3GPP TSG-RAN WG2 Meeting #121bis-e R2-230xxxx

Online Meeting, April 17th – 26th, 2023

**Agenda item: 4.4**

**Source: CATT**

**Title: LTE positioning corrections (CATT)**

**WID/SID: NR\_newRAT-Core**

**Document for: Discussion and Agreement**

# 1 Introduction

This document is to kick off the following email discussion:

 [AT121bis-e][407][POS] LTE positioning corrections (CATT)

      Scope: Check the CRs in agenda item 4.4: R2-2302625 / R2-2302626 / R2-2302627 / R2-2302628 / R2-2302629 / R2-2302630 / R2-2302631 / R2-2302632 / R2-2302633 / R2-2302634 / R2-2302635 / R2-2302636.

      Intended outcome: Report and agreed CRs (without CB if possible)

      Deadline: Monday 2023-04-24 2359 UTC

In this email discussion the following CRs related to TS 37.355 will be discussed to decide if these contributions can be agreed.

1. R[2-2302625](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302625.zip) Miscellaneous Corrections on Section 4 Functionality of Protocol in TS 37.355 CATT CR Rel-15 37.355 15.3.0 0419 - F LCS\_LTE\_acc\_enh
2. R[2-2302626](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302626.zip) Miscellaneous Corrections on Section 4 Functionality of Protocol in TS 37.355 CATT CR Rel-16 37.355 16.10.0 0420 - A LCS\_LTE\_acc\_enh
3. R[2-2302627](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302627.zip) Miscellaneous Corrections on Section 4 Functionality of Protocol in TS 37.355 CATT CR Rel-17 37.355 17.4.0 0421 - A LCS\_LTE\_acc\_enh
4. R[2-2302628](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302628.zip) Miscellaneous Corrections on Section 5 LPP Procedures in TS 37.355 CATT CR Rel-15 37.355 15.3.0 0422 - F LCS\_LTE\_acc\_enh
5. R[2-2302629](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302629.zip) Miscellaneous Corrections on Section 5 LPP Procedures in TS 37.355 CATT CR Rel-16 37.355 16.10.0 0423 - A LCS\_LTE\_acc\_enh
6. R[2-2302630](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302630.zip) Miscellaneous Corrections on Section 5 LPP Procedures in TS 37.355 CATT CR Rel-17 37.355 17.4.0 0424 - A LCS\_LTE\_acc\_enh
7. R[2-2302631](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302631.zip) Corrections on the descriptions in Positioning methods IEs CATT CR Rel-15 37.355 15.3.0 0425 - F LCS\_LTE\_acc\_enh
8. R[2-2302632](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302632.zip) Corrections on the descriptions in Positioning methods IEs CATT CR Rel-16 37.355 16.10.0 0426 - A LCS\_LTE\_acc\_enh
9. R[2-2302633](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302633.zip) Corrections on the descriptions in Positioning methods IEs CATT CR Rel-17 37.355 17.4.0 0427 - A LCS\_LTE\_acc\_enh
10. R[2-2302634](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302634.zip) Corrections on positioning assistance data transfer CATT CR Rel-15 37.355 15.3.0 0428 - F LCS\_LTE\_acc\_enh
11. R[2-2302635](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302635.zip) Corrections on positioning assistance data transfer CATT CR Rel-16 37.355 16.10.0 0429 - A LCS\_LTE\_acc\_enh
12. R[2-2302636](file:///F%3A%5CRAN2%E4%BC%9A%E8%AE%AE%5C2.%E4%BC%9A%E8%AE%AE%E6%96%87%E7%A8%BF%5C121bis%5Cdoc%5CR2-2302636.zip) Corrections on positioning assistance data transfer CATT CR Rel-17 37.355 17.4.0 0430 - A LCS\_LTE\_acc\_enh

# 2 Contact Information

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |
| --- | --- |
| Company | Contact: Name (E-mail) |
| ZTE | Yu Pan(pan.yu24@zte.com.cn) |
| Nokia | mani.thyagarajan@nokia.com |
| Qualcomm | Sven Fischer (sfischer@qti.qualcomm.com) |
| vivo | Xiang Pan (panxiang@vivo.com) |
| Intel | Yi.guo@intel.com |
| Lenovo | Hyung-Nam Choi (hchoi5@lenovo.com) |
| MediaTek | Nathan Tenny (nathan.tenny@mediatek.com) |
| Samsung | Taeseop Lee (taeseop.lee@samsung.com) |
| LG | Jonggil Nam (jonggil.nam@lge.com) |
|  |  |

# 3 Discussion

## 3.1 Miscellaneous Corrections on Section 4 Functionality of Protocol in TS 37.355

R2-2302625, R2-2302626 and R2-2302627 proposed serval corrections on section 4 Functionality of Protocol.

[1] R2-2302625 Miscellaneous Corrections on Section 4 Functionality of Protocol in TS 37.355 CATT CR Rel-15 37.355 15.3.0 0419 - F LCS\_LTE\_acc\_enh

[2] R2-2302626 Miscellaneous Corrections on Section 4 Functionality of Protocol in TS 37.355 CATT CR Rel-16 37.355 16.10.0 0420 - A LCS\_LTE\_acc\_enh

[3] R2-2302627 Miscellaneous Corrections on Section 4 Functionality of Protocol in TS 37.355 CATT CR Rel-17 37.355 17.4.0 0421 - A LCS\_LTE\_acc\_enh

The corrections are list as follow.

|  |  |
| --- | --- |
| Correction 1 |  |
| Correction 2 | 3. When the acknowledgement for LPP message *N* is received and the included *ackIndicator* IE matches the sequence number sent in message *N*, Endpoint A sends the next LPP message *N+1* to Endpoint B when this message is available. |

It is stated that:

For correction 1, not only UE but also SET should be included in the Figure 4.1.1-1: LPP Configuration for Control- and User-Plane Positioning in E-UTRAN.

For correction 2, this is an editorial correction.

**Rapporteur’s comments**:

As specified in TS 38.305, “The LTE Positioning Protocol (LPP) is terminated between a target device (the UE in the control-plane case or SET in the user-plane case) and a positioning server (the LMF in the control-plane case or SLP in the user-plane case). It may use either the control- or user-plane protocols as underlying transport. In this specification, only control plane use of LPP is defined. User plane support of LPP is defined in [15] and [16].”. The target device SET should be added.

**Question 1-1**: Please provide comments below on the above corrections.

|  |  |  |
| --- | --- | --- |
| Company | Agreeable corrections (1/2) | Comments |
| ZTE | Agree both |  |
| Nokia | 1 | If adding SET to the figure is the only change to the figure, then it is OK but in R2-2302625 I noticed that SLP had been removed. Removing SLP is not OK.Correction 2 i.e., deleting “provided” is not essential. It is used bring out a conditional statement. |
| Qualcomm | None | 1: The CR in R2-2302625 adds "SET" to the UE but removes "SLP" from the server. Adding "SET" to the UE would be O.K. and can be merged into a Rel-17 "editorial CR".2: Current sentence is correct (meaning of 'provided' according to English dictionary: "on the condition or understanding that."). |
| OPPO | 1 | Correction 1 is OK. For Correction 2, as stated by native English speakers, it is not essential. |
| vivo |  | The figure is not complete for other aspects as well, i.e., LTE/NR radio signals (A). If correction 1 is to be captured, this correction can be considered. |
| CATT | 1  | Correction 1 is essential correction, which supplements the missed target device. We are fine not to agree correction 2. |
| Intel | None | At such stage, we should only agree the essential changes. But this CR is not the case based on the “Inter-operability”, nothing is broken. UE/network will not implement the feature just based on the figure.  |
| Lenovo | 1 | The correction is not critical and can be fixed from Rel-17. Note that this issue exists since Rel-9 in 36.355.As commented by others in the new Figure 4.1.1-1 “SLP” is missing. |
| MediaTek | 1 | Agree with others that “SLP” should not be removed; otherwise change 1 is OK. Change 2 is not needed. |
| Samsung | 1 |  |
| LG | 1 | OK 1 for adding “SET” in picture due to a target device is defined as UE or SET.  |
| Xiaomi | 1 |  |

**Summary:**

Among the reply from companies:

* 1 company support both corrections;
* 9 companies express support for the 1st corrections, but 1 company think this can be merged to editorial CR.
* 1 company is open on support the 1st correction, but think if we support the 1st correction, the correction, i.e., LTE/NR radio signals (A), should also be supported.

Since there is clear support for the 1st correction, so it is proposed that the 1st correction can be agreed. But for the proposed correction, i.e., LTE/NR radio signals (A), there is A which is hidden.

|  |  |
| --- | --- |
| Correction 3 | 4.3.2 LPP Duplicate DetectionA sender may include a sequence number in all LPP messages sent for a particular location session. The sequence number shall be distinct for different LPP messages sent in the same direction in the same location session (e.g., may start at zero in the first LPP message and increase monotonically in each succeeding LPP message). Sequence numbers used in the uplink and downlink are independent (e.g., can be the same). |

It is stated that:

For this correction, Sequence Number is not mandatory present, i.e. this field may be included when LPP operates over the control plane and an lpp-MessageBody is included but shall be absent otherwise.

**Rapporteur’s comments:**

According to the field description of *sequenceNumber*, the IE will not present will not present when LPP operates over the user plane. “shall” is not applicable.

-- ASN1START

LPP-Message ::= SEQUENCE {

 transactionID LPP-TransactionID OPTIONAL, -- Need ON

 endTransaction BOOLEAN,

 sequenceNumber SequenceNumber OPTIONAL, -- Need ON

 acknowledgement Acknowledgement OPTIONAL, -- Need ON

 lpp-MessageBody LPP-MessageBody OPTIONAL -- Need ON

}

**Question 1-2**: Please provide comments below on this correction.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| ZTE | Yes |  |
| Nokia | No | Sequence number is used for two purposes: a) Duplicate detection and b) Acknowledgement (and Retransmission). It shall be used for CP positioning but may or may not be used for UP positioning. So, having the field as optional is fine but it shall be included for CP positioning. |
| Qualcomm  | No | Current specification is correct.According to clause 4.3.1:"The following requirements in clauses 4.3.2, 4.3.3, and 4.3.4 for LPP reliable transport apply only when the capability is supported."I.e., the field shall be included for LPP duplicate detection. Otherwise, duplicate detection would not work as specified. |
| OPPO | No | The current spec is correct. |
| vivo | No | The following requirements are copied from the transport layer requirements in clause 4.3.1.*A UE implementing LPP for the control-plane solution shall support LPP reliable transport (including all three of duplicate detection, acknowledgement, and retransmission).**The following requirements in clauses 4.3.2, 4.3.3, and 4.3.4 for LPP reliable transport apply only when the capability is supported.*We suppose clause 4.3.2 describes the UE behaviour based on the CP solution. Therefore, the UE shall include the sequence number in LPP message to support reliable transport. |
| Ericsson | No | Agree with Nokia and others |
| Intel | No | Agree with others.  |
| Lenovo | No | Agree with QC that from clause 4.3.1 (“Transport Layer Requirements”) it is clear that the description in clause 4.3.2 refers to the LPP reliable transport functionality for the C-plane solution. |
| MediaTek | No | Agree with others that in context the current spec is correct. |
| Samsung | No | Agree with others. |
| LG | No | Agree with others. |
| Xiaomi | No | Agree with others. |

**Summary:**

Among the reply from companies:

* 1 companies support the correction;
* 11 companies do not support the correction.

Based on the response, since there is clear majority not to support the correction, so it is proposed that the change is not pursued.

**Question 1-3**: Which release do you prefer to change above corrections from if you agree one or all of corrections above? Please provide your comments.

|  |  |  |
| --- | --- | --- |
| Company | Which release start from(Rel-15/16/17) | Comments |
| ZTE | From Rel-15 | Rel-15 f30 LPP spec already have the restriction that sequence number may be omitted. |
| Nokia | Rel-15 | Only the correction to the figure to add SET is needed. |
| OPPO | Rel-15 |  |
| CATT | Rel-15 |  |
| Lenovo | Rel-17 | For correction 1 only. This issue exists from Rel-9. |
| MediaTek | Rel-17 (slight preference) | Correction 1 only. As Lenovo noted, this is an older issue than Rel-15, and it does not create practical problems, so we tend to think it should only be corrected “opportunistically” from Rel-17. If there is a majority preference to correct it from the Rel-15 shift to TS 37.355, we can accept that. |
| Samsung | Rel-17 |  |
| LG | Rel-15 |  |
| Xiaomi | Rel-15 |  |
|  |  |  |

**Summary:**

Among the reply from companies:

* 6 companies prefer to change from Rel-15;
* 3 companies prefer to change from Rel-17;

Since there is slight preference to support the change from Rel-15, and also based on the summary of above Q1-1/Q1-2, it is proposed that only the first change can be agreed from R15.

**Proposal 1: RAN2 to agree with the following change of CR R2-2302625, R2-2302626 and R2-2302627 from Rel-15:**

* **Add “SET” in the figure of the clause 4.1.1 LPP Configuration;**

## 3.2 Miscellaneous Corrections on Section 5 LPP Procedures in TS 37.355

R2-2302628, R2-2302629 and R2-2302630 proposed serval corrections on section 5 LPP Procedures.

[4] R2-2302628 Miscellaneous Corrections on Section 5 LPP Procedures in TS 37.355 CATT CR Rel-15 37.355 15.3.0 0422 - F LCS\_LTE\_acc\_enh

[5] R2-2302629 Miscellaneous Corrections on Section 5 LPP Procedures in TS 37.355 CATT CR Rel-16 37.355 16.10.0 0423 - A LCS\_LTE\_acc\_enh

[6] R2-2302630 Miscellaneous Corrections on Section 5 LPP Procedures in TS 37.355 CATT CR Rel-17 37.355 17.4.0 0424 - A LCS\_LTE\_acc\_enh

The corrections are list as follow.

|  |  |
| --- | --- |
| Correction #1 | 5.1 Procedures related to capability transferThe purpose of the procedures that are grouped together in this clause is to enable the transfer of capabilities from the target device to the server. Capabilities in this context refer to positioning and protocol capabilities related to LPP and the positioning methods supported by target.These procedures instantiate the Capability Transfer transaction from TS 36.305 [2]. |

It is stated that:

For correction #1, the provided positioning capabilities are the capabilities that are supported by the target device but not the LPP.

**Question 2-1**: Please provide comments below on correction #1.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| ZTE | Yes |  |
| Nokia | No | Not essential. Existing text is clear which says, “enable the transfer of capabilities from the target device to the server”. The purpose of saying LPP here is to distinguish the UE capabilities as LPP level capabilities as opposed to radio capabilities at RRC level. |
| Qualcomm | No | Current specification is correct.Capabilities in this context refer to positioning and protocol capabilities related to LPP and the positioning methods supported by LPP (as defined in clause 4.1.3). (E.g., a target may also support positioning methods external to LPP (e.g., SUPL, LPPe)). |
| OPPO | No | The existing wording is clear. |
| vivo | No | The first sentence already clarified the capability is from target to server. The current second sentence may clarify the capabilities in this context are the capabilities supported in LPP, others are not included, e.g., UWB positioning. |
| Ericsson | No | Agree with Nokia and QC |
| Intel | No | Agree with others.  |
| Lenovo | No | The current description is correct if you consider it from protocol perspective. |
| MediaTek | No | Current spec is correct. |
| Samsung | No  | Agree with others. |
| LG | No | Agree with others. |
| Xiaomi | No | Agree with others. |

**Summary:**

Among the reply from companies:

* 1 company support the 1st corrections;
* 11 companies do not support the correction.

Based on the response, since there is clear majority not to support the correction, so it is proposed that the 1st change is not pursued.

|  |  |
| --- | --- |
| Correction #2 | 5.3.2 Location Information Delivery procedureThe Location Information Delivery allows the target to provide unsolicited location information to the server. The procedure is shown in Figure 5.3.2-1.**Figure 5.3.2-1: LPP Location Information Delivery procedure**1. The target sends a *ProvideLocationInformation* message to the server to transfer location information. If step 2 does not occur, this message shall set the *endTransaction* IE to TRUE.2. The target may send one or more additional *ProvideLocationInformation* messages to the server containing additional location information data. The last message shall include the *endTransaction* IE set to TRUE.NOTE: the LPP Location Information Delivery procedure can only be piggybacked in the MO-LR request. |

For this correction, for the case that UE provide the LPP provide location information to LMF directly without request, this is only enabled in the MO-LR request case.

**Question 2-2**: Please provide comments below on this correction.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| ZTE | No | The difference between different service types (e.g., MT-LR and MO-LR) is only reflected in the SA2’s spec. Different service types share the same LPP procedure |
| Nokia | No | Not essential. Adding a note about CN MO-LR detail just makes the specification complex. We don’t see any misalignment between stage-2 and stage-3. 38.305 does not mention anything about MO-LR in the UE initiated location information transfer procedure. |
| Qualcomm | No | The proposed change is not correct. A *ProvideLocationInformation* message may be provided unsolicited, e.g., together with a Request for Assistance Data, etc. See e.g., TS 38.305, clause 8 (e.g., "Additional information concerning the UE's approximate location and serving and neighbour cells may also be provided in the Request Assistance Data message and/or in an accompanying Provide Location Information message to help the LMF provide appropriate assistance data.). |
| OPPO | No | Not necessary to add a NOTE here since it should be captured in SA2’s spec. |
| vivo | No | After the positioning session has been set up, the target UE is free to trigger the location information delivery. E.g., to help with the determination of PRS configuration. |
| CATT | Yes | There is a clear Note in TS 36.305 which is referred by TS38.305 that ‘the LPP Location Information Delivery procedure can only be piggybacked in the MO-LR request’.------------ start of TS 38.305 ----------------------------------------------------------------7.1.2.3 Location information transferThe location information transfer procedure between a "target" and a "server" is specified in clause 7.1.2.3 of TS 36.305 [25].------------end of TS 38.305----------------------------------------------------------------Copy from TS 36.305: ------------ start of TS 36.305 ----------------------------------------------------------------7.1.2.3 Location information transferThe term “location information” applies both to an actual position estimate and to values used in computing position (e.g., radio measurements or positioning measurements). It is delivered either in response to a request or unsolicited.Figure 7.1.2.3‑1: LPP Location Information Transfer procedure1. The server may send a request for location information to the target, and may indicate the type of location information needed and associated QoS.2. In response to step 1, the target transfers location information to the server. The location information transferred should match the location information requested in step 1.3. Optionally (e.g., if requested in step 1), the target in step 2 may transfer additional location information to the server in one or more additional LPP messages.LPP Location Information Delivery procedure is used for unilateral location information transfer.NOTE: the LPP Location Information Delivery procedure can only be piggybacked in the MO-LR request. ------------ end of TS 36.305 ---------------------------------------------------------------- |
| Ericsson | No | Agree with others |
| Intel | No | Agree with others.  |
| Lenovo | No | The new note is same as the note specified in TS 36.305, clause 7.1.2.3. We think there is no need to duplicate a note from stage 2 to stage 3. |
| MediaTek | No | Agree with Lenovo; the note in stage 3 would be redundant. |
| Samsung | No | Agree with others. |
| LG | Yes | Agree with CATT. It is not necessary but it helps avoid to miss stage 2 desciption. |
| Xiaomi |  | It seems that there is a contradiction between section 7.1.2.3 and section 8.2.3.2.1.2. We prefer to delete the Note in TS 36.305.In TS 36.305,7.1.2.3 Location information transferLPP Location Information Delivery procedure is used for unilateral location information transfer.NOTE: the LPP Location Information Delivery procedure can only be piggybacked in the MO-LR request.8.2.3.2.1.2 UE-initiated assistance data transferAdditional information concerning the UE's approximate location and serving and neighbour cells may also be provided in the Request Assistance Data message and/or in an accompanying Provide Location Information message to help the E-SMLC provide appropriate assistance data. |

**Summary:**

Among the reply from companies:

* 2 companies support the 1st corrections;
* 10 companies do not support the correction.
* 1 company propose to remove the note in in TS 36.305.

Based on the response, since there is clear majority not to support the correction, so it is proposed that the 2rd change is not pursued. As for the contradiction between section 7.1.2.3 and section 8.2.3.2.1.2 in TS 36.305, companies may further discuss this issue at next meeting.

**Question 2-3**: Which release do you prefer to change from if you agree one or all of corrections above? Please provide your comments.

|  |  |  |
| --- | --- | --- |
| Company | Which release start from(Rel-15/16/17) | Comments |
| CATT | Rel-15 | It seems companies have different understanding on ‘LPP Location Information Delivery procedure can only be piggybacked in the MO-LR request.’ It is valuable to make it clear in stage-3. |
| LG | Rel-15 |  |
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**Summary:**

Among the reply from companies:

* 2 companies propose to change from Rel-15;

Based on the summary of Q

Based on the summary of above Q2-1/Q2-2, it is proposed all changes are not agreed.

**Proposal 2: RAN2 to agree not to pursue any changes from the CR R2-2302628, R2-2302629 and R2-2302630.** **As for the contradiction on LPP Location Information Delivery procedure between section 7.1.2.3 and section 8.2.3.2.1.2 in TS 36.305, companies may further discuss this issue by proposed CR at next meeting.**

## 3.3 Corrections on the descriptions in Positioning methods IEs

R2-2302631, R2-2302632 and R2-2302633 proposed corrections on the descriptions in Positioning methods IEs.

[7] R2-2302631 Corrections on the descriptions in Positioning methods IEs CATT CR Rel-15 37.355 15.3.0 0425 - F LCS\_LTE\_acc\_enh

[8] R2-2302632 Corrections on the descriptions in Positioning methods IEs CATT CR Rel-16 37.355 16.10.0 0426 - A LCS\_LTE\_acc\_enh

[9] R2-2302633 Corrections on the descriptions in Positioning methods IEs CATT CR Rel-17 37.355 17.4.0 0427 - A LCS\_LTE\_acc\_enh

These corrections are listed as the following:

|  |  |
| --- | --- |
| Correction 1 | 6.4.2 Common Positioning***additionalInformation***This IE indicates whether a target device is allowed to return additional information to that requested. If this IE indicates '*onlyReturnInformationRequested'* then the target device shall not return any additional information to that requested by the server. If this IE indicates '*mayReturnAditionalInformation'* then the target device may return additional information to that requested by the server. If a location estimate is returned, any additional information is restricted to that associated with a location estimate (e.g. might include velocity if velocity was not requested but cannot include measurements). If measurements are returned, any additional information is restricted to additional measurements (e.g. might include E-CID measurements if A-GNSS measurements were requested but not E-CID measurements). |
| Correction 3 (take one as example, similar corrections are in multiple places) |

|  |
| --- |
| ***systemFrameNumber***If the *delta-SFN* and *motionTimeSource* fields are not present, this field specifies the SFN of the RSTD reference cell containing the starting subframe of the PRS or NPRS positioning occasion if PRS or NPRS are available on the RSTD reference cell, or subframe of the CRS for RSTD measurements if PRS and NPRS are not available on the RSTD reference cell during which the most recent neighbour cell RSTD measurement was performed.In the case of more than a single PRS configuration on the RSTD reference cell, the first PRS configuration is referenced.If the *delta-SFN* and *motionTimeSource* fields are present, this field specifies the SFN of the RSTD reference cell when the TOA measurement for the RSTD reference cell has been made. |

 |
| Correction 4 |

|  |
| --- |
| ***multiPrbNprs***This field, if present, indicates that the target device supports NPRS configuration in more than one resource block (i.e., *maxCarrier* in *PRS-Info-NB* greater than 1). |

 |

It is stated that:

For correction 1, the wrong IE name is used within the field description “additionalInformation”.

For correction 3, the wrong IE name “deltaSFN” is used.

For correction 4, there is typo in the field description multiPrbNprs.

**Question 3-1**: Please provide comments below on the above corrections.

|  |  |  |
| --- | --- | --- |
| Company | Agreeable corrections (1/3/4) | Comments |
| ZTE | Agree 1,3,4 |  |
| Nokia | 1,3,4 | 1. We could correct this typo in the ASN.1 field name also but I guess this is just an alignment of procedure text to the ASN.1. So, OKAll editorial changes can be merged with some other CR. |
| Qualcomm | 1,3,4 | Editorial. Can be merged into a REL-17 CR. |
| OPPO | 1,3,4 | Agree these editorial changes. |
| vivo | 1,3,4 | For 1, prefer to fix the wrong field name in ASN.1 |
| CATT | 1, 3 and 4 | 1 and 3 are proposed to correct the wrong IE names, these corrections are essential.4 are made to make the sentence grammaticality. |
| Ericsson | Agree to editotrial correction | The CR category should be D not F |
| Intel |  | Editorial, cannot justify a separate CR. If there is a Rel-17 CR to be approved, the changes can be merged into that CR.  |
| Lenovo | See comments | * Correction 1: The typo (missing letter “d”) in ASN.1 “mayReturnAd**d**itionalInformation” should be better fixed. This issue exists since Rel-10, see 36.355.
* Correction 2: The ASN.1 name should be better fixed to be aligned with ASN.1 naming convention (i.e. removing the dash in the name). As result, 2 occurrences of “delta-SFN” in the description of “delta-SFN” in OTDOA-SignalMeasurementInformation field descriptions should be fixed.
* Correction 4: ok but is not critical.
 |
| MediaTek | See comments | For corrections 1 and 2, we should do something to align the descriptions with the ASN.1, but we tend to agree with Lenovo and vivo that the field names could be corrected instead. Correction 4 is needed but editorial.If we take corrections 1 and 2 as they are, the CR should be category D or merged into another Rel-17 CR as suggested by Intel. If we correct the ASN.1 field names, it would be better to treat it as a separate category F (changes to field names do not create a BC issue, but they might not be considered as purely editorial). |
| Samsung |  | Agree with Lenovo that it would be better to fix the wrong field names for the alignment. |
| LG | 3,4 See comments for 1 | OK 3,4 for editorial corrections. For 1, it is better to change typo of ASN.1 as blow, rather than description. ASN.1 should be human-readable (i.e. most likely close to natural language). AdditionalInformation ::= ENUMERATED { onlyReturnInformationRequested, mayReturnAd**d**itionalInformation, ...} |
| Xiaomi | 1,3,4 | Agree with vivo |

**Summary:**

Among the reply from companies:

* 7 companies support the correction 1/3/4 ;
* 5 companies think this is editorial correction;

And for the correction 1, instead to change the field description to align with the ASN.1, majority companies propose to change the typo of ASN.1 instead. So it is proposed to agree the correction 1/3/4, and merged to other CRs, and also change the 1st correction by correct the typo of ASN.1.

|  |  |  |  |
| --- | --- | --- | --- |
| Correction 2 | 6.4.2 Common Positioning– *CommonIEsError*The *CommonIEsError* carries common IEs for an Error LPP message Type.-- ASN1STARTCommonIEsError ::= SEQUENCE { errorCause ENUMERATED { undefined, lppMessageHeaderError, lppMessageBodyError, epduError, incorrectDataValue, ..., lppSegmentationError-v1450 }}-- ASN1STOP

|  |
| --- |
| *CommonIEsError* field descriptions |
| *errorCause*This IE defines the cause for an error. '*lppMessageHeaderError*', '*lppMessageBodyError*' and '*epduError*' is used if a receiver is able to detect a coding error in the LPP header (i.e., in the common fields), LPP message body or in an EPDU, respectively. ‘*incorrectDataValue’* is used if a receiver is not able to detect a correct LPP message Type. '*lppSegmentationError*' is used if a receiver detects an error in LPP message segmentation. |

 |

It is stated that:

For this correction, there lacks field description on the error cause “incorrectDataValue”.

**Question 3-2**: Please provide comments below on this correction.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| ZTE | Yes |  |
| Nokia | No | Not sure if incorrectDataValue relates to LPP message Type only. It could also be an incorrect value in any other fields in the message. Depends on how current implementations use this. |
| Qualcomm | No | *incorrectDataValue* may be used when an incorrect data value has been received (as the field name implies). If a receiver is not able to detect a correct LPP message Type, the *LPP-MessageBody* would not have been decoded correctly. |
| OPPO | No | We agree to add some wording for the missed description, but as stated by Nokia, not sure whether it relates to LPP message Type only. |
| vivo | Yes | OK to have the clarification on this field. Can be refined to cover the cases mentioned by other companies. |
| CATT | Yes | I’d like to update the correction following comments above:‘*incorrectDataValue’* is used if a receiver is not able to detect a correct LPP message. |
| Ericsson |  | The update should be as below:*incorrectDataValue’* is used if a receiver receives an incorrect data value  |
| Intel | No | Not essential.  |
| Lenovo | Yes but | This issue exists since Rel-9. Furthermore, the error cause value “undefined” is not defined either. |
| MediaTek | See comment | Agree with Ericsson. It’s good to document the meaning of the value, but this value is not related specifically to the LPP message type, and CATT’s suggestion of “not able to detect a correct LPP message” seems too broadly worded and would cover many other cases as well. |
| Samsung |  | Fine with the update from Ericsson. |
| LG | No | It’s fine with Ericsson suggestion. Even though, it does not give useful information, so we don’t think a description is needed.  |
| Xiaomi | Yes | Fine with Ericsson’s suggestion. |

**Summary:**

Among the reply from companies:

* 5 companies support the correction 2;
* 4 companies think this change is not needed, and also they are not sure whether the incorrectDataValue relates to LPP message Type only;
* 4 companies agree with the intention of the change, but prefer to E//’s suggested wording.

Based on the response above, it is proposed that RAN2 to agree the correction 2 with the wording uodates as suggested by E//.

|  |  |  |  |
| --- | --- | --- | --- |
| Correction 5 |

|  |
| --- |
| ***rsrp-Result***This field specifies the reference signal received power (RSRP) measurement, as defined in TS 36.331 [12], TS 36.214 [17]. In the case the target device includes *rsrp-Result-v1470*, the target device shall set the corresponding *rsrp-Result* (i.e. without suffix) to value 0. Measurement report mapping is according to TS 36.133 [18]. |
| ***rsrq-Result***This field specifies the reference signal received quality (RSRQ) measurement, as defined in TS 36.331 [12], TS 36.214 [17]. In the case the target device includes *rsrq-Result-v1470*, the target device shall set the corresponding *rsrq-Result* (i.e. without suffix) to value 0 or 34. Measurement report mapping is according to TS 36.133 [18]. |

 |

It is stated that:

For correction 5, the RSRP or RSRQ measurement results for E-CID positioning method reported by UE is a mapping value, but not the real value, and the mapping table is defined in the TS36.133.

**Question 3-3**: Please provide comments below on correction 5.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| ZTE | Yes | Ok to increase the readability |
| Nokia | No | Not essential. It is well known that RAN4 spec defines the measurement report mapping. |
| Qualcomm | No | Not essential. If considered useful, can be merged into a Rel-17 editorial CR. |
| OPPO | Yes | OK to make spec clearer. |
| vivo | No | 36.331 already has the following reference:For further details about the physical layer measurements, see TS 36.133 [16]. |
| CATT | Yes | The point of this correction is the mapping. The value of measurement report is obviously not correct without the mapping information.The measurement report mapping reference needs to be added to illustrate how to set the measurement value. |
| Intel | No | Not essential.  |
| Lenovo | No | Is a Rel-14 issue. Same as vivo we see no stringent need to add the reference to TS 36.133 since in both field descriptions there is already a reference to TS 36.331 where there is already the reference to the mapping table in TS 36.133, see description of IE RSRP-Range and IE RSRQ-Range. |
| MediaTek | No | Agree with vivo. |
| Samsung | No | Agree with vivo. |
| LG | No | Agree with vivo. |
| Xiaomi | No | Agree with vivo. |

**Summary:**

Among the reply from companies:

* 9 companies do not support the correction 5 ;
* 3 companies support the correction 5;

And among the companies that do not support the correction, some companies think this is not essential, while other companies think since there is already such reference in the TS36.331, so they think there is no need to add the reference in LPP spec.

Since there is majority disagreement, so it is proposed that the correction 5 is not supported.

**Question 3-4**: Which release do you prefer to change from if you agree one or all of corrections above? Please provide your comments.

|  |  |  |
| --- | --- | --- |
| Company | Which release start from(Rel-15/16/17) | Comments |
| ZTE | From Rel-15 |  |
| Nokia |  | We agree with only the editorial corrections 1,3, and 4. We leave it to the specification rapporteur to decide on how to handle the editorial corrections. |
| OPPO | Rel-15 |  |
| CATT | From Rel-15 |  |
| Lenovo | Rel-17 | All agreeable corrections can be made from Rel-17. |
| MediaTek | Rel-17 (slight preference) | Same as Q1-3; prefer Rel-17, can accept if there is a majority view for Rel-15. |
| LG | Rel-15 |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Summary:**

Among the reply from companies:

* 4 companies prefer to change from Rel-15;
* 2 companies prefer to change from Rel-17;
* 1 company prefer o leave these changes to the specification rapporteur.

There is slight majority to support to change from Rel-15. And also based on the summary of Q3-1/3-2/3-3, the following proposal is proposed.

**Proposal 3: RAN2 to agree the following corrections of the CR R2-2302631, R2-2302632 and R2-2302633 from Rel-15 which can be merged into one LPP CR with Proposal 1:**

* **In clause 6.4.2, follow the name of the IE defined in the ASN.1;**
* **In clause 6.4.2, add the following description for the error cause code “incorrectDataValue”:**

**incorrectDataValue’ is used if a receiver receives an incorrect data value.**

* **In clause 6.5.1.5, 6.5.1.6, 6.5.1.7, 6.5.1.5, 6.5.5.2, correct the IE name defined in the ASN.1: *delta-SFN***
* **In clause 6.5.1.7, correct the typo.**

## 3.4 Corrections on positioning assistance data transfer

R2-2302634, R2-2302635 and R2-2302636 proposed several corrections on positioning assistance data transfer,

[10] R2-2302634 Corrections on positioning assistance data transfer CATT CR Rel-15 37.355 15.3.0 0428 - F LCS\_LTE\_acc\_enh

[11] R2-2302635 Corrections on positioning assistance data transfer CATT CR Rel-16 37.355 16.10.0 0429 - A LCS\_LTE\_acc\_enh

[12] R2-2302636 Corrections on positioning assistance data transfer CATT CR Rel-17 37.355 17.4.0 0430 - A LCS\_LTE\_acc\_enh

The corrections are list as the following:

|  |  |
| --- | --- |
| Correction 1 | 5.2.3 Transmission of LPP Request Assistance DataWhen triggered to transmit a *RequestAssistanceData* message, the target device shall:1> set the IEs for the positioning-method-specific request for assistance data to request the data;1> deliver the request to lower layers for transmission. |
| Correction 2 | 5.2.3 Transmission of LPP Request Assistance DataWhen triggered to transmit a *RequestAssistanceData* message, the target device shall:1> set the IEs for the positioning-method-specific request for assistance data to request the data;1> deliver the request to lower layers for transmission. |

It is stated that:

For correction 1, it is the layer which triggers/receives the positioning service request that initiate the procedure, i.e., it can either be the upper layers, i.e., application layer for MO-LR or by the LPP layer for MT-LR.

For correction 2, upon generation of the LPP request assistance data message by setting the IEs correspondingly, it should be delivered to the lower layer for transmission.

**Question 4-1**: Please provide comments below on the above corrections.

|  |  |  |
| --- | --- | --- |
| Company | Agreeable corrections (1/2) | Comments |
| ZTE | Agree both |  |
| Nokia | None | Nothing wrong with the current text in the specification. Not essential. |
| Qualcomm | None. | Current specification is correct. |
| OPPO | Agree both |  |
| vivo | No | For correction 1, even for the MT-LR, it is the upper layer that performs the calculation may request AD.For correction 2, a similar Tdoc R2-2111127 in the previous meeting was concluded as not pursued. |
| CATT | 1 and 2 | These corrections make the procedure of transmission of LPP request assistance data complete. |
| Intel | No | Not essential.  |
| Lenovo | None | To correction 1: Where it is specified that LPP itself can initiate the transmission of LPP Request Assistance Data message? In LPP model either the target or server can initiate a procedure. |
| MediaTek | No | Same understanding as vivo; both changes are not essential. |
| Samsung | No |  |
| LG | No | Agree with vivo. |
| Xiaomi | No | Agree with vivo. |

**Summary:**

Among the reply from companies:

* 9 companies do not support the correction;
* 3 companies support the correction.

Based on the response, since there is clear majority not to support the correction, so it is proposed that the the correction 1 is not supported.

|  |  |
| --- | --- |
| Correction 3 (take one as example, similar corrections are in multiple places) | 5.2.4 Reception of LPP Provide Assistance DataUpon receiving a *ProvideAssistanceData* message, the target device shall:1> for each positioning method contained in the message:2> deliver the related assistance data to upper layers and/or lower layers. |

It is stated that:

For correction 3, upon receiving of the LPP provide assistance data message or the posSIB carrying the positioning assistance data, the handling of the positioning assistance data depends on the positioning methods, i.e., for RAT-dependent positioning method, the assistance data should be delivered to low layers for measurement or transmission, while for RAT-independent positioning method, the positioning assistance data should be delivered directly to the upper layer, e.g., application layer.

**Question 4-2**: Please provide comments below on correction 3.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| ZTE | Yes |  |
| Nokia | No | Not essential. |
| Qualcomm | No | Current specification is correct.The assistance data are delivered to "upper layer". "Lower layer" may get some specific (implementation dependent) parameters out of the assistance data to enable e.g., signal measurements, etc. |
| OPPO | Yes |  |
| vivo | No | If the request comes from the upper layer in clause 5.2.3, the response is delivered to the upper layer as well. Then the upper layer will indicate the lower layer to perform the measurement. |
| CATT | Yes | The lower layer not only needs indication to enable measurements, but also needs the configurations e.g. configurations of DL-PRS to search the DL-PRS signal at first. |
| Ericsson | No | Agree not essential |
| Intel | No | Not essential.  |
| Lenovo | No | Not essential |
| MediaTek | No | We understand the current specification is correct in that the AD are delivered to the upper layer (which triggered the request). We don’t generally specify the details of inter-layer communication in the implementation. |
| Samsung | No | Agree with MediaTek. |
| LG | No | Agree with Qualcomm and MediaTek. We don’t see the need to deliver a message to lower layer because it is not for sending/transmit a packet though lower layer. Lower layers get some parameters from that message.  |
| Xiaomi | No | Agree with vivo |

**Summary:**

Among the reply from companies:

* 10 companies do not support the correction;
* 3 companies support the correction.

Based on the response, since there is clear majority not to support the correction, so it is proposed that the the correction 2 is not supported.

**Question 4-3**: Which release do you prefer to change from if you agree one or all of corrections above? Please provide your comments.

|  |  |  |
| --- | --- | --- |
| Company | Which release start from(Rel-15/16/17) | Comments |
| ZTE | Rel-15 |  |
| OPPO | Rel-15 |  |
| CATT | Rel-15 |  |
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**Summary:**

Among the reply from companies:

* 3 company propose to change from Rel-15;
* 11 companies do not support the correction.

However, based on the summary of Q4-1/4-2, it is proposed that RAN2 does not pursure all the changes from the CR R2-2302634, R2-2302635 and R2-2302636.

**Proposal 4: RAN2 to agree not to pursue any changes from the CR R2-2302634, R2-2302635 and R2-2302636.**

# 4 Conclusion

**Proposal 1: RAN2 to agree with the following change of CR R2-2302625, R2-2302626 and R2-2302627 from Rel-15:**

* **Add “SET” in the figure of the clause 4.1.1 LPP Configuration;**

**Proposal 2: RAN2 to agree not to pursue any changes from the CR R2-2302628, R2-2302629 and R2-2302630. As for the contradiction on LPP Location Information Delivery procedure between section 7.1.2.3 and section 8.2.3.2.1.2 in TS 36.305, companies may further discuss this issue by proposed CR at next meeting.**

**Proposal 3: RAN2 to agree the following corrections of the CR R2-2302631, R2-2302632 and R2-2302633 from Rel-15 which can be merged into one LPP CR with Proposal 1:**

* **In clause 6.4.2, follow the name of the IE defined in the ASN.1;**
* **In clause 6.4.2, add the following description for the error cause code “incorrectDataValue”:**

**incorrectDataValue’ is used if a receiver receives an incorrect data value.**

* **In clause 6.5.1.5, 6.5.1.6, 6.5.1.7, 6.5.1.5, 6.5.5.2, correct the IE name defined in the ASN.1: *delta-SFN***
* **In clause 6.5.1.7, correct the typo.**

**Proposal 4: RAN2 to agree not to pursue any changes from the CR R2-2302634, R2-2302635 and R2-2302636.**