3GPP TSG-RAN WG2 Meeting #113bis Electronic R2-210xxxx

Elbonia, Apr 12 – 20 2021

**Agenda item: 6.6.3**

**Source: CATT**

**Title: Report of [AT113bis-e][607][POS] LPP proposals (CATT)**

**WID/SID: NR\_pos-Core - Release 16**

**Document for: Discussion and Agreement**

# 1 Introduction

This document is the report of the following email discussion:

* [AT113bis-e][607][POS] LPP proposals (CATT)

Scope: Discuss the proposals in R2-2103129 and conclude on which are agreeable.

Intended outcome: Report to comeback session, in R2-2104411

Deadline: Tuesday 2021-04-20 0800 UTC

In this email discussion the following contributions are discussed to decide if these contributions or proposals in the contributions can be agreed. Please see [R2-2103129](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103129.zip) for a summary of these contributions and for Rapporteur’s comments/suggestions. Please also check the contribution themselves before answering the questions in this email discussion.

1. [R2-2102920](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102920.zip" \o "C:Usersmtk16923Documents3GPP Meetings202104 - RAN2_113bis-e, OnlineExtracts37355_CR0294_(Rel-16)_R2-2102920.docx) Corrections on the field description of NR-AdditionalPathList and DL-PRS positioning frequency layer related parameters, CATT
2. [R2-2102921](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102921.zip) Corrections on NR-Multi-RTT-RequestAssistanceData, CATT
3. [R2-2102987](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102987.zip) Considerations on missing need codes in LPP, Lenovo, Motorola Mobility
4. [R2-2103921](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103921.zip) LPP Layer interaction with lower layers for Positioning Frequency layer and Measurement Gap, Ericsson
5. [R2-2103923](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103923.zip) Need of compact expirationTime Indication, Ericsson
6. [R2-2103924](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103924.zip) Correction of field description name, Ericsson
7. [R2-2104049](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104049.zip) Correction to PRS configuration, Huawei, HiSilicon
8. [R2-2104050](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104050.zip) Correction to the uplink LPP message, Huawei, HiSilicon
9. [R2-2104051](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104051.zip) Correction to DL-PRS capability, Huawei, HiSilicon
10. [R2-2104052](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104052.zip) Correction on positioning error reporting, Huawei, HiSilicon
11. [R2-2104269](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104269.zip) Correction on the field description of additionPaths, ZTE Corporation, Sanechips
12. [R2-2102786](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102786.zip) 37.355 Draft CR on timestamp reference in NR positioning measurement report, vivo

# 2 Contact Information

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

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| Company | Contact: Name (E-mail) |
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# 3 Discussion

## 3.1 Field description of NR-AdditionalPathList and PFL related parameters

[R2-2102920](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102920.zip" \o "C:Usersmtk16923Documents3GPP Meetings202104 - RAN2_113bis-e, OnlineExtracts37355_CR0294_(Rel-16)_R2-2102920.docx) addresses the problem related with the field description of IE *nr-RelativeTimeDifference* and positioning frequency layer related parameters configured by *NR-DL-PRS-PositioningFrequencyLayer*, i.e., *dl-PRS-SubcarrierSpacing*, *dl-PRS-CyclicPrefix*, *dl-PRS-PointA*, *dl-PRS-CombSizeN*, *dl-PRS-ResourceBandwidth* and *dl-PRS-StartPRB*. And the following changes are proposed:

1. Add a description for the mapping of reported value and the measured negative value in the field description of *nr-RelativeTimeDifference-r16*.
2. Add a restriction that “all DL PRS resource sets belonging to the same positioning frequency layer have the same value of the parameters configured by *NR-DL-PRS-PositioningFrequencyLayer*” in the field description of the following parameters configured by *NR-DL-PRS-PositioningFrequencyLayer*:

* *dl-PRS-SubcarrierSpacing*,
* *dl-PRS-CyclicPrefix*,
* *dl-PRS-StartPRB*

**Rapporteur’s comments**: This is an essential correction. For the 1st correction, it makes the NW and UE behaviour clear. For the 2nd correction, the corresponding changes are related with the definition of the positioning frequency layer, which makes the definition of the DL-PRS frequency layer clear and aligned with RAN1’s spec. So, rapporteur proposes to agree on this CR.

**Proposal 1: RAN2 to agree adding a description for the mapping of reported value and the measured negative value, and if it is agreeable to add clarification that all DL PRS resource sets belonging to the same positioning frequency layer have the same value of the parameters *dl-PRS-SubcarrierSpacing*, *dl-PRS-CyclicPrefix* and *dl-PRS-PointA*.**

**Question 1**: please provide your views on proposal 1 of whether to add a description for the mapping of reported value and the measured negative value, and to add clarification for the DL-PRS frequency related parameters.

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**Summary 1**: TBD.

**Proposal 1**: TBD.

## 3.2 nr-AdType field in NR-Multi-RTT-RequestAssistanceData IE

[R2-2102921](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102921.zip) points out an issue related with the required assistance data for NR Multi-RTT positioning. *NR-Multi-RTT-RequestAssistanceData* IE used to request assistance data for NR Multi-RTT positioning. This IE has a field (*nr-AdType*) that indicates the type of assistance data requested. One of the codepoints for this field is ‘*ul-srs*’ which indicates SRS related information is being requested. However, since SRS related information is not provided as part of the assistance data from LMF to UE in the case of multi-RTT positioning, the *nr-AdType* in the request for assistance data for multi-RTT should not have the ‘*ul-srs*’ codepoint. Thus, the following changes are proposed in [R2-2102921](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102921.zip):

1. Add a field description for the IE *ul-srs* that this IE should not be included in this version of the protocol.
2. Add a filed description for the IE *nr-AdType* in the *NR-Multi-RTT-RequestAssistanceData.*

**Rapporteur’s comments**: This is an essential correction and with backward compatible changes. Besides, this question has been discussed in the last meeting RAN2#113e, and most of companies indicate the change can be OK if it is done in a backward compatible way. Thus, Rapporteur proposes to agree the CR.

**Proposal 2: RAN2 to agree** **adding a field description for *nr-AdType* and clarifying in the field description of that the codepoint ‘*ul-srs*’ is not used in this release.**

**Question 2**: please provide your views on proposal 2 to add a field description for *nr-AdType* and clarifying in the field description of that the codepoint ‘*ul-srs*’ is not used in this release.

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**Summary 2**: TBD.

**Proposal 2**: TBD.

## 3.3 Missing need codes

[R2-2102987](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102987.zip) proposes several overviews of the optional fields and conditional fields for which need codes are missing and the following changes are proposed:

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| Proposal 1: For Rel-14 and earlier, it is recommended not to add the missing need codes for the time being but to check the existing implementations carefully and decide afterwards whether there is a need to make any changes or not.  Proposal 2: For Rel-15, it is recommended to add the missing need codes but may need to be decided case-by-case (i.e. feature-based) depending on whether there are already existing implementations of UE and network in the field or not. Details of the need codes can be discussed separately.  Proposal 3: For Rel-16, it is recommended to add the missing need codes. Details of the need codes can be discussed separately. |

**Rapporteur’s comments**: The discussion paper makes a general analysis for the optional fields and conditional fields for which need codes are missing. RAN2 can first discuss whether to agree to add the missing need codes and the corresponding version of the specifications based on this discussion paper. Since the details of the need codes to be modified have already been covered by email discussion [Offline-601][POS], thus, if agreed to make such changes, companies can further check these parameters case by case in email discussion [Offline-601][POS].

**Proposal 3: RAN2 to discuss whether to agree to add the missing need codes in principle first and which corresponding version of the specifications need to be modified. And if agreed, companies can further check these parameters case by case in another email discussion [Offline-601][POS].**

**Question 3**: please provide your views on proposal 3 of whether to add the missing need codes in principle first, and if yes, please provide the corresponding version of the specification need to be modified.

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**Summary 3**: TBD.

**Proposal 3**: TBD.

## 3.4 LPP and RRC interaction for NR DL PRS measurements

[R2-2103921](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103921.zip)[4] is a revised resubmission of CR in R2-2102123 addressing an issue impacting the NR DL PRS measurements requiring measurement gaps. And the following changes are proposed in [R2-2103921](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103921.zip):

1. The LPP interaction with RRC and lower layers has been captured 6.4.3*.*

**Rapporteur’s comments**: We have the following description in LTE which is missing in NR under IE *OTDOA-ReferenceCellInfo*: “*If earfcnRef of this assistance data reference cell is different from that of the serving cell, the LPP layer shall inform lower layers to start performing inter-frequency RSTD measurements with this cell and provide to lower layers the information about this assistance data reference cell, e.g. EARFCN and PRS positioning occasion information*”. It is worth considering a similar clarification for NR DL PRS measurements also. This seems to be an essential correction in Rel-16.

**Proposal 4: RAN2 to discuss if it is agreeable to add a clarification about the LPP layer to RRC layer interaction when measurement gap is required for NR DL PRS measurements.**

**Question 4**: please provide your views on proposal 4 of whether to add a clarification about the LPP layer to RRC layer interaction when measurement gap is required for NR DL PRS measurements.

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**Summary 4**: TBD.

**Proposal 4**: TBD.

## 3.5 ExpirationTime Indication

[R2-2103923](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103923.zip) discusses the need of granular *expirationTime* rather than the UTC time and the following changes are proposed:

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| [Observation 1 The ValueTag is not efficient since the posSIB still needs to be decoded. and ExpirationTime in the current form is also difficult to use because it is per SIB and consumes 12 Bytes.](#_Toc68210021)  [Observation 2 Significant signalling savings can be done for broadcast with Light weight ignalling mechanism.](#_Toc68210022)  [Proposal 1 RAN2 to agree to include updateRateTimeUnit and updateRateTime as substitute of expirationTime for some of the posSIBs and in addition to the expirationTime for some of the other posSIBs.](#_Toc68210024) |

**Rapporteur’s comments**: It seems an enhancement on broadcast positioning assistance data instead of essential correction in Rel-16.

**Proposal 5: RAN2 to discuss whether to include *updateRateTimeUnit* and *updateRateTime* as substitute of *expirationTime* or in addition to the *expirationTime* for some posSIBs.**

**Question 5**: please provide your views on proposal 5 of whether to include *updateRateTimeUnit* and *updateRateTime* as substitute of *expirationTime* or in addition to the *expirationTime* for some posSIBs.

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**Summary 5**: TBD.

**Proposal 5**: TBD.

## 3.6 Field description name of nr-PositionCalculationAssistance

[R2-2103924](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103924.zip) points out different names exist for the field description *nr-PositionCalculationAssistance*. In 37.355, the IE *nr-PositionCalculationAssistance* is defined to provides position calculation assistance data for UE-based mode. However, in the corresponding field description of assistance data related parameters for DL-TDOA and DL-AOD methods, the wrong IE names of *nr-PositionCalculationAssistanceData* is used. Based on this, the following changes are proposed in [R2-2103924](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2103924.zip):

1. The field name has been changed from *nr-PositionCalculationAssistanceData* to *nr-PositionCalculationAssistance.*

**Rapporteur’s comments**: This is an essential correction which is a typo. The rapporteur proposes a CR to include all of such typo corrections.

**Proposal 6: RAN2 to agree the correction to change the field name from *nr-PositionCalculationAssistanceData* to *nr-PositionCalculationAssistance*.**

**Question 6**: please provide your views on proposal 6 to change the field name from *nr-PositionCalculationAssistanceData* to *nr-PositionCalculationAssistance*.

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**Summary 6**: TBD.

**Proposal 6**: TBD.

## 3.7 Corrections to DL PRS configuration related IEs/fields

[R2-2104049](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104049.zip) addresses corrections related with the PRS configuration relevant parameters and the following changes are proposed:

1. Accept the changes regarding DL-PRS related IEs.

* Clarify that the numbering space for *NR-DL-PRS-ResourceSetID* is per TRP across multiple frequency layers
* Modify the sentence "*qcl-DL-PRS-ResourceSetID* specifies the DL-PRS Resource Set ID" to "*qcl-DL-PRS-ResourceSetID* specifies DL-PRS Resource Set configured for the same TRP whose DL-PRS resource serve as the source reference signal for the DL-PRS"
* Change the name *nrMaxSetsPerTRP* to *nr-MaxSetsPerTRP-PerFrequencyLayer*
* In the sentence "The IE *NR-SelectedDL-PRS-IndexList* is used by the location server to provide the selected Frequency Layer index of *nr-DL-PRS-AssistanceDataList* to the target device.", it should be the index of PRS resources

1. Accept the following changes regarding the *associated-DL-PRS-ID*.

* In the IE NR-DL-PRS-BeamInfo
  + In the field description of *associatedDL-PRS-ID*, remove the sentence "The beam information from the associated TRP is considered to be in GCS if the lcs-gcs-translation-parameter field is not provided, and to be in LCS if the lcs-gcs-translation-parameter field is provided."
  + In the field description of *associatedDL-PRS-ID*, clarify that when the field is present, the fields *lcs-GCS-TranslationParameter* and *dl-PRS-BeamInfoSet* shall be absent.
  + In the field desctiption for *lcs-GCS-TranslationParameter*, clarify that the field’s fucntion for the current TRP is applicable only when the field associatedDL-PRS-ID is absent
* In the IE *NR-TRP-LocationInfo*
  + In the field description of *associatedDL-PRS-ID*, clarify that when the field is present, the field *trp-Location* shall be absent.

**Proposal 7: RAN2 to discuss whether to agree the following corrections proposed by** [R2-2104049](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104049.zip)**.**

**Question 7**: please provide your views on proposal 7 of whether to agree the above corrections proposed by [R2-2104049](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104049.zip).

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**Summary 7**: TBD.

**Proposal 7**: TBD.

## 3.8 Need code and conditional presence tags in fields in UL messages

[R2-2104050](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104050.zip) points out that according to the description in Section 6.1 of the LPP spec 37.355, the conditional presence tag should not be used in the uplink LPP message. However, there are several uplink LPP messages, within which conditional presence tag was used. Thus, the following changes are proposed in [R2-2104050](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104050.zip):

1. Add field description for the field *nr-dl-tdoa-LocationInformation*, remove the conditonal presence tag *UEB* and its explanation. Move the explanation to the field description.
2. Add field description for the field *nr-dl-AoD-LocationInformation*, remove the conditonal presence tag *UEB* and its explanation. Move the explanation to the field description.
3. Remove the condition presence tag *SameRx* for the field *nr-DL-AoD-AdditionalMeasurements* and *nr-DL-PRS-RxBeamIndex* and remove the explanation for *SameRx*. Add the description to the field description of the field *nr-DL-PRS-RxBeamIndex*

**Rapporteur’s comments**: The motivation for the corrections is supported. Moreover, the similar problems also exist in LTE spec and these conditional presence tags handling for LTE/NR has been there since Rel-9/Rel-15. Besides, except the conditional tags proposed to be changed in [R2-2104050](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104050.zip), there still other similar problems in current 37.355, i.e., conditional presence tag *NB-IoT* for NB-IOT positioning specific IEs, or the tag segmentation for the common IEs *CommonIEsProvideLocationInformation*, *CommonIEsRequestAssistanceData* and *CommonIEsProvide Capabilities*.

**Proposal 8: RAN2 to discuss whether it is OK to replace the conditional presence tags for fields used in uplink messages with field description explained the conditions under which the field is present.**

**Question 8**: please provide your views on proposal 8 of whether to replace the conditional presence tags for fields used in uplink messages with field description explained the conditions under which the field is present.

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**Summary 8**: TBD.

**Proposal 8**: TBD.

## 3.9 Corrections to DL-PRS capability related IEs/fields

[R2-2104051](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104051.zip) addresses the corrections related with the DL-PRS capability and the following changes are proposed:

1. Clarify that *NR-DL-PRS-ProcessingCapabilityPerBand* is defined for a single positioning frequency layer on a certain band
2. In the field description for *NR-DL-TDOA/DL-AoD-ProvideCapabilities*

* For the field nr-DL-TDOA/AoD-mode, clarify that the bit for standalone should always be set to “0”
* In the field description for periodical reporting, clarify that the bit for standalone should be set to 0 and what are the meanings for the other bits for ue-based and ue-assisted
* remove the sentence” If this field is absent, the target device does not support *periodicalReporting* in *CommonIEsRequestLocationInformation*.”

1. In *NR-DL-AoD-MeasurementCapability*, remove “*srs-PosResource*” and clarify that it is “UE Multi-RTT measurements”

**Proposal 9: RAN2 to discuss whether it is OK to make above corrections proposed by** [**R2-2104051**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104051.zip)**.**

**Question 9**: please provide your views on proposal 9 of whether to agree above corrections proposed by R2-2104051.

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**Summary 9**: TBD.

**Proposal 9**: TBD.

## 3.10 Clarifications for positioning error reporting

[R2-2104052](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104052.zip) points out the problem about the error cause for E-CID, DL-AOD, DL-TDOA and multi-RTT methods. Since the error for E-CID is only reported in *provideLocationInforamtion* for this version of LPP spec sent from device to the server. Hence, the following changes are proposed in [R2-2104052](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104052.zip):

1. Add in the IE description of *NR-ECID-Error* that in this version of specification, only *NR-ECID-TargetDeviceErrorCauses* can be chosed
2. Add in the IE description of *NR-DL-TDOA-Error*, *NR-DL-AoD-Error*, *NR-Multi-RTT-Error* that when *DL-TDOA-Error*, *DL-AoD-Error*, *Multi-RTT-Error* is included in *provideAssistanceData*, *locationServerErrorCauses* is chosen; while under *ProvideLocationInformation*, *targetDevidceErrorCauses* is chosen

**Rapporteur’s comments**: Except the proposed changes in [R2-2104052](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104052.zip), the same problems also exist in other positioning methods in both NR and LTE (NR since Rel-15, LTE since Rel-9), too much corrections but not essential need to be introduced if agreed. Besides, according to rapporteur’s view, there is no need to do such clarification since nothing is unclear or broken according to the current spec.

**Proposal 10: RAN2 to discuss whether need to further clarify the cases under which the two error types (*locationServerErrorCauses*, *targetDevidceErrorCauses*) should be included.**

**Question 10**: please provide your views on proposal 10 of whether need to further clarify the cases under which the two error types (*locationServerErrorCauses*, *targetDevidceErrorCauses*) should be included.

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**Summary 10**: TBD.

**Proposal 10**: TBD.

## 3.11 Add field description of additionalPaths

In [R2-2104269](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104269.zip) the following changes are proposed:

1. Add the field description of *additionalPath*s in *NR-DL-TDOA-RequestLocationInformation* and *NR-Multi-RTT-RequestLocationInformation*.

**Proposal 11: RAN2 to discuss whether it is agreeable to add the field description of *additionalPaths*.**

**Question 11**: please provide your views on proposal 11 of whether it is agreeable to add the field description of *additionalPaths*.

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| Company | Agree/Disagree | Technical Arguments/Suggested Text Changes/CR cover issues |
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**Summary 11**: TBD.

**Proposal 11**: TBD.

## 3.12 Timestamp reference

[R2-2102786](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102786.zip) points out that the reference for generation of timestamp in NR positioning measurement report is based on information provided *nr-DL-PRS-ReferenceInfo*. However, the clarification is missing in TS37.355. Thus, [R2-2102786](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2102786.zip) proposes to make the following changes:

1. Add description of the construction of timestap and clarify these parameters come from reference cell.

**Rapporteur’s comments**: *nr-TimeStamp* is reported not only in DL-TDOA, but also in DL-AoD and Multi-RTT measurement which has no reference cell for measurement report. *nr-TimeStamp* is a common IE which doesn’t not only come from reference cell. So it seems no need to add this clarification.

**Proposal 12: The CR to add description of the construction of timestamp and clarify these parameters comes from reference cell is not agreed, since *nr-TimeStamp* is also reported in DL-AoD and/or Multi-RTT measurement which has no reference cell for measurement report.**

**Question 12**: please provide your views on proposal 12 to not add description of the construction of timestamp and clarify these parameters come from reference cell.

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| Company | Agree/Disagree | Technical Arguments/Suggested Text Changes/CR cover issues |
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**Summary 12**: TBD.

**Proposal 12**: TBD.

# 4 Conclusion

TBD