.
* [AT109e][608][POS] Corrections to location measurement indication (Lenovo)

 Intended outcome: Agreed CR in R2-2001932

 Deadline: Wednesday 2020-03-04 1200 CET

[R2-2001932](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5C38331_CR1454r1_%28Rel-15%29_R2-2001932_Corrections%20to%20NR%20LocationMeasInd.docx) Corrections to the Location measurement indication procedure Lenovo, Motorola Mobility CR Rel-15 38.331 15.8.0 1454 1 F NR\_newRAT-Core

* Agreed in email discussion [AT109e][608]

# 6 Rel-16 NR Work Items

## 6.8 NR Positioning Support

(NR\_pos-Core; leading WG: RAN1; REL-16; started: Mar 19; target; Mar 20; WID: [RP-191156](file:///C%3A%5CData%5C3GPP%5CTSGR%5CTSGR_84%5Cdocs%5CRP-191156.zip)). Documents in this agenda item will be handled in a break out session

Time budget: 1 TU

Tdoc Limitation: 6 tdocs

### 6.8.1 Organisational

Including incoming LSs, rapporteur inputs, etc. Note running CRs will be treated under the corresponding agenda items.

**LSs will only be treated if flagged by the contact companies. LSs not flagged will be automatically noted.**

**The following LS(s) will be treated in the first session the week of February 24**

[R2-2000010](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000010_R1-1913522.doc) LS on agreements related to NR Positioning (R1-1913522; contact: Nokia) RAN1 LS in Rel-16 NR\_pos To:RAN2, RAN3, RAN4

Huawei wonder if the SMTC is configured by LMF or gNB. Intel understand that the configuration comes from the gNB; Ericsson agree.

Intel think the LMF could still provide the SMTC. Nokia understand that it is an open issue. Intel confirm it is captured as an open issue in the stage 3.

Offline discussion to draft a reply LS if needed, pending resolution of the open issue in the stage 3 discussion.

* [AT109e][609][POS] Reply LS to R2-2000010 (Nokia)

 Intended outcome: Agreeable draft LS in R2-2001933

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001933](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001933.docx) Draft reply LS on agreements related to NR Positioning Nokia LS out Rel-16 NR\_pos To:RAN1 Cc: RAN3, RAN4

Nokia think this may not be critical to send.

Huawei have some concerns about how the SMTC will be managed between one or more gNBs and the LMF, and how the timing will be determined by the LMF.

Nokia think this is a somewhat fundamental question about the validity of the RAN1 WA.

* No LS sent at this time.

**The following LS(s) will not be treated**

[R2-2000033](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000033_R3-197794.docx) LS on DL-AOD procedure (R3-197794; contact: Huawei) RAN1 LS in Rel-16 NR\_pos-Core To:RAN2

* Noted without presentation

[R2-2000038](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000038_R4-1915801.docx) Response LS on Reference Point for Timing Related Measurements in FR2 (R4-1915801; contact: CATT, Ericsson) RAN4 LS in Rel-16 NR\_pos-Core To:RAN1 Cc:RAN2, RAN3

* Noted without presentation

### 6.8.2 Architecture and protocol aspects

#### 6.8.2.1 Stage 2

Including impact to 36.305 and 38.305. This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting.

Including outcome of the email discussion [108#84][NR/Pos] Running stage 2 CR on positioning (Intel)

Summary document to be provided by Huawei [TBC]

*Running CRs*

**The following running CRs will be treated in the first session the week of February 24**

[R2-2001080](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001080%20Stage%202%20CR%20for%20the%20introduction%20of%20SSR%20positioning%20support%20into%20LTE.docx) Stage 2 CR for the introduction of SSR positioning support into LTE Intel Corporation, ESA CR Rel-16 36.305 15.4.0 0085 - B NR\_pos-Core

* Revised in R2-2002111

[R2-2002111](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2002111%20Stage%202%20CR%20for%20the%20introduction%20of%20SSR%20positioning%20support%20into%20LTE.docx) Stage 2 CR for the introduction of SSR positioning support into LTE Intel Corporation, ESA CR Rel-16 36.305 15.4.0 0085 1 B NR\_pos-Core

* Agreed

[R2-2000473](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000473%20Running%20stage%202%20CR-positioning%20v03.docx) Running stage 2 CR on NR positioning ([108#84][NR Pos]) Intel Corporation, ESA CR Rel-16 38.305 15.5.0 0017 - B NR\_pos-Core

Intel clarify there are still open issues to be resolved from this meeting.

* [AT109e][610][POS] Revision of running CR to 38.305 (Intel)

 Intended outcome: Agreeable CR taking into account decisions of this meeting, in R2-2001934

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001934](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001934%20Running%20stage%202%20CR-positioning%20v05.docx) Running stage 2 CR on NR positioning ([108#84][NR Pos]) Intel Corporation, ESA CR Rel-16 38.305 15.5.0 0017 1 B NR\_pos-Core

* [AT109e][625][POS] Final check of running CR to 38.305 (Intel)

 Intended outcome: Agreed CR in R2-2002241

 Deadline: Friday 2020-03-06 1200 CET

R2-2002241 Running stage 2 CR on NR positioning ([108#84][NR Pos]) Intel Corporation, ESA CR Rel-16 38.305 15.5.0 0017 2 B NR\_pos-Core

*Summary document*

**The following summary document will be treated the week of February 24**

[R2-2001931](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001931%20Summary%20on%20AI%206.8.2.1%20for%20R16%20Positioning_v2.docx) Summary on the Stage-2 Aspects of R16 Positioning Huawei, HiSilicon, Intel Corporation discussion Rel-16 NR\_pos-Core

ProposalToDisc1: RAN2 should discuss whether R15 SRS can be supported for R16 multi-RTT positioning.

 Qualcomm understand that RAN1 have not agreed on this, but if they do later, it should be easy to incorporate. Not in RAN2 scope to decide.

 Ericsson agree it would be easy to incorporate and point out the reporting would be over NRPPa since it affects the gNB Rx-Tx measurement.

 CATT agree with Qualcomm.

 We will wait for input from RAN1 on this point.

ProposalToDisc2: RAN 2 should discuss whether Semi-persistent SRS for positioning is supported.

• If Semi-persistent SRS for positioning is needed, an email discussion for the design of activation/deactivation MAC CE is needed.

ProposalToDisc3: RAN2 should discuss whether aperiodic SRS for positioning can be supported.

 Qualcomm think there is no big signalling difference between the aperiodic and SP cases.

 Huawei think the difference between SP and aperiodic is the need to design a new MAC CE for SP; for aperiodic nothing new is needed.

 CATT support the use of SP but agree the new MAC CE will be a lot of effort.

 Intel understand that if aperiodic is used for intra-node cases there is no extra impact ,but to use it between nodes we need an extra trigger.

 vivo understand that RAN1 agree to support both cases.

 Ericsson do not see a strong need for both SP and aperiodic and are fine to postpone these cases to Rel-17. They don’t think QC’s proposal for the MAC CE design is desirable in its current form and see some complexity from the design. They also understand that the RAN1 support for aperiodic is contingent on discussion in RAN2/3.

**Agreement:**

Support semi-persistent SRS for positioning.

ProposalToDisc4: RAN2 to discuss on the following aspects

• whether the gNB or the LMF triggers the decision of non-periodic SRS activation/deactivation.

• whether the delay for NRPPa signalling is considered as an issue for non-periodic SRS activation/deactivation

• whether NRPPa message MEASUREMENT REQUEST can convey the non-periodic SRS configuration

* [AT109e][611][POS] Support of non-periodic SRS cases (Huawei)

 Intended outcome: Summary of agreements on support of aperiodic SRS including triggering by gNB or LMF, and progress towards design of a MAC CE for SP activation/deactivation. Summary in R2-2001935.

 Deadline: Wednesday 2020-03-04 1300 CET

ProposalToDisc5: RAN2 should discuss

• whether spatial relation is determined by gNB or recommended by LMF

• whether Xn exchange of PRS configuration is needed

• whether gNB should be allowed to retrieve measurements from the UE for the purpose of spatial relation setup

 Qualcomm understand that since the AD are provided by the LMF for DL-only positioning and UL+DL, the LMF needs to know about the spatial relation. Intel think for the gNB to make the decision on the spatial relation, it would need all the configuration information from neighbour cells, and it may be easier to have the LMF take the decision. vivo think for the UL case it should be determined by the gNB, since the gNB has the measurement information to determine the spatial relationship; but they are fine to have it determined by LMF for DL and UL+DL.

 Ericsson think the SSB configuration itself could be provided by RRC, with indices to indicate the spatial relation in the AD, for DL-only.

 Huawei think the spatial relation should be determined by the LMF because it has the neighbouring cell information. Qualcomm agree and think the serving gNB cannot make this decision. Intel and CATT also agree.

 Ericsson think the gNB is already doing the UL-DL alignment for the serving cell. For DL-only it would be OK for them to have the configuration from the LMF, but for the cases with uplink involved they see it as easier for the gNB to configure, with coordination over Xn.

 Intel think we should have one solution covering DL and UL. For DL the LMF makes sense and we should align to this solution.

 vivo think the RRM information available in the gNB can help determine the spatial relationship.

 Ericsson are not sure of the value of having one solution. They wonder if there would be additional delay for coordinating between the gNB and the LMF in multi-cell RTT.

 Huawei think the recommendation can be from the LMF with the final decision in the gNB using its own RRM measurements.

 CATT agree that for DL-only the LMF should configure the spatial relationship, and in the UL-involved cases the LMF has better insight into the neighbour cells and should also configure the spatial relationship. Coordination over Xn may not always be possible in real networks.

 QC understand we agreed last meeting that for multi-RTT, all the AD are provided by the LMF. They don’t see a need to distinguish positioning methods in this respect, and they agree with CATT about the potential unavailability of Xn coordination.

 Ericsson see that the SSB configuration will come from the gNB, and the AD from LMF can just use indices to indicate which SSB is referred to, to avoid duplicating the SSB information on two interfaces.

* [AT109e][612][POS] Spatial relationship configuration (Huawei)

 Intended outcome: Summary of agreements on how the spatial relationship is determined for UL-involved cases and how SSB configuration is signalled. Summary in R2-2001936.

 Deadline: Wednesday 2020-03-04 1300 CET

ProposalToDisc6:RAN2 should clarify whether R16 positioning methods can be based on LTE signals.

 CATT understand based on the LS from RAN1 that only E-CID uses Rel-15 signals and other methods use Rel-16 signals only. Qualcomm have the same view.

 Nokia point out we have positioning with LTE signals in Rel-15.

 Qualcomm understand that RAN1 did not agree to any support of inter-RAT signals.

**Agreement:**

There is no support of Rel-16 NR RAT-dependent positioning methods with LTE signals.

ProposalToDisc7: RAN2 should discuss whether SUPL can be supported for R16 positioning methods.

 Qualcomm understand that this would need to be discussed in OMA and we can’t take a decision here. Nokia agree. CATT agree that OMA should make the decision but wonder if we should send an LS to OMA to tell them to take the new version of LPP into account. Chair thinks we should wait until we have a stable spec for such an LS.

 Intel suggest we mark it as unsupported rather than TBD, until OMA take a decision.

 CATT think we would also need to inform OMA of the spec numbering change. Intel think they should know this. Nokia point out that 36.355 points to 37.355.

**Agreement:**

SUPL will be marked as not supported (can be revisited if OMA take some action).

ProposalToDisc8:RAN2 should discuss whether UL PRS-RSRP and DL-PRS RSRP should be optionally reported for UL-TDOA and DL-TDOA and whether both should be optionally reported for multi-RTT.

 To be discussed as part of the stage 3 topics.

Furthermore, the following issues seem agreeable for most companies and RAN2 should confirm on them.

ProposalToConf1: RAN2 should confirm that uplink E-CID is also supported.

 CATT understand that per RAN1, UL E-CID is not required.

 QC understand that there is no RAN2 impact. Intel agree and understand that it is also out of RAN1 scope.

 Huawei observe that RAN3 has no agreements or discussion on this, but they think there is no blocking issue for us to support it and we could take the decision and let RAN3 add the measurements. Intel think we cannot take this decision without RAN1 guidance.

 No action on this point.

[R2-2001935](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001935%20%5BOffline-611%5DPOS%5D%20Support%20of%20non-periodic%20SRS%20cases%20%20%28Huawei%29.docx) Summary of offline discussion #611 on non-periodic SRS for positioning Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

[R2-2002330](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2002330%20Introductoin%20of%20R16%20positioning%20on%20MAC%20spec.docx) Running CR for the introduction of NR positioning on MAC spec Huawei, HiSilicon draftCR 38.321 Rel-16 15.8.0 B NR\_pos-Core

* [109e#xx][NR/Pos] Non-periodic SRS for positioning (Huawei)

Discuss the proposals from R2-2001935.

 Intended outcome: Summary for next meeting

 Deadline: Long

* [AT109e][628][POS] MAC CE design for activation/deactivation of SP SRS for positioning (Huawei)

 Intended outcome: Agreed CR in R2-2002246, based on R2-2002330

 Deadline: Friday 2020-03-06 1200 CET

R2-2002246 Running CR for the introduction of NR positioning on MAC spec Huawei, HiSilicon CR Rel-16 38.321 15.8.0 xxxx - B NR\_pos-Core

[R2-2001936](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001936%20%5BOffline-612%5DPOS%5D%20Spatial%20relationship%20configuration%20%28Huawei%29.docx) Summary of offline discussion #612 on spatial relationship for positioning Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

* [109e#xx][NR/Pos] Details of spatial relation for positioning (Huawei)

Continue the discussion from R2-2001936 and resolve open issues.

 Intended outcome: Summary for next meeting

 Deadline: Long

*Non-periodic SRS*

**The following documents will not be individually treated**

[R2-2000513](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000513.docx) Discussion on non-periodic SRS resource for positioning ZTE Corporation discussion Rel-16 NR\_pos-Core

[R2-2000967](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000967%20Remaining%20issues%20on%20SRS%20configuration.docx) Remaining issues on SRS configuration Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

[R2-2001214](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001214_%28SP%20SRS%20Discussion%29.docx) Semi-persistent and aperiodic SRS-for-positioning Qualcomm Incorporated discussion Rel-16 NR\_pos-Core

[R2-2001237](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001237%20-%20Spatial%20Relations%20and%20MAC%20CE.docx) Spatial Relations and MAC CE Ericsson discussion Rel-16

#### 6.8.2.2 RRC

Including impact to 36.331 and 38.331. This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting.

Including outcome of the email discussion [108#41][NR/Pos] Running CR to 38.331 on positioning (Ericsson)

Summary document to be provided by the CR rapporteur (Ericsson)

*Running CRs*

**The following running CRs will be treated in the first session the week of February 24**

[R2-2001216](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001216_%28Running%20CR%2036331_SSR%29.docx) Introduction of PPP-RTK (SSR) Qualcomm Incorporated CR Rel-16 36.331 15.8.0 4215 - B NR\_pos-Core

posSIB numbers need to be aligned to 37.355.

Qualcomm clarify the numbers are aligned with the outcome of discussion 601.

* Agreed
* [AT109e][613][POS] PPP-RTK CR to 36.331 (Qualcomm)

 Intended outcome: Agreeable CR in R2-2001937

 Deadline: Wednesday 2020-03-04 1300 CET

R2-2001937 Introduction of PPP-RTK (SSR) Qualcomm Incorporated CR Rel-16 36.331 15.8.0 4215 1 B NR\_pos-Core

[R2-2001333](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001333%20RRC%20Positioning_v5.docx) Running CR for the introduction of NR positioning Ericsson draftCR Rel-16 38.331 15.8.0 B NR\_pos-Core

* Revised in R2-2002112

[R2-2002112](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2002112.docx) Running CR for the introduction of NR positioning Ericsson draftCR Rel-16 38.331 15.8.0 B NR\_pos-Core

Qualcomm do not understand the need for the “type 2 SRS” terminology and think we need to distinguish the Rel-15 and Rel-16 spatial relations more clearly. Apple have the same concern and think it would be better to implement a new SRS configuration IE for this purpose. Nokia also agree on the terminology issue.

* [AT109e][614][POS] Running CR to 38.331 on positioning (Ericsson)

 Intended outcome: Agreeable CR in R2-2001938

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001938](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001938.docx) Running CR for the introduction of NR positioning Ericsson discussion Rel-16 38.331 15.8.0 B NR\_pos-Core

Proposal 1 The current name comprising of Type2 shall be changed to reflect “Pos”. Use baseline as per RRC Rapporteur suggestion below.

srs-ResourcePosSetToAddModList-r16

srs-ResourcePosToReleaseList-r16

srs-ResourcePosToReleaseList-r16

srs-ResourcePosToAddModList-r16

SRS-ResourcePosSetId-r16

SRS-ResourcePosId-r16

SRS-ResourcePos-r16

SRS-ResourcePosSet-r16

maxNrofSRS-ResourcePosSets

maxNrofSRS-ResourcesPos

Nokia would prefer “SRS-Pos” or “Pos-r16”. Apple also prefer “SRS-Pos”. vivo think we should align with the terminology in 38.214: SRS-positioning-config. LG think “SRS-Pos” is good, and wonder if we could separate SRS-Config from SRS-PosConfig.

Ericsson think adding the positioning to SRS-Config is in line with how we normally do extensions.

Names to be changed to “SRS-Pos” rather than “SRS-ResourcePos”.

CR to be checked in discussion 626.

* [AT109e][626][POS] Final check of running CR to 38.331 (Ericsson)

 Intended outcome: Agreed CR in R2-2002242

 Deadline: Friday 2020-03-06 1200 CET

R2-2002242 Running CR for the introduction of NR positioning Ericsson CR Rel-16 38.331 15.8.0 1504 - B NR\_pos-Core

[R2-2001255](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001255%20-%20Running%20CR%20on%2038.331%20for%20on-demand%20SIB.docx) Running CR on 38.331 for on-demand SI procedure in RRC\_CONNECTED for Positioning Ericsson draftCR Rel-16 38.331 15.8.0 NR\_pos

* Noted (considered in the broadcast agenda item)

*Summary document*

**The following summary document will be treated the week of February 24**

[R2-2002052](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2002052.docx) Summary for Positioning RRC running CR Ericsson discussion Rel-16 NR\_pos-Core

Proposal 5 Gap pattern should be included in LocationMeasurementInfo field.

Qualcomm understand this will come from RAN4 and we can’t decide it here. Nokia wonder if there was a request from RAN1 or RAN4. Intel have the same question. Qualcomm understand that RAN1 agreed the UE can request measurement gaps and RAN4 will decide the pattern.

Noted (wait for RAN4)

*SRS*

**The following documents will not be individually treated**

[R2-2000243](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000243.doc) UL SRS UE capabilities captured by RRC in TS 38.331. CATT discussion Rel-16 NR\_pos-Core

[R2-2001228](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001228_%28MAC%20CE%20for%20SRS-for-positioning%29.docx) Introduction of NR positioning Qualcomm Incorporated CR Rel-16 38.321 15.8.0 0693 - B NR\_pos-Core

*Other documents*

**The following document will not be individually treated**

[R2-2000968](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000968%20Discussion%20on%20GAP%20request%20for%20RSTD%20measurement.doc) Discussion on GAP request for RSTD measurement Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

#### 6.8.2.3 LPP

This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting.

Including outcome of the email discussion [108#85][NR/Pos] Running CR to 36.355 (Intel)

Including outcome of the email discussion [108#86][NR/Pos] Single positioning method approach in LPP (Ericsson)

Including outcome of the email discussion [108#87][NR/Pos] Additional path reporting (Ericsson)

Summary document to be provided by the CR rapporteur (Intel)

Running CRs

**The following running CRs will be treated the week of February 24**

R2-2001168 Introduction of Rel-16 NR positioning Intel Corporation CR Rel-16 37.355 15.0.0 0250 - B NR\_pos-Core Late

* Not provided (replaced by R2-2001942)

[R2-2000474](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000474%20Capturing%20RAN1%20parameters%20for%20positioning_v04.docx) LPP CR Capturing RAN1 parameters for positioning ([108#85][NR Pos]) Intel Corporation draftCR Rel-16 37.355 15.0.0 NR\_pos-Core R2-1914728

Intel clarify the CR needs to be updated, including merge of PPP-RTK and UE-based positioning.

* [AT109e][615][POS] Update RAN1 parameters part of 37.355 CR (Intel)

 Intended outcome: Agreeable draft CR that can be merged with the other running CRs. Updated draft CR in R2-2001941, report in R2-2001959.

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001941](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001941%20LPP%20RAN1%20parameter_Rap.docx) LPP CR Capturing RAN1 parameters for positioning ([108#85][NR Pos]) Intel Corporation draftCR Rel-16 37.355 15.0.0 NR\_pos-Core R2-2000474

* Endorsed to be merged into the LPP CR

[R2-2001959](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001959%20%5BAT109e%5D%5B615%5D%5BPOS%5D_V1.doc) Report of [AT109e][615][POS] Update RAN1 parameters part of 37.355 CR (Intel) Intel Corporation discussion Rel-16

Agreements:

Beam level measurement results as in Rel-15 are added in NR ECID method.

The ProvideAssistanceData in running CR[2] can be upgraded as below.

 The required physical resources are put in:

 nr-DL-PRS-ProvideAssistanceData-r16 (nr-DL-PRS-AssistanceDataList-r16,

nr-SSB-Config-r16)

 The selected physical resources index for some positioning method are put in:

 nr-Multi-RTT-ProvideAssistanceData-r16

 nr-DL-AoD-ProvideAssistanceData-r16

 nr-DL-TDOA-ProvideAssistanceData-r16

Non-critical extension is used in message body to capture Rel-16 NR dependent positioning methods, and prefix “nr” is used to distinguish LTE and NR. The EN is removed;

Common NR positioning IEs are captured in section 6 as new sub-clause. NR-PhysCellId is moved to section 6.4.1.

Do not group report configuration, indicate requested measurement per positioning method.

UL SRS/DL PRS RSRP measurements is optional for multi-RTT.

Huawei think the beam level measurements should not be based on PRS. Intel think we followed Rel-15.

Qualcomm think the subsections of Common NR Positioning IEs are not needed.

* [AT109e][616][POS] 37.355 running CR merge (Intel)

 Intended outcome: Agreeable updated CR in R2-2001942

 Deadline: Thursday 2020-03-05 1200 CET

R2-2001942 Introduction of Rel-16 NR positioning Intel Corporation CR Rel-16 37.355 15.0.0 0250 1 B NR\_pos-Core

* [AT109e][627][POS] Final check of running CR to 37.355 (Intel)

 Intended outcome: Agreed CR in R2-2002243

 Deadline: Friday 2020-03-06 1200 CET

R2-2002243 Introduction of Rel-16 NR positioning Intel Corporation CR Rel-16 37.355 15.0.0 0250 2 B NR\_pos-Core

[R2-2001230](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001230_%28Running%20CR%2037355_SSR%29_v6.docx) Introduction of PPP-RTK (SSR) Qualcomm Incorporated CR Rel-16 37.355 15.0.0 0251 - B NR\_pos-Core

* Endorsed for merging into the 37.355 running CR

Email discussions

**The following email discussion summaries will be treated the week of February 24**

[R2-2001279](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001279%20Email%20discussion%20NR-Pos%20Single.docx) Summary of [108#86][NR/Pos] Single positioning method approach in LPP Ericsson report Rel-16

* Revised in R2-2002115

[R2-2002115](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2002115_%28Email%20discussion%20108%2386NR-Pos%20Single%20positioning%20method%20approach%20in%20LTE%29_QC_ERIC.docx) Summary of [108#86][NR/Pos] Single positioning method approach in LPP Ericsson report Rel-16

Nokia consider that we have given a lot of review time to the CR with independent methods, and think the selection is somewhat a matter of preference. Considering the time they would prefer that we stick to the current running CR.

Qualcomm think it is not a matter of preference and the single method would restrict the functionality. In their understanding everyone agrees that multiple methods can work without issues.

Ericsson think the bulk of the time spent is on the representation of the PRS which is not affected by the single method proposal, so there isn’t a big time cost. They think we have used a mapping of methods to signals in LTE (e.g. OTDOA corresponds to PRS) and this is similar, so there is some precedent for this approach. Since multi-RTT and DL-TDOA use the same signals it makes sense to group them.

Huawei generally agree with Nokia and Qualcomm and think there are a lot of details to be resolved, e.g. RSRP may be reported differently for different positioning methods, so the “single method” cannot be truly agnostic to the positioning method. They also feel we can be sure the multiple methods will work and prefer to keep the current CR.

CATT agree with Huawei that different methods can use different configurations and think it does not work well to combine all the methods.

* [AT109e][617][POS] Single positioning method (Ericsson)

 Intended outcome: Summary of discussion and potential agreements. Summary in R2-2001943.

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001943](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001943%20Summary%20of%20emaildisc%20109e%23617%20POS%20Single%20positioning%20method.docx) Summary of [AT109e][617][POS] Single positioning method Ericsson report Rel-16

* Postponed

[R2-2000475](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000475%20108%2385%20UE%20capability%20on%20NR%20positioning_V01.doc) UE capability on positioning ([108#85][NR Pos]) Intel Corporation discussion Rel-16 37.355 NR\_pos-Core

**Agreements:**

For RAT dependent positioning method, introduce following RAN2 related NR positioning capabilities as a baseline:

DL-TDOA, DL-AoD: positioning mode (UE based or UE assisted);

DL-TDOA, DL-AoD, NR E-CID, Multi-RTT: Support of periodical Reporting;

NR ECID: Support of triggered Reporting;

Nokia generally agree with the proposal but think there could be other capabilities and we could take more time for a final decision, considering that we expect to hear from RAN1.

Intel understand that RAN1 have not discussed yet, and this proposal is in line with the current running CR.

Proposal 2. For RAT dependent positioning method, ask RAN2 to confirm the need of “supported freqs list”;

CATT think the frequency list is needed. Qualcomm think something like this will be needed but it may not be the same as LTE, and we need RAN1 input. Nokia think we should wait to understand the need. CATT think RAN2 need to confirm the frequency list information with RAN4.

Intel understand the LMF needs to know this to provide appropriate AD. They agree it may not be the same as LTE, but think we may not get the needed information from RAN1.

Huawei generally agree with the proposal but think it should be a band list instead of a frequency list. Also wonder if we should discuss gNB capability. Intel think there could be some capability information in NRPPa to let the LMF know the gNB capability, but it should be discussed in RAN3.

Nokia think the use case needs to be understood.

* [AT109e][618][POS] Supported frequency/band list (Intel)

 Intended outcome: Summary of agreements on use cases, band vs. frequency list, and what is needed to provide to the LMF. Summary in R2-2001944.

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001944](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001944%20report%20of%20%5BAT109e%5D%5B618%5D%5BPOS%5D_V01.doc) Summary of [AT109e][618][POS] Supported frequency/band list Intel discussion Rel-16

* Postponed

[R2-2001243](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001243%20Summary-of-108%2387NR-Rel16-Additional-Path-Reporting_HW_CATT_MTK_NOK_Eric.docx) Summary of [108#87][NR/Rel-16] Additional path reporting Ericsson discussion Rel-16

=> Revised in R2-2001659

[R2-2001659](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001659%20Summary-of-108%2387NR-Rel16-Additional-Path-Reporting.docx) Summary of [108#87][NR/Rel-16] Additional path reporting Ericsson discussion Rel-16

**Agreements:**

Add support for additional path reporting to LPP for timing-based measurements, similar to LTE.

Recommend RAN3 to support timing-based additional path reporting in NRPPa.

CATT support P1 but think the NRPPa aspect could be postponed to Rel17 to allow time for RAN1 to decide.

Qualcomm think both P1 and P2 should specify the same approach as LTE, and only for timing-based methods. Intel agree.

Huawei think if we support additional DL paths there is no reason not to support additional UL paths, because the situation is completely symmetric.

vivo are OK with the proposals but think in LTE we only report one RSTD per TRP pair, and here we should consider the overhead and report deltas for the additional paths.

Ericsson agree with Qualcomm that it is only for timing-based methods. They think the number of paths needs to be determined and could differ from LTE. On vivo’s comment, they clarify that deltas are already proposed in the TP.

Huawei think P1 could also apply to DL-AoD which is not timing-based. Nokia understood that there was agreement to do this for the timing-based measurements (only). Huawei think the understanding is clear that the proposal refers to measurements at different timing instants. Qualcomm think it is rather about detecting separate peaks at the time of measurement, which doesn’t work for RSRP, so it has to apply to timing-based measurements. Intel agree.

Huawei think angular measurements could also be included. Qualcomm are not sure how this would work since there is no time dimension in the angular measurement. Nokia have the same question and wonder if Huawei’s question applies to DL or just UL. Huawei clarify they are thinking only of UL; the transmission may arrive at the gNB with different AoA. Qualcomm think this would be multiple measurements, not additional paths. Intel have the same view.

* [AT109e][619][POS] Draft LS to RAN3 on uplink additional path reporting (Ericsson)

 Intended outcome: LS recommending to RAN3 that they include additional path reporting in NRPPa. Draft LS in R2-2001945.

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001945](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001945%20-%20LS%20to%20RAN3%20on%20uplink%20additional%20path%20reporting%20%28Ericsson%29.docx) Draft LS on uplink additional path reporting Ericsson LS out Rel-16 NR\_pos To:RAN3

“Up to FFS paths” needs to be replaced by “up to 2 paths”.

* Approved with this change in R2-2992244
* [AT109e][620][POS] Text proposal for merge into 37.355 CR (Ericsson)

 Intended outcome: Agreeable TP in R2-2001946, to be merged into 37.355, including number of additional paths.

 Deadline: Wednesday 2020-03-04 1300 CET

The following items can be subject for discussions at RAN2 #109-eletronic

- FFS if relative path strength is to be included

- FFS if strongest path indication among reported can be considered.

[R2-2001946](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001946%20Summary%20of%20%5BAT109e%5D%5B620%5D%5BPOS%5D%20Text%20proposal%20for%20merge%20into%2037.355%20CR%20%28Ericsson%29.docx) Text proposal on additional path reporting Ericsson draftCR Rel-16 37.355 15.0.0 B NR\_pos-Core

Huawei think the NR propagation environment is more complex than LTE, so there should be more paths supported. They suggest 8.

Intel think RAN1 did not evaluate this, but as a compromise they can accept it with the same parameters as LTE, i.e. 2 paths.

Nokia think the LTE value would be OK as a baseline; otherwise it should be left FFS. They also understand that it was intended only to be used for timing-based measurements, not RSRP. Ericsson agree the latter was a mistake.

Intel think there was quite some support for delaying this to Rel-17.

CATT agree with the LTE value as a baseline, and think evidence of the benefits of more paths should be shown. Ericsson think evidence was presented in previous discussions.

Huawei could accept 2 paths as a baseline for the sake of progress.

Ericsson think we could send an LS to RAN4. Huawei think this is too much overhead. Intel have a similar view to Huawei and think we could take 2 paths now and consider more in Rel-17.

Number of paths to be changed to 2.

* Endorsed to be merged into the 37.355 running CR with this change.

Summary document

**The following summary document will be treated the week of February 24**

[R2-2001173](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001173%20Summary%20on%20LPP%20for%20agenda%206.8.2.3%20v02.doc) Summary on LPP for aganda 6.8.2.3 Intel Corporation discussion Rel-16 NR\_pos-Core Late

**Agreements:**

The name DL-AoD is kept.

Confirm (same as current running CR) when a UE is configured to report multiple DL PRS RSTD, PRS RSRP, RxTX measurements with each measurement between a different pair of DL PRS resources or DL PRS resource sets, and those multiple measurements being performed on the same pair of TRPs, the UE reports one full measurement results and additional delta measurement(s).

Confirm that same as stage 2/3 CR and follow RAN3 preference, AoD is calculated in LMF.

PRS resource set ID and PRS resource ID should be indicated within dl PRS QCL.

Proposal S1\_2: Remove prefix “DL” from the name of PRS related fields.

Qualcomm think this would be a lot of editorial work and we would need a new prefix to prevent confusion with the PRS in LPP; NR-PRS or something similar.

Nokia would prefer to keep the DL prefix for future compatibility (e.g. if we introduce SL-PRS).

Ericsson think NR-PRS would be OK.

CATT would prefer to keep DL and think we should use the same terms as RAN1.

Keep the DL prefix.

Proposal S1\_3: Beam level measurement results are added in NR ECID method.

Qualcomm don’t think RAN1 agreed to this. Ericsson think the RAN1 measurements are defined per resource and it is in RAN2 scope how to combine per-resource measurements into a per-cell measurement. They understand that the UE therefore has beam-level measurements available and it is reasonable to report what it already has.

Huawei have the same understanding as Qualcomm that there is no RAN1 agreement, but also think most companies support this. Qualcomm point out the LS from RAN1 referred to “RRM measurements”.

Ericsson think the RAN1 guidance points to 38.215 where the measurements are defined per resource.

Companies can check offline with their RAN1 colleagues. To be considered in updating LPP CR.

Proposal S1\_4: confirm (same as current running CR) when a UE is configured to report multiple DL PRS RSTD, PRS RSRP, RxTX measurements with each measurement between a different pair of DL PRS resources or DL PRS resource sets, and those multiple measurements being performed on the same pair of TRPs, the UE reports one full measurement results and additional delta measurement(s).

Huawei think we need an LS to RAN4 to confirm the ranges and granularity. Intel think RAN4 are already working on this and companies can coordinate.

Ericsson point out we also have the measurement quality and uncertainty to consider. Qualcomm think we should stick to RAN1 agreements in this respect and discuss possible enhancements later. Huawei agree with Qualcomm. Intel agree: RAN1 have sent the parameters to us.

Proposal S1\_5: To confirm whether same as stage 2/3 CR and follow RAN3 preference, AoD is calculated in LMF.

CATT agree with the proposal. Nokia also agree and think we should follow the expressed RAN3 preference.

DISC S2\_1: To discuss whether indicate PRS-ID, PCI, CGI and ARFCN individually or just change TRP-ID name to TRP-ID-Set.

 To be discussed as part of the update of the LPP CR.

DISC S2\_2: To discuss whether PRS resource set ID and PRS resource ID should be indicated within dl PRS QCL.

 Qualcomm think this is needed. Ericsson have the same view. CATT understand that this was agreed in RAN1.

DISC S2\_3: To discuss whether/how to handle SSB duplication issue.

eMailDISC S3\_8: To discuss whether nr-UL-RequestCapabilities-r16 is needed considering UL SRS is configured via RRC.

eMailDISC S3\_9: To discuss if UL capability is needed, what UL capabilities are needed, e.g. whether nr-UL-SRS-MeasCapability is needed

* [AT109e][623][POS] LS to RAN4 on measurement range and granularity (Intel)

 Intended outcome: Draft LS in R2-2001948 to RAN4 (Cc: RAN1) providing our measurements from the running CR and asking for range and granularity.

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001948](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001948%20Draft%20LS%20to%20RAN4%20on%20measurement%20range%20and%20granularity-V01.doc) Draft LS on positioning measurement range and granularity Intel LS out Rel-16 NR\_pos To:RAN4

* Approved in R2-2002245
* [AT109e][622][POS] Uplink capability for positioning (Huawei)

 Intended outcome: Summary of agreements on whether/what UL capability is needed at LMF. Summary in R2-2001947.

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001947](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001947%20%5BOffline-622%5DPOS%5D%20Uplink%20capability%20for%20positioning%20%28Huawei%29.docx) Summary of [AT109e][622][POS] Uplink capability for positioning Huawei discussion Rel-16 NR\_pos-Core

* Postponed

The posSIB numbers will be aligned in the following email discussion (output to be recorded in this agenda item):

* [AT109e][601][POS] Harmonise posSIB numbering across CRs (Intel)

 **Scope:** Align posSIB numbering between the following CRs:

* R2-2001333 (38.331 running CR)
* R2-2001216 (36.331 CR to introduce PPP-RTK)
* R2-2001255 (38.331 CR to introduce on-demand SI request in connected mode)
* R2-2001230 (37.355 CR to introduce PPP-RTK)
* R2-2001234 (TPs to 37.355 to introduce UE-based DL positioning)
* R2-2000006 (37.355 CR to introduce barometric pressure broadcast)
* R2-2000188 (36.331 CR to introduce barometric pressure broadcast)
* R2-2000396 (36.331 CR to introduce TBS AD broadcast)
* R2-2000426 (37.355 CR to introduce TBS AD broadcast)
* R2-2000153 (37.355 CR to introduce NavIC)
* R2-2000157 (36.331 CR to introduce NavIC)

**Intended Outcome:** Agreed document listing the posSIB numbers, for reference by individual CR authors

**Deadline: Thursday** 2020-02-27 1200 CET

[R2-2001951](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001951%20report%20of%20%5BAT109e%5D%5B601%5D%5BPOS%5D_V1.docx) Report of [AT109e][601][POS] Harmonise posSIB numbering across CRs (Intel) Intel Corporation discussion Rel-16 NR\_pos-Core

* Endorsed in email discussion [AT109e][602]
* CR authors are asked to take the contents into account

[R2-2002331](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2002331%20Way%20forward%20on%20the%20AoD%20calculation.docx) Way forward on the AoD calculation Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

Huawei are concerned about the NRPPa overhead between the gNB and LMF. If the gNB does not use a fixed beam pattern it will need frequent updating.

Ericsson have some sympathy but think this could be addressed in Rel-17. They think RAN3 should avoid reopening the issue.

Intel think NRPPa overhead is a RAN3 issue.

CATT think if the selected TRP does not belong to the serving gNB, it is hard for the serving gNB to calculate the AoD.

Qualcomm think overhead on a network interface is not a big concern, and think we should stick to the architectural principle that the LMF calculates the position information.

Nokia agree with Intel that this is a RAN3 issue and they expect RAN3 would have taken overhead into account.

Huawei think any gNB transmitting PRS should be responsible for calculating the AoD, and they don’t see this proposal as changing the architecture since anyway the angle will be passed to the LMF.

* Noted

Other documents

**The following documents will not be individually treated**

[R2-2000241](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000241.doc) Design of ProvideAssistantData for RAT-Dependent positioning methods CATT discussion Rel-16 NR\_pos-Core

[R2-2000289](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000289%20Reduce%20overhead%20of%20RSTD%20measurement%20report_final.docx) Reduce overhead of RSTD measurement report vivo discussion

[R2-2000290](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000290%20Remaining%20issues%20on%20support%20of%20NR%20RAT-dependent%20positioning_clean.docx) Remaining issues on support of NR RAT-dependent positioning vivo discussion

[R2-2000476](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000476%20Open%20issues%20in%20LPP%20CR.doc) Open issues in LPP CR Intel Corporation discussion Rel-16 NR\_pos-Core

[R2-2000966](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000966%20Remaining%20issues%20on%20DL%20positioning%20procedure.docx) Remaining issues on DL positioning procedure Huawei, HiSilicon, MediaTek discussion Rel-16 NR\_pos-Core

[R2-2000969](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000969%20Discussion%20on%20DL-AoD%20positioning%20procedure.docx) Discussion on DL-AoD positioning procedure Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

[R2-2000970](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000970%20Discussion%20on%20SRS%20capability%20transfer.docx) Discussion on SRS capability transfer Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

[R2-2000991](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000991_SSB_Configs.docx) SSB Configuration for UL-PRS and DL-PRS LG Electronics Inc. discussion Rel-16

[R2-2001232](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001232_%28posSIBs%20for%20NR%20positioning%29.docx) posSIBs for NR positioning Qualcomm Incorporated discussion NR\_pos-Core

[R2-2001278](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001278%20CR%2037355%20Single%20positioning%20method%20approach%20in%20LPP.docx) Single positioning method approach in LPP Ericsson CR Rel-16 37.355 15.0.0 0253 - B NR\_pos-Core

[R2-2001353](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001353%20Strongest%20first%20path%20indication%20with%20RSTD%20and%20UE%20RxTx%20measurements%20.docx) Strongest first path indication with RSTD and UE RxTx measurements Ericsson discussion Rel-16

#### 6.8.2.4 Broadcast assistance data

This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting.

Including outcome of the email discussion [108#88][NR/Pos] Remaining issues on broadcast assistance data (Ericsson)

Summary document to be provided by the email discussion rapporteur (Ericsson)

Email discussion

**The following email discussion summary will be treated the week of February 24**

[R2-2001241](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001241%20Summary%20of%20108%2388NR-Rel16%20Remaining%20Broadcast%20Issues_V2.docx) Summary of [108#88][NR/Rel-16] Remaining issues on broadcast assistance data Ericsson discussion Rel-16 Late

**Agreements:**

For positioning On-demand SI request message sent by the UE in RRC\_CONNECTED is per SIB.

For positioning, On-demand SI request message sent by the UE in RRC IDLE/INACTIVE is per SI.

Subscription based mechanism is not pursued in Rel-16.

Proposal 5 Introduce a new posSystemInformationAreaID and NW may configure pos-SystemInformationAreaID same as SystemInformationAreaID.

 Nokia are not convinced a separate ID is needed and think the areas would be managed by the RAN based on what the operator wants to deploy.

 CATT think RAN3 agreed that the area ID would come from the LMF via NRPPa and the AD could have quite a different scope from the other SI.

 Nokia are not sure if this is critical; it seems more of an additional functionality and they doubt if the flexibility is needed. Think it could be done in a future release.

 CATT think RAN3 already agreed and RAN2 can follow the agreement.

 Intel think it would be difficult to enhance the broadcast in a future release.

Proposal 6 Request RAN3 to define a new posSystemInformationAreaID.

Proposal 3 A new SIB is defined to host posSIB scheduling information.

 Ericsson clarify there was a small majority for SIB1, but some operators were interested in a new SIB.

 Qualcomm think the concern was that a new SIB may not always be possible for the UE to receive, and it’s clear that SIB1 works. CATT have the same concern that the UE may not be able to receive the new SIB when there is no CSS. Ericsson think we have solutions for delivering SI when there is no CSS.

**Agreement:**

Use SIB1 for scheduling as a baseline in the running CR.

Proposal 7 Support unicast tag for indication of idle/inactive to connected mode for on demand data request/retrieval.

CATT think we would need to define a new access category and involve CT1 to make this change. Ericsson think it could be done with a new cause code.

Postponed.

* [AT109e][621][POS] Positioning system information area ID (CATT)

 Intended outcome: Summary of agreements on whether to have a separate positioning system information area ID. Summary in R2-2001950.

 Deadline: Wednesday 2020-03-04 1300 CET

Discussion scope later updated to:

* [AT109e][621][POS] Open issues on broadcast assistance data (CATT)

Scope: Discuss the following issues on broadcast assistance data:

* whether to have a separate positioning system information area ID or reuse the existing area ID;
* whether to support the UE including GNSS ID/SBAS ID in the on-demand SI request;
* whether to include segment number in NRPPa metadata.

 Intended outcome: Summary of agreements on the identified issues. Summary in R2-2001950.

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001950](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001950%20621POS%20Open%20Issueson%20on%20broadcast%20AD%28CATT%29.doc) Summary of [AT109e][621][POS] Open issues on broadcast assistance data CATT discussion Rel-16 NR\_pos-Core

* Postponed

*Summary document*

**The following summary document will be treated the week of February 24**

[R2-2002053](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2002053.docx) Summary for Broadcast of Assistance Data Ericsson discussion Rel-16 NR\_pos-Core

**Agreement:**

RAN2 confirm for posSIBs, UE should make an on-demand request for the SIB based on the feature requirement and not based on SIB update mechanism.

Proposal 13 RAN2 to consider the solution outlined in [LPP: R2-2001268] and [RRC: R2-2001268]

Postponed.

*Other documents*

**The following documents will not be individually treated**

[R2-2000242](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000242.docx) Further Considerations on Broadcast Assistance Data CATT discussion Rel-16 NR\_pos-Core Late

[R2-2000971](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000971%20Discussion%20on%20on-demand%20SI%20in%20connected%20for%20NR%20positioning.docx) Discussion on on-demand SI in connected for NR positioning Huawei, HiSilicon discussion Rel-16 NR\_pos-Core

[R2-2001236](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001236%20-%20Segmentation%20info%20in%20gNB.docx) Segmentation info in gNB Ericsson discussion Rel-16

[R2-2001239](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001239%20Overhead.docx) Overhead in current structure Ericsson discussion Rel-16

[R2-2001268](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001268%20LPP%20restructure%20CR.docx) Restructuring of LPP Broadcast solution to remove overheads Ericsson draftCR Rel-16 37.355 15.0.0 B NR\_pos-Core

[R2-2001269](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001269%20RRC%20Restructuring.docx) Restructuring of RRC Broadcast solution to remove overheads Ericsson draftCR Rel-16 38.331 15.8.0 B NR\_pos-Core

[R2-2001636](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CDocs%5CR2-2001636.zip) On supporting of SIB for positioning Samsung R&D Institute UK discussion

#### 6.8.2.5 UE-based positioning

This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting.

Including outcome of the email discussion [108#89][NR/Pos] UE-based downlink positioning assistance data (Qualcomm)

Summary document to be provided by the email discussion rapporteur (Qualcomm)

Email discussion

**The following email discussion summary will be treated the week of February 24**

[R2-2001234](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001234_%28Email%20discussion%20108-89NR-Pos%20Assistance%20Data%20for%20UE-based%29.docx) Summary of [108#89][NR/Pos] UE-based downlink positioning assistance data Qualcomm Incorportaed discussion NR\_pos-Core

Proposal: RAN2 to discuss and decide

(a) whether beamwidth information can be provided in the assistance data in Rel-16 or should be deferred to e.g. Rel-17;

(b) whether to support LCS-to-GCS translation parameter for the spatial direction information;

(c) whether to include RTD drift rate in the assistance data;

(d) whether to include RTD per DL-PRS Resource.

* [AT109e][624][POS] Open issues on UE-based downlink positioning assistance data (Qualcomm)

 Intended outcome: Updated TP reflecting agreement where possible on the open issues:

 (a) whether beamwidth information can be provided in the assistance data in Rel-16 or should be deferred to e.g. Rel-17;

 (b) whether to support LCS-to-GCS translation parameter for the spatial direction information;

 (c) whether to include RTD drift rate in the assistance data;

 (d) whether to include RTD per DL-PRS Resource.

 Updated TP in R2-2001949.

 Deadline: Wednesday 2020-03-04 1300 CET

[R2-2001949](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CDocs%5CR2-2001949.zip) Summary of [AT109e][624][POS] Open issues on UE-based downlink positioning assistance data Qualcomm Incorporated discussion

Agreements:

Provide the LCS-to-GCS translation parameter in the assistance data as part of the spatial direction information of the DL-PRS Resources (IE NR-DL-PRS-BeamInfo).

Do not include the RTD Drift Rate in the assistance data in Rel-16.

RTD is not provided per DL-PRS Resource in the assistance data in Rel-16.

For the baseline CR, the angular information is provided using a single field with 0.1-degrees resolution. FFS if we migrate in the future to a more compact representation.

Ericsson are concerned about the size of the assistance data and think an assessment is needed. Suggest an email discussion on the structure.

Intel think we could use this TP as a baseline for the merge, and optimisations to the structure can be discussed at the next meeting.

Qualcomm think we cannot try to optimise the structure separately from the rest of LPP.

On P1, CATT think we need guidance from RAN1.

On P2, vivo wonder how we can distinguish UE-based and UE-assisted information. Qualcomm think they are signalled separately.

* TP endorsed to be merged in the running CR, with the understanding that concerns about data size and structure can be discussed in future meetings.

Summary document

**The following summary document will be treated the week of February 24**

[R2-2001245](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001245_%28Summary%20of%206.8.2.5%20UE-based%20positioning%29.docx) Summary of UE-based positioning Agenda Item 6.8.2.5 Qualcomm Incorporated discussion Late

Other documents

**The following documents will not be individually treated**

[R2-2000837](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000837_Virtual_Pos_1.0.doc) On supporting UE-based positioning Sony discussion Rel-16 NR\_pos-Core

[R2-2001240](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001240%20UE-based.docx) UE-based configuration options Ericsson discussion Rel-16

[R2-2001244](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001244_%28UE-Based%20Remaining%20Details%29.docx) Remaining details for UE-based downlink positioning assistance data Qualcomm Incorporated discussion NR\_pos-Core

### 6.8.3 Other

R2-2000291 Inactive state measurement message sending for positioning vivo discussion Withdrawn

## 6.20 NR TEI16 enhancements

### 6.20.1 RAN2 led TEI16 enhancements - Control plane related

**The following documents will be treated by email discussion**

[R2-2000238](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5C36%20305_CR0083r1_%28Rel-16%29_R2-2000238.docx) Introduction of B1C signal in BDS system in A-GNSS CATT, CAICT, CMCC, China Telecom, China Unicom, Huawei, ZTE Corporation, MediaTek Inc CR Rel-16 36.305 15.4.0 0083 1 B TEI16 R2-1912203

* Agreed in email discussion [AT109e][602]

[R2-2000239](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5C37%20355_CR0248_%28Rel-16%29_R2-2000239.docx) Introduction of B1C signal in BDS system in A-GNSS CATT, CAICT, CMCC, China Telecom, China Unicom, Huawei, ZTE Corporation, MediaTek Inc CR Rel-16 37.355 15.0.0 0248 - B TEI16

* Revised in R2-2002121

[R2-2002121](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5C37355_CR0248r1_%28Rel-16%29_R2-2002121.docx) Introduction of B1C signal in BDS system in A-GNSS CATT, CAICT, CMCC, China Telecom, China Unicom, Huawei, ZTE Corporation, MediaTek Inc CR Rel-16 37.355 15.0.0 0248 1 B TEI16

* Agreed in email discussion [AT109e][602]

[R2-2000240](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5C38%20305_CR0013r1_%28Rel-16%29_R2-2000240.DOCX) Introduction of B1C signal in BDS system in A-GNSS CATT, CAICT, CMCC, China Telecom, China Unicom, Huawei, ZTE Corporation, MediaTek Inc CR Rel-16 38.305 15.5.0 0013 1 B TEI16 R2-1912205

* Agreed in email discussion [AT109e][602]

Above tdocs for agreement by email discussion:

* [AT109e][602][NR TEI] BDS B1C signal CRs (CATT)

 **Scope:** Agree to the CRs in R2-2000238, R2-2000239, and R2-2000240

**Intended Outcome:** Agreed CRs

 **Deadline:** Wednesday 2020-02-26 1200 CET

[R2-2001238](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001238%20-%20Transfer%20of%20unicast%20RS%20observations%20with%20GNSS%20integer%20ambiguity%20level%20information.docx) Transfer of unicast RS observations with GNSS integer ambiguity level information Ericsson discussion Rel-16

[R2-2001256](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001256%20-%20CR%20on%2037.355%20Introducing%20support%20for%20GNSS%20Integer%20Ambiguity%20Level%20Indications.docx) Introducing support for GNSS Integer Ambiguity Level Indications Ericsson CR Rel-16 37.355 15.0.0 0252 - B NR\_pos, NR\_pos-Core R2-1916412

* Agreed in email discussion [AT109e][603]

For agreement by email discussion:

* [AT109e][603][NR TEI] GNSS integer ambiguity level indication CR (Ericsson)

 **Scope:** Agree to the CR in R2-2001256

**Intended Outcome:** Agreed CR

 **Deadline:** Wednesday 2020-02-26 1200 CET

# 7 Rel-16 LTE Work Items

Documents in these agenda items will be handled in break out sessions

## 7.6 LTE TEI16 enhancements

Small Technical Enhancements to LTE. TEI should be predominantly within a single WG and fully completed within the same quarter in all affected WGs. RAN2 impact of RAN1/4-led TEI shall be limited to RRC signalling of configuration parameters and UE capabilities (no MAC impact, no RRC procedural impact, etc). Please also see RP-191602 endorsed at RAN#84.

Time budget: 1 TU

**The following documents will be treated by email discussion**

[R2-2000007](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000007%20Sensor%20Provide%20Location%20Information%20Elements.docx) Sensor Provide Location Information Elements Correction Polaris Wireless CR Rel-16 37.355 15.0.0 0002 - F TEI16

To be agreed by email discussion:

* [AT109e][605][LTE TEI] Barometric pressure sensor bias CR (Polaris)

 **Scope:** Agree to the CR in R2-2000007

**Intended Outcome:** Agreed CR

 **Deadline:** Wednesday 2020-02-26 1200 CET

R2-2001940 Sensor Provide Location Information Elements Correction Polaris Wireless CR Rel-16 37.355 15.0.0 0002 1 F TEI16

* Agreed in email discussion [AT109e][605]

[R2-2000006](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000006%20Addition%20of%20broadcast%20of%20barometric%20pressure%20assistance%20data.docx) Addition of broadcast of barometric pressure assistance data Polaris Wireless, FirstNet, Intel, AT&T, NextNav CR Rel-16 37.355 15.0.0 0001 - C LCS\_LTE\_acc\_enh-Core, TEI16

* Revised in R2-2001955

[R2-2001955](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001955%20Addition%20of%20broadcast%20of%20barometric%20pressure%20assistance%20data.docx) Addition of broadcast of barometric pressure assistance data Polaris Wireless, FirstNet, Intel, AT&T, NextNav CR Rel-16 37.355 15.0.0 0001 1 C LCS\_LTE\_acc\_enh-Core, TEI16

* Revised in R2-2001957

[R2-2001957](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001957%20Addition%20of%20broadcast%20of%20barometric%20pressure%20assistance%20data.docx) Addition of broadcast of barometric pressure assistance data Polaris Wireless, FirstNet, Intel, AT&T, NextNav CR Rel-16 37.355 15.0.0 0001 2 C LCS\_LTE\_acc\_enh-Core, TEI16

* Agreed in email discussion [AT109e][604]

[R2-2000188](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000188%20Addition%20of%20broadcast%20of%20barometric%20pressure%20assistance%20data.docx) Addition of broadcast of barometric pressure assistance data Polaris Wireless, FirstNet, Intel, AT&T, NextNav CR Rel-16 36.331 15.8.0 4026 2 C LCS\_LTE\_acc\_enh-Core, TEI16 R2-1912737

* Revised in R2-2001956

[R2-2001956](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001956%20Addition%20of%20broadcast%20of%20barometric%20pressure%20assistance%20data.docx) Addition of broadcast of barometric pressure assistance data Polaris Wireless, FirstNet, Intel, AT&T, NextNav CR Rel-16 36.331 15.8.0 4026 3 C LCS\_LTE\_acc\_enh-Core, TEI16 R2-1912737

* Agreed in email discussion [AT109e][604]
* Above tdocs on barometric pressure assistance data to be agreed by email discussion:
* [AT109e][604][LTE TEI] Broadcast of barometric pressure assistance data CRs (Polaris)

 **Scope:** Agree to the CRs in R2-2000006 and R2-2000188. Note: Updates to the CRs will be needed to align with the output of [AT109e][601].

**Intended Outcome:** Agreed CRs

 **Deadline:** Tuesday 2020-03-03 1200 CET

[R2-2000396](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000396.docx) Broadcast of TBS assistance data NextNav, AT&T, FirstNet, Polaris Wireless CR Rel-16 36.331 15.8.0 4134 2 C LCS\_LTE\_acc\_enh-Core, TEI16 R2-1914075

* Revised in R2-2001958

[R2-2001958](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001958.docx) Broadcast of TBS assistance data NextNav, AT&T, FirstNet, Polaris Wireless CR Rel-16 36.331 15.8.0 4134 3 C LCS\_LTE\_acc\_enh-Core, TEI16 R2-1914075

* Agreed in email discussion [AT109e][606]

[R2-2000426](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000426.docx) Broadcast of TBS assistance data NextNav, AT&T, FirstNet, Polaris Wireless CR Rel-16 37.355 15.0.0 0249 - C LCS\_LTE\_acc\_enh-Core, TEI16

* Revised in R2-2002191

[R2-2002191](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2002191.docx) Broadcast of TBS assistance data NextNav, AT&T, FirstNet, Polaris Wireless CR Rel-16 37.355 15.0.0 0249 1 C LCS\_LTE\_acc\_enh-Core, TEI16

* Agreed in email discussion [AT109e][606]
* Above tdocs to be agreed by email discussion:
* [AT109e][606][LTE TEI] Broadcast of TBS assistance data CRs (NextNav)

 **Scope:** Agree to the CRs in R2-2000396 and R2-2000426. Note: Updates to the CRs will be needed to align with the output of [AT109e][601].

**Intended Outcome:** Agreed CRs

 **Deadline:** Tuesday 2020-03-03 1200 CET

R2-2000398 Broadcast of TBS assistance data NextNav, AT&T, FirstNet, Polaris Wireless CR Rel-16 36.355 15.6.0 0246 2 C LCS\_LTE\_acc\_enh-Core, TEI16 R2-1914076 Withdrawn

## 7.7 Support of Indian Navigation Satellite System (NavIC)

(LCS\_NAVIC; leading WG: RAN2; REL-16; started: Sept 19; target; March-20; WID: RP-192350)

Time budget: 0 TU Final agreement of CRs is expected

This agenda item will focus on agreeing to the final CRs for the WID and will only be treated over email. No web conference is planned for this agenda item.

**The following documents will be treated by email discussion**

[R2-2000153](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000153_CR%20of%20TS%2037.355%20%20for%20introducing%20NavIC%20in%20LTE%28Rel-16%29%20-%20core%20part.docx) CR of TS 36.355 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs Private Limited, Tejas Networks Ltd., Qualcomm Incorporated CR Rel-16 37.355 15.0.0 0247 5 B LCS\_NAVIC, LCS\_NAVIC-Core R2-1916406

* Revised in R2-2001952

[R2-2001952](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001952_CR%20of%20TS%2037.355%20%20for%20introducing%20NavIC%20in%20LTE.docx) CR of TS 36.355 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs Private Limited, Tejas Networks Ltd., Qualcomm Incorporated CR Rel-16 37.355 15.0.0 0247 6 B LCS\_NAVIC, LCS\_NAVIC-Core R2-1916406

* Revised in R2-2002238

R2-2002238 CR of TS 36.355 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs Private Limited, Tejas Networks Ltd., Qualcomm Incorporated CR Rel-16 37.355 15.0.0 0247 7 B LCS\_NAVIC, LCS\_NAVIC-Core R2-1916406

* Agreed in email discussion [AT109e][607]

[R2-2000157](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000157_CR%20of%20TS%2036.331%20%20for%20introducing%20NavIC%20in%20LTE%20%28Rel-16%29-%20core%20part.docx) CR of TS 36.331 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs Private Limited, Tejas Networks Ltd., Qualcomm Incorporated CR Rel-16 36.331 15.8.0 4137 4 B LCS\_NAVIC R2-1916407

* Revised in R2-2001953

[R2-2001953](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001953_CR%20of%20TS%2036.331%20%20for%20introducing%20NavIC%20in%20LTE.docx) CR of TS 36.331 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs Private Limited, Tejas Networks Ltd., Qualcomm Incorporated CR Rel-16 36.331 15.8.0 4137 5 B LCS\_NAVIC R2-1916407

* Revised in R2-2002239

R2-2002239 CR of TS 36.331 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs Private Limited, Tejas Networks Ltd., Qualcomm Incorporated CR Rel-16 36.331 15.8.0 4137 6 B LCS\_NAVIC R2-1916407

* Agreed in email discussion [AT109e][607]

[R2-2000158](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2000158_CR%20of%20TS%2036.305%20%20for%20introducing%20NavIC%20in%20LTE%20-%20core%20part.docx) CR of TS 36.305 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs CR Rel-16 36.305 15.4.0 0084 3 B LCS\_NAVIC R2-1916408

* Revised in R2-2001954

[R2-2001954](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202002%20-%20RAN2_109e%2C%20Online%5CExtracts%5CR2-2001954_CR%20of%20TS%2036.305%20%20for%20introducing%20NavIC%20in%20LTE.docx) CR of TS 36.305 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs CR Rel-16 36.305 15.4.0 0084 4 B LCS\_NAVIC R2-1916408

* Revised in R2-2002240

R2-2002240 CR of TS 36.305 for introducing NavIC in LTE Reliance Jio, MediaTek Inc., Huawei, CEWiT, Saankhya Labs CR Rel-16 36.305 15.4.0 0084 5 B LCS\_NAVIC R2-1916408

* Agreed in email discussion [AT109e][607]
* Above tdocs to be agreed by email discussion:
* [AT109e][607][NAVIC] NavIC CRs (Reliance Jio)

 **Scope:** Agree to the CRs in R2-2000153, R2-2000157, and R2-2000158. Note: Updates to the CRs will be needed to align with the output of [AT109e][601].

**Intended Outcome:** Agreed CRs

 **Deadline:** Tuesday 2020-03-03 1200 CET