3GPP TSG-RAN WG2 #117-e R2-22xxxxx

Online Meeting, Feb 21st – March 3rd, 2022

Agenda Item: 6.3.3

Source: Ericsson

Title: Report for LPP Corrections for Positioning

Document for: Discussion, Decision

# Introduction

The below papers have been submitted in the LPP AI 6.3.3 which requires input from companies to identify the support for the corrections.

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| [**R2-2202224**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2202224.zip) | Addition of missing need code for the BDS TGD2 parameter | Lenovo, Motorola Mobility |
| [**R2-2203275**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2203275.zip) | Correction of reference TRP for DL-AoD and Multi-RTT measurement report | Qualcomm Incorporated |
| [**R2-2203277**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2203277.zip) | Correction to NR-DL-PRS-ResourcesCapability field description | Qualcomm Incorporated |
| [**R2-2203531**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2203531.zip) | Introducing new high accuracy GAD shape with scalable uncertaintyRevision of [**R2-2203367**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2203367.zip) | Ericsson, T-Mobile USA, Qualcomm Incorporated |
| **[R2-2203368](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2203368.zip)** | Clarification on LPP segmentation | Ericsson |

* [AT117-e][626][POS] Agenda item 6.3.3 (Ericsson)

      Scope: Treat documents R2-2202224, R2-2203275, R2-2203277, R2-2203531, and R2-2203368 and conclude on the CRs.

      Intended outcome: Agreed CRs (without CB)

      Deadline:  Wednesday 2022-03-02 1000 UTC

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|  |  |
| --- | --- |
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# Discussion

## [R2-2202224](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2202224.zip) Missing Need Code

The CR adds the below Need code which was missing.

[[ bdsTgd2-r16 INTEGER (-512..511) OPTIONAL -- Need ON

]]

Question 1: Do Companies Agree with the CR?

|  |  |  |
| --- | --- | --- |
| Company | Change is fine Yes/No | Comments |
| Huawei, HiSilicon | Yes |  |
| ZTE | Yes |  |
| Qualcomm | Yes |  |
| CATT | Yes |  |
| Xiaomi | Yes |  |
| vivo | Yes |  |
| Apple | Yes |  |
| Intel | yes |  |
| Nokia |  | We are fine if the majority thinks this is right but looking at the ICD, Tgd2 is defined as the group delay differential between B2I and B3I signals (while Tgd1 is the group delay differential between B1I and B3I signals). We assume Tgd2 is optional because it is supported only if B2I signal is supported but isn’t it mandatory to provide Tgd2 if the B2I signal is supported? |
| Samsung | Yes |  |
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1. The CR in R2-2202224 for missing need code is agreed.

## [R2-2203275](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2203275.zip) Correction of Reference TRP

The CR removes mentioning of the reference TRP as the first TRP in the measurement report for DL-AOD and multi-RTT citing the reference TRP does not exist for these positioning methods.

A part of CR is shown below.

The IE *NR-DL-AoD-SignalMeasurementInformation* is used by the target device to provide NR DL-AoD measurements to the location server.

Question 2: Do Companies Agree with the CR?

|  |  |  |
| --- | --- | --- |
| Company | Change is fine Yes/No | Comments |
| Huawei, HiSilicon | Yes | Reference TRP is only for RSTD measurement |
| ZTE | Yes |  |
| Qualcomm | Yes (proponent) |  |
| CATT | Yes |  |
| Xiaomi | Yes |  |
| vivo | Yes |  |
| Apple | Yes |  |
| Intel | Yes |  |
| Nokia | Yes | We could use this opportunity to make some editorial changes too. There is inconsistency in the use of the terms “DL PRS-RSRP” and “DL PRS measurements”. The placement of hyphen in different instances of these terms varies in different places. Consistently use “DL PRS-RSRP” and “DL PRS measurements”. |
| Samsung | Yes |  |
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1. The CR in R2-2203275 for correction (removal) of mentioning of reference TRP is agreed.

## [R2-2203277](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2203277.zip) Correction of NR-DL-PRS-ResourcesCapability

The CR provides correction to the field description of NR-DL-PRS-ResourcesCapability.

A part of CR is shown below.

***maxNrOfDL-PRS-ResourcesPerPositioningFrequencylayer***

Indicates the maximum number of DL-PRS resources per positioning frequency layer. Value 6 is only applicable to FR1 bands.

Question 3: Do Companies Agree with the CR?

|  |  |  |
| --- | --- | --- |
| Company | Change is fine Yes/No | Comments |
| Huawei, HiSilicon | Yes |  |
| ZTE | Yes |  |
| Qualcomm | Yes (proponent) |  |
| CATT | Yes |  |
| Xiaomi | Yes |  |
| vivo | Yes |  |
| Apple | Yes |  |
| Intel | yes |  |
| Nokia | Yes | So, even if theoretically there are 2x64x64=8192 DL-PRS resources in one PFL, the UE capability per PFL is max 1024 DL-PRS resources? |
| Samsung | Yes | Sharing view with Nokia. Need discussion on whether this field should be extended or not.* maxNrOfDL-PRS-ResourceSetPerTrpPerFrequencyLayer-r16 (<=2)
* maxNrOfDL-PRS-ResourcesPerResourceSet-r16 (<=64)
* nrMaxTRPsPerFreq-r16 (=64)
* maxNrOfDL-PRS-ResourcesPerPositioningFrequencylayer-r16 (<=1024)
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1. The CR in R2-2203277 for correction of capability description of maxNrOfDL-PRS-ResourcesPerPositioningFrequencylayer is agreed .

## [R2-2203531](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_117-e/Docs/R2-2203531.zip) Correction of GAD Shape

The CR provides reference and LPP extension of to two new GAD shapes which have been added by SA2 for improving the location estimate using high accurate scalable GAD shapes for regulatory requirement. It uses a BOOLEAN value to indicate whether HA was represented using default or extended uncertainty range.

Question 4: Do Companies Agree with the CR?

|  |  |  |
| --- | --- | --- |
| Company | Change is fine Yes/No | Comments |
| Huawei, HiSilicon | No | This should be first discussed and agreed in SA2 |
| ZTE | Yes |  |
| Qualcomm | Yes | The additional GAD shapes have been added to Rel-16 23.032 and seems needed for some emergency services. |
| CATT | Yes |  |
| Xiaomi | Yes |  |
| vivo | See comments | Fine with the intention but more clarification is needed as the CR seems over-interpreted based on SA spec.1. Whether the scalable uncertainty mechanism is essential depends on the validity of the issue, i.e., the horizontal uncertainty is above 46.4 m and vertical location is of high accuracy. In our understanding, the range of High Accuracy extended uncertainty (0.00778 m to 200 m) can cover that of High Accuracy Uncertainty (0.006 m to 46.49129 m). I’m not sure whether my understanding is correct and share similar view with HW as the mechanism is not straightforward.
2. If the scalable uncertainty mechanism is needed, the corresponding field description shall be added about new indications, ha-HorizontalExtendedRangeUsed and ha-VerticalExtendedRangeUsed.
 |
| Apple |  | Agree with Huawei and vivo that more clarification from SA2 are needed |
| Intel |  | We are ok to have the change. But should not the category be B instead of F? |
| Nokia | Yes | Indeed, the additional GAD shapes with scalable uncertainties have been added to 23.032 v16.1.0 (2021-12) by SP-211279. We can consider this RAN2 CR as alignment to SA2 specification and hence CAT F is fine (in fact SA2 CR also seems to be a CAT F).  |
| Samsung | Yes |  |
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1. The CR in R2-2203531 for Correction of GAD Shape is agreed.

## R2-2203368 LPP Segmentation

The CR provides/clarifies the reason and reference as why LPP segmentation was introduced.

Question 2: Do Companies Agree with the CR?

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| --- | --- | --- |
| Company | Change is fine Yes/No | Comments |
| Huawei, HiSIlicon | No | The previous CR is not wrong that the size of the LPP PDU should not exceed the limit in the lower layer.  |
| ZTE | No | Agree with HW that the size of LPP PDU that can be delivered should be restricted by lower layer rather than NAS layer |
| Qualcomm | No | The current specification is correct. The message size is limited by "lower layers", not by NAS layer. Indeed, the reference 24.501 clause 7.2.2 just points to TS 38.323, which defines the limit of the "lower layers". |
| CATT | No | Agree with HW and QC, the maximum size of the LPP PDU is limited by the PDCP SDU size. |
| Xiaomi | No | Agree with QC. |
| vivo | No | Agree with HW and QC. |
| Apple | No |  |
| Intel | No |  |
| Nokia | No | Agree that the current specification text for LPP message segmentation is not wrong. The consequence if not approved explanation text is vague. If a more concrete description of the problem due to misunderstanding of the need for LPP segmentation can be provided, we can rethink this. |
| Samsung | No | Agree with HW and QC. Also we don’t need to limit the usage of LPP segmentation. |
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1. The CR in R2-2203368 for clarification of LPP Segmentation is not agreed.

# Conclusion

Based on the discussion in section 2 we propose the following:

Proposal 1 The CR in R2-2202224 for missing need code is agreed.

Proposal 2 The CR in R2-2203275 for correction (removal) of mentioning of reference TRP is agreed.

Proposal 3 The CR in R2-2203277 for correction of capability description of maxNrOfDL-PRS-ResourcesPerPositioningFrequencylayer is agreed .

Proposal 4 The CR in R2-2203531 for Correction of GAD Shape is agreed.

Proposal 5 The CR in R2-2203368 for clarification of LPP Segmentation is not agreed.

# References

[1] AI 6.3.3