3GPP TSG-RAN WG2 Meeting #113-e***R2-21xxxxx***

Electronic, January 25 – February 5, 2021

**Agenda item:** 5.5

**Source:** Qualcomm Incorporated

**Title:** Summary of Email discussion [AT113-e][603][POS] NR Rel-15 positioning CRs

**Document for:**  Discussion and Decision

# 1. Introduction

This document summarizes the following email discussion.

* [AT113-e][603][POS] NR Rel-15 positioning CRs (Qualcomm)

      Scope: Discuss and conclude on R2-2101380/R2-2101381, R2-2101465, R2-2101468, R2-2100397, R2-2100398/R2-2100399, R2-2100400/R2-2100401, R2-2101816/R2-2101817, and R2-2101926/R2-2101927

      Intended outcome: Agreed CRs

      Deadline:  Monday 2021-02-01 1200 UTC

References:

[1] R2-2100397, "Remove the NOTE in architecture figure in TS38.305", CATT  
 CR Rel-15, 38.305, 5.7.0, 0054 , F, NR\_newRAT-Core.

[2a] R2-2100398, "Corrections on the indication for the not provided assistance data and location information in TS38.305", CATT  
 CR Rel-15, 38.305, 15.7.0, 0055, F, NR\_newRAT-Core.

[2b] R2-2100399, "Corrections on the indication for the not provided assistance data and location information in TS38.305", CATT  
 CR Rel-16, 38.305, 16.3.0, 0056, A, NR\_newRAT-Core.

[3a] R2-2100400, "Corrections on the descriptions of RequestLocationInformation message in TS38.305", CATT  
 CR Rel-15, 38.305, 15.7.0, 0057, F , NR\_newRAT-Core.

[3b] R2-2100401, "Corrections on the descriptions of RequestLocationInformation message in TS38.305", CATT  
 CR Rel-16, 38.305, 16.3.0, 0058, A, NR\_newRAT-Core.

[4a] R2-2101465, "Support OTDOA assistance data for case of NR serving cell", Qualcomm Incorporated, Ericsson CR Rel-15, 38.305, 15.7.0, 0061, F, NR\_newRAT-Core.

[4b] R2-2101468, "Support OTDOA assistance data for case of NR serving cell", Qualcomm Incorporated, Ericsson CR Rel-16, 38.305, 16.3.0, 0062, F, NR\_newRAT-Core.

[5a ] R2-2101815, "Clarification on E-CID and NR E-CID", Huawei, HiSilicon  
 discussion, Rel-15, NR\_newRAT-Core

[5b] R2-2101816, "Correction to E-CID-R15", Huawei, HiSilicon  
 CR Rel-15, 38.305, 15.7.0, 0063, F, NR\_newRAT-Core

[5c] R2-2101817, "Correction to E-CID-R16", Huawei, HiSilicon  
 CR Rel-16, 38.305, 16.3.0, 0064, A, NR\_newRAT-Core

[6a] R2-2101926, "Correction on the description for UE capability transfer-R15", Huawei, HiSilicon  
 CR Rel-15, 38.305, 15.7.0, 0066, F, NR\_newRAT-Core

[6b] R2-2101927, "Correction on the description for UE capability transfer-R16", Huawei, HiSilicon  
 CR Rel-16, 38.305, 16.3.0, 0067, A, NR\_newRAT-Core

[7a] R2-2101928, "Correction to 5G support for NB-IOT positioning-R15", Huawei, HiSilicon  
 CR Rel-15, 38.305, 15.7.0, 0068, F, NR\_newRAT-Core

[7b] R2-2101929, "Correction to 5G support for NB-IOT positioning-R16", Huawei, HiSilicon  
 CR Rel-16, 38.305, 16.3.0, 0069, A, NR\_newRAT-Core

[8a] R2-2101379, "GNSS RTK observations resolution indication", Ericsson  
 discussion, Rel-15

[8b] R2-2101380, "Correction of A-GNSS Assistance Data RTK Observation", Ericsson  
 CR Rel-15, 37.355, 15.1.0, 0285, F, NR\_newRAT-Core.

[8c] R2-2101381, "Correction of A-GNSS Assistance Data RTK Observation", Ericsson  
 CR Rel-16, 37.355, 16.3.0, 0286, A, NR\_newRAT-Core

# 2. Discussion

## 2.1 38.305: Remove the NOTE in architecture figure (R2-2100397 [1])

Reason for change: In RAN3 LS R2-2008514/ R3-205719 LS on the NOTE in architecture figure in TS 38.305, RAN3 mentioned

*RAN3 have discussed the note in the architecture figure of stage-2 TS 38.305 section 5.1, which reads “Proprietary interface possible”. RAN3 is of the opinion that such a note is not needed in the stage-2 NG-RAN architecture figure and does not add clarity. Furthermore, RAN3 believes that such archietcture details are in the RAN3 domain*.

RAN3 therefore respectfully asks RAN2 to take the above into account and consider removing the note.

Summary of change: Remove the note for the figure Figure 5.1-1.

Rapporteur's Comments:

- The NOTE in the architecture Figure 5.1-1 was removed in the Rel-16 version of the specification (CR#0037) at RAN2#112e, but not in the Rel-15 version.

- The mentioned RAN3 LS (R2-2008514/R3-205719) was related to the Rel-16 NR Positioning WI (NR\_pos-Core) and not NR\_newRAT-Core.

**Question 1-1:** Do you agree that a Rel-15 correction is needed according to the Reason for Change provided in R2-2100397 [1]?

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Intel | No | R16 CR in R2-2009000 has been agreed in last meeting. In RAN3 LS, RAN3 only mentioned R16 since there is no UE impact. Therefore R15 CR is not needed. |
| Ericsson | No | Agree with Intel |
| Huawei, HiSilicon | No | Agree with Intel |
| CATT | Yes | Although RAN3 doesn’t mention R15, but the same problem does exist in R15. Thus it is better to delte the note as in R16. |
| Qualcomm | No | Agree with others that this is not an essential correction. With or without this Note, it seems nothing fundamentally changes. |
| vivo | Yes | It is better to keep R15 and R16 aligned. Although RAN3 only mentioned R16, but indeed R15 has the same issue. |
| Nokia | Yes | Since the CR is for NR specific stage 2 specification (unlike stage 3 which is common for NR and LTE) and since the CR is for only one release back, we have a slight preference to keep the NR stage 2 38.305 aligned from the start of the NR release. The consequence if not approved could be changed to “misalignment with Rel-16 version of 38.305” as I am not aware of a RAN3 specification making any contradictory statement about the interface in question. |
| Samsung | No | Agree with Intel. |
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**Question 1-2:** If your answer to Question 1-1 was "Yes", do you agree with the CR in [1]?

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| Company | Yes /  Yes with Modification | Comments |
| CATT | Yes |  |
| vivo | Yes |  |
| Nokia | Yes | May be the CR cover could be updated as indicated in our comment for Q1-1 above. |
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## 2.2 38.305: Corrections on the indication for the not provided assistance data and location information (R2-2100398, R2-2100399) [2]

Reason for change: According to the LPP error detection in the error handling procedures in TS37.355:

1> if the message type is an *LPP RequestAssistanceData* or *RequestLocationInformation* and some or all of the requested information is not supported:

2> return any information that can be provided in a normal response, which includes indications on other information that is not supported.

It specifies that if some or all of the requested information is not supported for the assistance data or location information transfer procedure, LMF or UE will reture any information that can be provided in an LPP message, which includes indications on the information that is not provided.

However, as for the assistance data transfer procedure for A-GNSS, OTDOA, Barometric Pressure Sensor, WLAN and TBS positioning methods in TS38.305, it only specifies the case that when all of the requested assistance data is not supported, LMF will return any information that can be provided in an LPP message, which includes indications on the assistance data that is not provided. As for the case that some of the requested assistance data is not provided, what LMF should to do is unclear.

Besides, as for the location information transfer procedure for A-GNSS, OTDOA, E-CID, Barometric Pressure Sensor, WLAN, Bluethooth, TBS and Motion Sensor positioning methods in TS38.305, it only specifies the case that when all of the requested assistance data is not supported, UE will return any information that can be provided in an LPP message, which includes indications on the assistance data that is not provided. As for the case that some of the requested assistance data is not provided, what UE should to do is unclear.

Summary of change: 1. For the assistance data transfer procedure for A-GNSS, OTDOA, Barometric Pressure Sensor, WLAN and TBS positioning methods in TS38.305, add a clarification that If some of the UE requested assistance data cannot be provided by the LMF, return any information that can be provided in an LPP message of type Provide Assistance Data which includes a cause indication for the not provided assistance data.

2. For the assistance data transfer procedure for A-GNSS, OTDOA, E-CID, Barometric Pressure Sensor, WLAN, Bluethooth, TBS and Motion Sensor positioning methods in TS38.305, add a clarification that If some of the requested measurement information cannot be provided by the UE, the UE returns any information that can be provided in an LPP message of type Provide Location Information which includes a cause indication for the not provided location information.

NOTE: Similar CRs for TS 36.305 (Rel-14 – Rel-16) are also proposed in AI 4.4 (R2-2100394, R2-2100395, R2-2100396)

Rapporteur's Comments:

- This Stage 2 text is available since Rel-9 and seems has not created problems/misunderstandings so far. It is also unclear how this issue can result in "positioning accuracy decrease or even positioning failure", as mentioned in the "Consequences if Not Approved" section.

- The Rel-15 and Rel-16 CRs are not exact mirrors (there are more affected clauses in the Rel-16 version compared to the Rel-15 version); i.e., both CRs (if needed) should probably be Cat F.

**Question 2-1:** Do you agree that a correction is needed according to the Reason for Change provided in R2-2100398/R2-2100399 [2]?

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| --- | --- | --- | --- |
| Company | Yes/No | Release 15/16/both | Comments |
| Intel | No | both | Change 1: the only thing is not covered in stage 2 is  “If any of the UE requested assistance data in step (1) are not provided in step 2, “the LMF also needs to indicate the error cause. But no essential since anyway the UE will be implemented based on stage 3.  Change2, do not see the problem. Current text is “before any of the requested measurements have been obtained”, shall already cover “UE can only provide some of the requested information” |
| Ericsson | No | Both |  |
| Huawei, HiSilicon | No | Both |  |
| CATT | Yes | Both | **To Intel:**  **For change 1:**  We also agree with the proposed change method of Intel, which is “if any of the UE requested assistance data in step (1) are not provided in step 2”.  **For change 2:**  Since current text “before any of the requested measurements have been obtained” means that the reponse time elapsed while none of the requested measurements have been obtained, which cannot cover “UE can only provide some of the requested information”.  **Besides, as for the essential of the change:**  We support to fix obvious issues of stage2 not introducing more and more legacy issues for the next release to improve the quality of stage 2 protocol.  Currently, the server will indicate the error cause only when all of the requested information is not provided, which will lead to the inconsistent between stage 2 and stage 3 specifications. |
| Qualcomm | No | both | This is a general Stage 2 description, which doesn’t look wrong. In particular, we don't think this "may lead to the positioning accuracy decrease or even positioning failure", as mentioned in the Consequences if not approved section of the cover sheet. |
| vivo | No | both |  |
| Nokia | No | both | Not essential. The stage 3 specification is clear as to how to handle if “Any” or “All” of the requested information is NOT available. Such error handling details are usually stage 3 details. No need to correct the stage 2 as it anyway gives some hints and further details can be looked in to in stage 3. |
| Samsung | No | Both | no need to clarify the case of partial information available. No need of cause. Partial msg just can be transferred. |
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**Question 2-2:** If your answer to Question 2-1 was "Yes", do you agree with the CRs in [2a] and/or [2b]?

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| Company | Yes /  Yes with Modification | Comments |
| CATT | Yes |  |
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## 2.3 38.305: Corrections on the descriptions of RequestLocationInformation message (R2-2100400, R2-2100401) [3]

Reason for change: 1. According to the IE *A-GNSS-RequestLocationInformation* in LPP *RequestLocationInformation* message in TS37.355, the positioning mode of UE-based and UE- assisted is indicated within the *RequestLocationInformation* message but not within the positioning instructions of A-GNSS.

However, the current specification specifies that there include positioning mode of UE-based, UE-assisted and Standalone within the positioning instructions of A-GNSS, which is conflict with TS37.355.

2. According to the LPP RequestLocationInformation message in TS37.355, there is not include positioning instructions for WLAN, Bluethooth, TBS, Motion Sensor and Barometric Pressure Sensor positioning methods. Besides, the positioning mode indicated within the *RequestLocationInformation* message do not include Standalone mode.

However, the current specification specifies that there include Standalone positioning mode within the positioning instructions for WLAN, Bluethooth, TBS, Motion Sensor and Barometric Pressure Sensor positioning methods, which is conflict with TS37.355.

3. A-GNSS positioning method supporte standlone mode as described in clause 8.1. However, there lacks of A-GNSS positioning methods in the general descriptions of positioning methods supported in standlone mode in clause 4.3.1.

4. According to the LPP RequestLocationInformation message in 37.355, the positioning mode can also be indicated within the RequestLocationInformation message for the DL-AOD, DL- TDOA as well as multi-RTT positioning methods, which does not described in the corresponding location information transfer procedure in current TS38.305.

Summary of change: 1.For the location information transfer procedure of A-GNSS, remove the positioning mode from the description of the positioning instructions and clarify the corresponding positioning mode can be indicated within the *RequestLocationInformation* message.

2. For the location information transfer procedure of WLAN, Bluethooth, TBS, Motion Sensor and Barometric Pressure Sensor positioning methods, delete the description of the positioning instructions and clarify the corresponding positioning mode can be indicated within the *RequestLocationInformation* message.

3. Add A-GNSS positioning method in the general descriptions of positioning methods supported in standlone mode in clause 4.3.1.

4. For the location information transfer procedure of DL-AOD, DL-TDOA and multi-RTT positioning methods, clarify that the corresponding positioning mode can be indicated within the RequestLocationInformation message.

NOTE: The Rel-15 [3a] and Rel-16 [3b] CRs are not identical:  
Change #3 above is only proposed for the Rel-15 version;  
Change #4 above is only proposed for the Rel-16 version.  
(For simplicity, the Reason/Summary of Change has been merged in the description above; please see the actual CRs in [3]).

Rapporteur's Comments:

- "Positioning Instructions" in Stage 2 are used in a generic sense which does not necessarily refer to specific LPP IEs. "Positioning Instructions" generally include common and positioning method specific instructions.

- Assisted-GNSS was not included in the list of methods supported in standalone mode below Table 4.3.1-1 on purpose. Assisted-GNSS per se is not standalone. Clause 8.1 describes "GNSS positioning methods" incl. A-GNSS and autonomous (standalone) mode.

- Since Rel-15 and Rel-16 CRs are not exact mirrors, both CRs (if needed) should probably be Cat F.

**Question 3-1:** Do you agree that a correction is needed according to the Reason for Change provided in R2-2100400/R2-2100401 [3]?

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| --- | --- | --- | --- |
| Company | Yes/No | Release 15/16/both | Comments |
| Intel | No | Both | 1 and 2, in stage 3 postioning mode is reflected based on “locationInformationType” in CommonIEsRequestLocationInformation.Stage 2 used “positioning instructions”, it does not mean the fields “gnss-PositioningInstructions”. Therefore nothing wrong.  3 seems correct. But the change is not essential; |
| Ericsson | Partly | Rel-16 | 3. is OK since GNSS can be in standalone |
| Huawei, HiSilicon | No | Both | Carried in the GNSS request location information message does not mean that it is within A-GNSS-RequestLocationInformation.  Agree with the comment from the rapporteur that if GNSS is assisted aka A-GNSS, it can no longer be standalone. |
| CATT | Yes | Both | To Intel and Ericsson:  **For change 1 and change 2:**  Within *CommonIEsRequestLocationInformation* of the *RequestLocationInformation* message, there is an indication of the requested information type, i.e., measurement information only, location estimate only, or location estimate and measurement information both supported, which may imply the positioning method, i.e., measurement information only corresponding to the UE-assisted positioning mode, while location estimate only as well as location estimate and measurement information both supported imply the UE-based positioning method. However, there is not any indication of the standalone positioning method within *RequestLocationInformation* message.  **For chang 3:**  We support to fix obvious issues of stage2 not introducing more and more legacy issues for the next release to improve the quality of stage 2 protocol.  Firstly, @QC and Huawei, we think it is better to check with current stage 2 and stage 3 specification on whether A-GNSS method support in standalone. And according to our checking result, we think A-GNSS can be in standalone. |
| Qualcomm | No | Both | This is a general Stage 2 description, which doesn’t look wrong. Defining Assisted-GNSS as standalone adds more confusion  (this was discussed in Rel-14, and A-GNSS is not listed intentionally). |
| vivo | No | Both | Agree with Qualcomm. |
| Nokia | See comments | See comments | We think use of the term “positioning instructions” in stage 2 is just a figurative text used at a high level. It is not meant to translate to the field called positioning instructions in stage 3. So, for this part of the changes in the CR, the existing text is OK. Not OK to make the changes relating to positioning instructions.  On the deletion of standalone as a signalled mode, we agree that UE use of “standalone” mode is not instructed by the server because standalone operation is left to UE implementation without any network assistance. So, deleting “standalone” inside the parenthesis next to positioning mode is OK (as it is not signalled). In the case of NR stage 2 38.305 since there is only one backward release that needs to be aligned, we are OK to make the deletion of “standalone” in both Rel-15 and Rel-16. |
| Samsung | Yes | Both | We think this seems correct. |
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**Question 3-2:** If your answer to Question 3-1 was "Yes", do you agree with the CRs in [3a] and/or [3b]?

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| Company | Yes /  Yes with Modification | Comments |
| CATT | Yes |  |
| Nokia | Yes with Modification | Only the change about deleting the “standalone” is acceptable for us. Please see comments under Q3-1 for details. |
| Samsung | Yes |  |
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## 2.4 38.305: Support OTDOA assistance data for case of NR serving cell (R2-2101465, R2-2101468) [4]

Reason for change: 1. When the UE is served by a NR cell, and the LMF requests the UE to perform measurements for OTDOA positioning, the LMF may provide assistance data including optionally timing information to enable the UE to quickly acquire the LTE reference cell. However the LMF is not aware of timing relationships between the LTE and NR cells because it does not receive the SFN Initialization Time for NR cells, although it is of course able to do so for LTE cells.

RAN3 has agreed a Rel-15 NRPPa CR (R3-207173, with Rel-16 mirror in R3-207174) whereby the OTDOA Information Exchange procedure is used towards gNBs in order to enable the LMF to retrieve timing and access point location information for cells in a gNB. With this, it becomes possible for the LMF to construct the assistance data in LPP related to LTE-NR timing offset.

However stage 2 is not aligned to this.

2. There is a remaining Editor's Note in clause 8.2.3.2.2 which has been removed in the Rel- 16 version (CR#0053) but not in the Rel-15 version of the specification.

3. In clause 8.10.3.2.3, 8.13.3.3a, 8.14.3.3a: in the description of each bullet point (2) there is a wrong reference to the MAC specification.

Summary of change: 1. OTDOA Positioning support includes potential interaction with gNBs, and this is captured in relevant sections.   
 A new section is introduced under clause 8.2.2 to list the information that may be transferred from the gNB to LMF.  
 The detail on Assistance Data Delivery between LMF and ng-eNB for OTDOA is generalized (i.e. ng-eNB is replaced by NG-RAN node wherever applicable).

2. Obsolete Editor's Note is deleted.

3. In clause 8.10.3.2.3, 8.13.3.3a, 8.14.3.3a: in the description of each bullet point (2) the reference to the MAC specification 38.321 is corrected.

NOTE: The Rel-15 [4a] and Rel-16 [4b] CRs are not identical:  
Change #2 is only proposed for the Rel-15 version;  
Change #3 is only proposed for the Rel-16 version.  
(For simplicity, the Reason/Summary of Change has been merged in the description above; please see the actual CRs in [4]).

Rapporteur's Comments:

- The OTDOA Information Exchange procedure towards gNBs has been added to NRPPa Rel-15 by RAN3.

**Question 4-1:** Do you agree that a correction is needed according to the Reason for Change provided in R2-2101465/R2-2101468 [4]?

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| --- | --- | --- | --- |
| Company | Yes/No | Release 15/16/both | Comments |
| Intel | Yes | Both | Agree to align with RAN3 changes. |
| Ericsson | Yes | Both | Relevant alignment and clarification |
| Huawei, HiSilicon | Yes | Both |  |
| CATT | Yes | Both | Agree to align with RAN3.  We support to fix obvious issues of stage2 not introducing more and more legacy issues for the next release, in order to improve the quality of stage 2 protocol. |
| Qualcomm | Yes | Both | (proponent) |
| vivo | Yes | Both |  |
| Nokia | Yes | Both | Thanks for the reference to RAN3 agreed CRs. As these are alignments to RAN3 specification, we are OK with the changes. |
| Samsung | Yes | Both | Agree on this. |
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**Question 4-2:** If your answer to Question 4-1 was "Yes", do you agree with the CRs in [4a] and/or [4b]?

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| --- | --- | --- |
| Company | Yes /  Yes with Modification | Comments |
| Intel | Yes |  |
| Ericsson | Yes |  |
| Huawei, HiSilicon | Yes |  |
| CATT | Yes |  |
| Qualcomm | Yes | (proponent) |
| vivo | Yes |  |
| Nokia | Yes | Just wondering why not state explicitly that the timing information in question is the SFN initialisation time or frame timing information? |
| Samsung | Yes |  |
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## 2.5 38.305: Correction to E-CID (R2-2101815, R2-2101816, R2-2101817) [5]

Reason for change: The specification support in Rel-15 for a gNB to report E-UTRA measuremrent as E-CID is not included in the WID NR\_newRAT, and is also contradicting in the current stage-2 specification. A Rel-16 CR has already removed the support, but the Rel-15 spec has not been changed accordingly.

Summary of change: 1. The sentence “In the case of a serving gNB, E-CID positioning can be supported using E- UTRA measurements provided by a UE to the serving gNB” is removed from clause 4.3.4.

2. Remove the E-UTRA measurement from the list transferred from gNB to LMF in clause 8.3.2.3.

Rapporteur's Comments:

- Cover Sheet: The Rel-16 version has no CR number; both CRs have no revision number (should be "-").

- Both CRs (if needed) should probably be Cat F.

**Question 5-1:** Do you agree that a correction is needed according to the Reason for Change provided in R2-2101816/R2-2101817 [5]?

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| --- | --- | --- | --- |
| Company | Yes/No | Release 15/16/both | Comments |
| Intel |  |  | Just for my clarification, So, the gNB can only report CGI to the LMF for Rel-15 ECID? |
| Ericsson | No |  | Even though it is not explcit in WID, we do not see the need to revert the previous agreements. |
| Huawei, HiSilicon | Yes | Both | @Ericsson  By saying the previous agreement, does it actually refer to the endorsed TS 38.305 v1.0.0 in R2-1803804 during RAN2#101, which was based on the TP R2-1803310/R2-1803317? Then why didn’t we have the stage-2 change in section 6.3.1?  We noticed the argument used by that time was as follows.   |  | | --- | | Compared to R2-1800826, the Standard UE Positioning Methods (clause 4.3) are restructured, based on RAN3 discussions on NRPPa:  - The NRPPa ECID procedure allows an LMF to request measurements from an NG-RAN node. There are no separate procedures in the latest draft specification for ng-eNB’s and gNB’s. Therefore, the "Enhanced Cell ID for E-UTRA Methods" (4.3.3) and "Cell ID for NR Method" (4.3.8) are merged into a single section.  - The same as above for E-CID is also proposed for OTDOA. |   There was some discussion on whether LMF is able to identify the RAT type of the UE when UL E-CID method is instigated. If you look at the section 2.3 of the discussion paper, our observation is that LMF should be able to be aware of the UE access Type of PCell RAT and of PSCell RAT (Rel-16 LMF). It is thus feasible for the LMF to instigate a proper type of E-CID positioning method based on different RAT type of the PCell of the UE.  In Rel-15, NRPPa does not classify E-UTRA RSRP/RSRQ as other RAT measurement, in which only GERAN and UTRAN measurements are included. This means that EUTRA RSRP/RSRQ can only for ng-eNB.  In Rel-16, RAN3 also made the agreement (UL NR E-CID Cat B CR) to move gNB reporting E-UTRA RSRP/RSRQ as part of other RAT measurement of NR E-CID in R2-2008658.  To us, supporting gNB to report E-UTRA RSRP/RSRQ is not complete in either stage-2 or stage-3 specification in Rel-15, which is why we suggest to remove it in stage2 to align with stage3.  For R16 spec, the previously voided Clause for E-CID wrongly removed the report of NR CID from gNB to LMF, but this is actually supported.  @Intel  gNB can report CGI and cell portion to the LMF in Rel-15 E-CID. This is reflected by the following bullets in the WID for NR-NewRAT-Core:   |  | | --- | | - Support of positioning to comply with regulatory requirements:  - via RAT independent and E-UTRA RAT dependent positioning schemes, including:  - Transport of LPP messages between 5G-CN and UE through gNB [RAN2];  - Transport of LPPa type messages between 5G-CN and NG-RAN hosting E-UTRA (eNB) [RAN2, RAN3];  NOTE: This objective is intended for the architecture options 4 and 7, and can be reused for option 5.  - Support of measurement gaps and idle periods for location related inter-RAT measurements [RAN4, RAN2].  NOTE: This objective strives for common design of NR parts of inter-RAT measurement between NR and E-UTRA  - via network based NR CID and cell portion positioning, including:  - Definition of messages and transport between 5G-CN and NG-RAN hosting NR (gNB) [RAN3, RAN2]. | |
| CATT | YesT orderer.o accept the CR if there is a real requirement f |  | Support to align with the WID. We support to fix obvious issues of stage2 not introducing more and more legacy issues for the next release, in order to improve the quality of stage 2 protocol.  But not sure it still makes sense if gNB just report Cell Global Identifier /Physical Cell ID and Cell Portion ID to LMF in Rel-15 ECID? |
| Qualcomm |  |  | We agree with the intention to sort out the E-CID confusion. In Rel-15, we have E-CID support based on LTE signals, which however, also includes NR Cell/Cell Portion ID. In Rel-16, we then support NR E-CID. In addition, there are UL- and DL- versions of it with different measurements supported. It seems the CR primarily addresses the UL E-CID?  Wouldn't the DL E-CID need the same correction as well? I.e., "Information that may be transferred from the UE to LMF" includes E-UTRA measurements in Table 8.3.2.4-1? (i.e., in case of a serving gNB) |
| Huawei, HiSIlicon-2 |  |  | @CATT/Intel  I guess both CATT and Intel have this comment. So, here i would give a more detailed explanation in the following.  For the NPRRa spec for R15 38.455-f30, the E-CID measurement are carried by three fields for E-CID MEASUREMENT INITIATION RESPONSE:   * 9.2.5 E-CID measurement result * 9.2.6 Other-RAT measurements. * 9.2.12 Cell Portion ID   In 9.2.5, i.e., the measurement results from its own RAT, only EUTRA measuemtns, cell ID, serving cell TAC are reported.  in 9.2.6, there are only GERAN and UMTS measusments, i.e., no EUTRA measurements.  For E-CID MEASUREMENT REPORT, measurements are carried by the two fields   * 9.2.5 E-CID measurement result * 9.2.12 Cell Portion ID   Hence, for a gNB in R15, for both E-CID MEASUREMENT INITIATION RESPONSE and E-CID MEASUREMENT REPORT, it can only report serving cell ID in 9.2.5 and Cell Portion ID. It cannot report EUTRA measurement since in the other-RAT measurements, there is no EUTRA measusements.  @QC  The change we made to R15/R16 stage2 spec are as follows:   * R15:   + The sentence “In the case of a serving gNB, E-CID positioning can be supported using E-UTRA measurements provided by a UE to the serving gNB” is removed from clause 4.3.4.   + Remove the E-UTRA measurement from the list transferred from gNB to LMF in clause 8.3.2.3. * R16   + The sentence “In the case of a serving gNB, E-CID positioning can be supported using E-UTRA measurements provided by a UE to the serving gNB” is removed from clause 4.3.4.   + The table in section 8.3.2.3 currently voided is added back, but only the Cell ID and cell portion is kept, i.e. E-UTRA measurement is not added back.   Then, for R15 and R16 DL E-CID   * R15   + We think the UE still can report EUTRA measurement report to the LMF even if the PCell is gNB, since this is supported by the R15 LPP * R16   + Same as above. LPP supports the reporting of EUTRA measurements for DL E-CID regardless of the PCell is ng-eNB or gNB |
| vivo | Yes |  | Agree with Huawei’s latest comments above. |
| Nokia |  |  | We prefer that this issue is discussed in RAN3 and be resolved over there along with any necessary stage 2 updates.  When Nokia brought this issue for discussion in the last meeting, my understanding as a RAN2 delegate was, TS 38.455 (even now in the latest version v15.3.0 (2021-01) allows LMF to send to NG-RAN (which means it includes gNB) a MEASUREMENT INITIATION REQUEST message with IE “*Measurement Quantities Item*” set to RSRP and RSRQ. In Rel-15, since only E-CID based on LTE signals is supported then these quantities must surely refer to E-UTRA RSRP and E-UTRA RSRQ. The E-CID MEASUREMENT INITIATION RESPONSE also says it can be sent from NG-RAN to LMF (which means a gNB can send it too). In this response message I see that IE “*E-CID Measurement Result*” can be included and this IE contains >>Result RSRP EUTRA for a list of cells and >>Result RSRQ EUTRA for a list of cells. I am not sure where in 38.455 it says this signaling cannot be used this way. I can understand that this confusion could potentially be due to RAN3 specifying a common procedure and message for E-CID but as I see it it does not clarify that NG-RAN in this case is restricted to ng-eNB only. Anway, we prefer this issue be addressed in RAN3. |
| Samsung | Yes |  |  |
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**Question 5-2:** If your answer to Question 5-1 was "Yes", do you agree with the CRs in [5b] and/or [5c]?

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| --- | --- | --- |
| Company | Yes /  Yes with Modification | Comments |
| Huawei, HiSIlicon | Yes with modifications | The editorial comments from rapporteur should be implemented. Agree with the rapporteur that the R16 change is differenet from R15 chagne and they should be both Cat. F CR. |
| vivo | Yes |  |
| Samsung | Yes |  |
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## 2.6 38.305: Correction on the description for UE capability transfer (R2-2101926, R2-2101927) [6]

Reason for change: In Sectoin 7.1.2.1, the description for capability transfer refers the whole section to the LTE positioning stage2 spec for more detials. While in 36305, the description is for E-SMLC server instead of LMF.

7.1.2.1 Capability transfer

A UE request for capability from E-SMLC or delivery of the E-SMLC capability to the UE is not supported in this version of the specification.

Capabilities in an LPP context refer to the ability of a target or server to support different position methods defined for LPP, different aspects of a particular position method (e.g. different types of assistance data for A-GNSS) and common features not specific to only one position method (e.g. ability to handle multiple LPP transactions). These capabilities are defined within the LPP protocol and transferred between the target and the server using LPP transport.

The exchange of capabilities between a target and a server may be initiated by a request or sent as "unsolicited" information. If a request is used, the server sends an LPP Request Capabilities message to the target device with a request for capability information. The target sends an LPP Provide Capabilities message.

Revised paragraph similar to section 7.1.2.5 needs to be added to revise for the description of LMF.

Summary of change: Add a complete description for capability transfer for NR E-CID instead of refering to the LTE spec.

Rapporteur's Comments:

- The term "E-SMLC" appears only in the first sentence of the referenced description. This sentence seems generally not wrong also for 38.305.

- Cover Sheet: Both CRs have no revision number (should be "-").

**Question 6-1:** Do you agree that a correction is needed according to the Reason for Change provided in R2-2101926/R2-2101927 [6]?

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| --- | --- | --- | --- |
| Company | Yes/No | Release 15/16/both | Comments |
| Intel | No | Both | No inter-operability issue. Not essential. |
| Ericsson | No | Both | Agree with Intel |
| Huawei, HiSilicon | Yes | Both | The issue with the current spec is that the current spec refers to the LTE stage2. While in the LTE stage2, the description is only for E-SMLC, not for LMF. |
| CATT | Yes | both | We support to fix obvious issues of stage2 not introducing more and more legacy issues for the next release to improve the quality of stage 2 protocol. |
| Qualcomm | No | Both | This is not an essential correction. 36.305 defines this procedure between target and server. Only the first sentence mentions "delivery of the E-SMLC capability to the UE is not supported in this version of the specification", which is not wrong per se (an E-SMLC is still present in the 38.305 architecture). |
| vivo | No | Both | Not essential. |
| Nokia | No | Both | Agree it is not an essential correction. 38.305 points to 36.305 for the procedure between target and server. In this context, one can easily understand the server or E-SMLC in 36.305 procedure equivalently applies to LMF in NR. If need be, we can change E-SMLC to “server” in 36.305. No strong preference. |
| Samsung | Yes | Both |  |
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**Question 6-2:** If your answer to Question 6-1 was "Yes", do you agree with the CRs in [6a] and/or [6b]?

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| --- | --- | --- |
| Company | Yes /  Yes with Modification | Comments |
| Huawei, HiSilicon | Yes, with modifications | The comments from rapporteur should be implemented. |
| CATT | Yes with Modification | The same thing happens in 7.1.2.2 and 7.1.2.3, so prefer to clarify the server as LMF in general.7.1.2.2 Assistance data transfer The assistance data transfer procedure between a "target" and a "server" is specified in clause 7.1.2.2 of TS 36.305 [25]. 7.1.2.3 Location information transfer The location information transfer procedure between a "target" and a "server" is specified in clause 7.1.2.3 of TS 36.305 [25]. |
| Samsung | Yes |  |
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## 2.7 38.305: Correction to 5G support for NB-IOT positioning (R2-2101928, R2-2101929) [7]

Reason for change: In the legacy LTE stage2 spec for positioning, the following paragraph has been specified for NB-IOT positioning.

7.1.3 UE positioning measurements in idle state for NB-IoT

[…]

While for NR spec, the above description is not given. In our understanding, NB-IOT supported in NR is under the scope of NB-IoT connected to 5GC and is supported for the current network architecture for positioning.

Summary of change: Add a paragraph for the description for NB-IOT positioning in 5G.

Rapporteur's Comments:

- Cover Sheet: Both CRs have no revision number (should be "-"); clauses affected are missing (the proposed new clause should be mentioned).

- 36.305 has the NB-IoT text in clause 7.1.3. For 38.305, clause 7.x seems more appropriate than the proposed 5.3.x (if the CR is needed).

**Question 7-1:** Do you agree that a correction is needed according to the Reason for Change provided in R2-2101928/R2-2101929 [7]?

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| --- | --- | --- | --- |
| Company | Yes/No | Release 15/16/both | Comments |
| Intel |  |  | No strong opinion. But if we do capture NB-IOT for option5. Then we need to clarify it is only applicable for ng-eNB. |
| Ericsson |  |  | No strong Opinion. Agree with Intel that it should be clarified that is for ng-eNB. |
| Huawei, HiSilicon | Yes | Both | NB-IOT connected to 5GC is part of the R15 features under the NR positioning architecture. It is important that there is stage2 description for it such that people can know it is part of the many features for positioning under NG-RAN. For SA2 stage2 spec 23.273, it has specified lower power periodic/triggered deferred MT-LR procedure for the Control Plane CIoT 5GS Optimisation, which alreasy considers NB-IOT positioning.  Agree that NB-IOT should be only under ng-eNB |
| CATT |  |  | Agree with Intel and Ericsson, if NB-IoT connected to 5GC is captured, it should be applicable only for ng-eNB. And we also agree with rapporteur’s comments to describe it in 7.x if needed. |
| Qualcomm |  |  | No strong opinion either. It was never explicitely discussed in RAN2, but since generally supported, Stage 2 should also capture it. |
| vivo |  |  | No strong Opinion.If it was captured, agree with rapporteur’s comments to relace it in 7.x |
| Nokia | No | Both | We have not explicitly discussed positioning support for NB-IoT connected to 5GC in RAN2 in positioning sessions. If NB-IoT session did not discuss positioning support, like they did with LTE NB-IoT, then we must not add this as a correction now. It needs to be added with proper discussion and as an enhancement for NG-RAN. |
| Samsung |  |  | Agree with intel/Ericsson/ CATT |
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**Question 7-2:** If your answer to Question 7-1 was "Yes", do you agree with the CRs in [7a] and/or [7b]?

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| --- | --- | --- |
| Company | Yes /  Yes with Modification | Comments |
| Huawei, HiSilicon | Yes, with modifications | The comments from rapporteur should be implemented.  For the clause hosting this change, based on the legacy stage2 spec, this clause is under the clause 7.1.3 of 36.305. We prefer to align with the legacy spec while holding no strong opinion.  We can also add some clarifications that it is only applicable for ng-eNB by changing the NG-RAN in the figure to ng-eNB per comments from E// and Intel |
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## 2.8 37.355: Correction of A-GNSS Assistance Data RTK Observation (R2-2101379, R2-2101380, R2-2101381) [8]

Reason for change: The GNSS RTK observations IE was introduced based on the RTCM MSM messages. These messages come in two different resolutions, standard and high, while RTK-Observations only represents in the high resolution. This means that the device cannot determine the resolution of the original MSM message. Therefore, a resolution indicator standard/high would makes the representation complete.

Such a resolution indication can be used by the device to assess uncertainty together with the RTK residuals, and also in case the messages are translated back internally in the device to RTCM MSM messages to use a legacy positioning engine that supports RTCM MSM messages.

Summary of change: An optional resolution indicator is added to the GNSS-RTK-Observations IE.

Rapporteur's Comments:

- Unclear how a resolution indication "can be used by the device to assess uncertainty".

- LPP value range allows for the high-resolution, which includes the low-resolution as special cases.

- The low-resolution fields would also need a different scale factor.

- Work Item code seems wrong; should be LCS\_LTE\_acc\_enh-Core (if a CR is needed).

**Question 8-1:** Do you agree that a correction is needed according to the Reason for Change provided in R2-2101380/R2-2101381 [8]?

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| --- | --- | --- | --- |
| Company | Yes/No | Release 15/16/both | Comments |
| Intel |  |  | Not quite sure whether different RTCM Multiple Signal Messages (MSM) is handled by different engine? If yes, then additional indication is needed to distinguish different MSM messages. |
| Ericsson | Yes | Both | Typically, legacy positioning engines states which MSM messages they support. Therefore, needed for complete reproduceability of the original information in RTCM.  Regarding questions from the rapporteur:  - The observation quantization error depends on the representation and whether the original values were provided with standard or high resolution. To some extent this is addressed by the residual IEs (only defined for GPS and GLONASS, but they are not always provided and are not addressing all attributes)  - high and standard resolution can both be represented, and therefore it is not possible for the target device to disclose whether the original information was provided with high or standard resolution.  - the existing scaling factors are enough to define the observation itself, but can be good to describe the standard representation granularity in the field description  - Agree – it should have been LCS\_LTE\_acc\_enh-Core as work item code |
| CATT |  |  | It seems an enhancement of the RTK data, not a CR. |
| Qualcomm | No | Both | We are not aware of any issues with the Rel-15 specification (and legacy implementations). When this was discussed in Rel-15, it was concluded that LPP needs to support the high-resolution fields only. |
| Nokia | No | Both | This is an enhancement. Not a correction and certainly not an essential correction. |
| Samsung | No | Both | Same view with CATT/Nokia |
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**Question 8-2:** If your answer to Question 8-1 was "Yes", do you agree with the CRs in [8b] and/or [8c]?

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| --- | --- | --- |
| Company | Yes /  Yes with Modification | Comments |
| Ericsson | Yes with modification | Update based on rapporteur comments:  - field description to define the standard resolution granularity  - Change the work item code to LCS\_LTE\_acc\_enh-Core |
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# 3. Summary