3GPP TSG-RAN WG2 Meeting #115 Electronic DRAFT R2-2108808

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**Title: Summary of agenda item 6.3.3 - REL-16 LPP Corrections**

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

**Document for: Discussion and Decision**

# 1 Introduction

This paper provides a summary of contributions submitted under agenda item 6.3.3 for Rel-16 LPP corrections. The following contributions are addressed in this paper:

1. R2-2107121 Correction for LPP assistance information, ROHDE & SCHWARZ
2. R2-2107227 Discussion on the presence tag for Uplink LPP message, CATT
3. R2-2107228 Corrections on the conditional presence tag clarification for Uplink LPP message, CATT
4. R2-2107229 Corrections on the conditional presence tag clarification for Uplink LPP message, CATT
5. R2-2107332 Correction to PRS-only TP, Huawei, HiSilicon
6. R2-2108363 Correction to the need code in NR-SelectedDL-PRS-IndexList, Qualcomm Incorporated
7. R2-2108404 on Need codes and PRS-only TP, Ericsson
8. R2-2108405 Correction of Need code for UE signalling of NR-TimeStamp, Ericsson
9. R2-2108406 Addition of PRS only TP, Ericsson

# 2 Discussion

## 2.1 BDS positioning

CR in R2-2107121 [1] proposes a correction to the field *bdsAdot-r16* in *NavModel-BDS-KeplerianSet2-r16* IE. It is pointed out that the field *bdsAdot-r16* has an error in the value range defined for the field. The upper bound in the range is defined as 16777216 instead of 16777215. It points out that this results in an extra bit for the field and allows an undefined value of 16777216 to be signalled to the UE. Correcting the value range would be a non-backward compatible fix and hence it proposes to just clarify in the field description of *bdsAdot* that the value 16777216 is not allowed to be signalled by the LMF to the UE.

**Rapporteur’s comment**: Rapporteur feels this CR points out a valid error in the specification that needs correction and the proposed solution to just update the field description, instead of ASN.1 change, is reasonable. However, during pre-meeting email discussion, one company commented that the field *bdsAdot-r16* in ASN.1 does not correctly represent a 2s complement 25bit parameter. They also point out there are other fields viz. *bdsToe-r16* and *bdsDeltaA-r16*, with similar problem.

**Proposal 1**: RAN2 is kindly requested to discuss and decide if the field *bdsAdot-r16* in *NavModel-BDS-KeplerianSet2-r16* IE correctly represents the value range for a 2s complement 25bit parameter.

## 2.2 NR-SelectedDL-PRS-IndexList IE

CR in R2-2108363 [6] proposes changing the Need code from Need ON to Need OP for some fields that clearly have UE behaviour specified for absence of the field. The CR also identifies an incorrect IE name referenced in the description for *NR-SelectedDL-PRS-IndexList* IE.

Need code for fields *nr-SelectedDL-PRS-IndexListPerFreq*, *dl-SelectedPRS-ResourceSetIndexList*, and *dl-SelectedPRS-ResourceIndexList* in IE *NR-SelectedDL-PRS-IndexList* are changed from Need ON to Need OP. Also, the name *NR-DL-PRS-ProvideAssistanceData* in the introduction text for the IE *NR-SelectedDL-PRS-IndexList* is changed to *NR-DL-PRS-AssistanceData*.

**Rapporteur’s comment**: The UE behaviour upon absence of the field for the fields indicated in the CR are important to be preserved. Otherwise, we could have considered deleting text from field description and not make any ASN.1 change. Assuming all implementations would have followed the detailed UE behaviour explicitly spelt out in the field description it seems reasonable to consider the ASN.1 changes proposed in this CR.

**Proposal 2**: RAN2 to agree the CR in R2-2108363 containing changes to the need code for fields *nr-SelectedDL-PRS-IndexListPerFreq*, *dl-SelectedPRS-ResourceSetIndexList*, and *dl-SelectedPRS-ResourceIndexList* in IE *NR-SelectedDL-PRS-IndexList* and a correction of an incorrect IE name to *NR-DL-PRS-AssistanceData*.

## 2.3 Conditionally present fields in UL messages

There are multiple CRs [2] [3] [4] [7] [8] addressing the issue UL messages or IEs having conditionally present fields specified by means of comment text tags attached to the OPTIONAL statement in the abstract syntax while according to the guidelines described in Section 6.1 such tags are to be used in the downlink (server to target) direction only. The discussion paper in R2-2107227 [2] points out that even after the last RAN2 meeting, where this issue was discussed and CRs agreed, there are still many uplink IEs that still have this issue and impacts legacy release all the way up to Rel-9. The annex in [2] contains a complete list of IEs having this issue. However, the CR in [8] addresses the problem only in the *NR-TimeStamp* IE.

The proposed resolution to the problem by CATT and Ericsson differs. CATT proposes to update the guidelines in Section 6.1 and remove the text which says the comment text tags are used in the downlink (server to target) direction only. Otherwise, they think the LPP specification needs extensive changes for multiple releases. Ericsson proposes to just remove the tags and provide text clarifications. They however proposed changes only to the *NR-TimeStamp* IE and that too the text clarification was given in a note as opposed to being in the field description.

**Rapporteur’s comment**: Removing the restriction that the Conditional and Need tags are used in the downlink direction only seems to be a major change just to avoid making extensive ASN.1 changes to the LPP specification and is not compliant to the intended usage of these tags. On the other hand, it is not easy to answer how far we should go to make ASN.1 changes in the LPP specification for this issue. This is indeed a tricky issue that requires further discussion in RAN2.

**Proposal 3**: RAN2 is kindly requested to discuss and decide whether to relax the current guideline that the conditional and need tags are used in the downlink direction only or otherwise how to address the incorrect use of conditional tags and need codes in UL messages/IEs that are still present in the LPP specification.

## 2.4 Explicit indication of PRS-Only TPs in PRS Assistance Data

The CRs in R2-2107332 [5] and R2-2108406 [9] have in common a main proposal to add an explicit indication for PRS-Only TPs for TPs provided in the NR DL-PRS assistance data that is signalled to the UE.

R2-2107332 [5] says reasons for the proposed addition of the PRS-Only TP indication is, with the NR PCI, NCGI and NR ARFCN being optional fields, there is no clear UE behaviour specified as to when the UE can assume the absence is due to the TP in the cell being a PRS-Only TP and they think the RAN1 agreements in R1-2104065 also justifies the addition of this PRS-Only TP indication. In addition, they point out that such flag is already used in LTE.

The reason provided in R2-2108406 [9] for the addition of the PRS-Only TP indication is because the need code for the NR PCI, NCGI and NR ARFCN optional fields is Need ON and hence it is difficult to clearly bring out that the absence of these fields can also be due to the TP in the cell being a PRS-Only TP.

The two CRs also have additional clarifications like changes to NR PCI, NCGI and NR ARFCN fields to indicate that these fields are not present if PRS-Only TP flag is set to TRUE and some additional editorial changes in R2-2107332 [5] while R2-2108406 [9] proposes additional clarifications about meaning of a cell in NR and the definition of PRS-Only TP and also includes an additional TP ID field along with the PRS-Only flag.

**Proposal 4**: RAN2 is kindly requested to first discuss and decide if a PRS-Only TP indication in DL-PRS assistance data is needed. If agreeable, RAN2 should also discuss if the addition of a new TP ID along with PRS-Only TP indication is needed. Other details in the CRs in R2-2107332 and R2-2108406 can be decided later once these two points are discussed and resolved.

# 3 Conclusion

This document provided a summary of the contributions submitted under agenda item 6.3.3 for Rel-16 LPP corrections and has made the following proposals. Proposal 1 and Proposal 2 should be easy to decide while Proposal 3 and Proposal 4 will require further discussions in RAN2:

**Proposal 1**: RAN2 is kindly requested to discuss and decide if the field *bdsAdot-r16* in *NavModel-BDS-KeplerianSet2-r16* IE correctly represents the value range for a 2s complement 25bit parameter.

**Proposal 2**: RAN2 to agree the CR in R2-2108363 containing changes to the need code for fields *nr-SelectedDL-PRS-IndexListPerFreq*, *dl-SelectedPRS-ResourceSetIndexList*, and *dl-SelectedPRS-ResourceIndexList* in IE *NR-SelectedDL-PRS-IndexList* and a correction of an incorrect IE name to *NR-DL-PRS-AssistanceData*.

**Proposal 3**: RAN2 is kindly requested to discuss and decide whether to relax the current guideline that the conditional and need tags are used in the downlink direction only or otherwise how to address the incorrect use of conditional tags and need codes in UL messages/IEs that are still present in the LPP specification.

**Proposal 4**: RAN2 is kindly requested to first discuss and decide if a PRS-Only TP indication in DL-PRS assistance data is needed. If agreeable, RAN2 should also discuss if the addition of a new TP ID along with PRS-Only TP indication is needed. Other details in the CRs in R2-2107332 and R2-2108406 can be decided later once these two points are discussed and resolved.