3GPP TSG-RAN WG2 Meeting #118-e ***R2-22xxxxx***

Electronic Meeting, May 9 – 20, 2022

**Agenda item:** 6.11.1 / 6.11.2.8

**Source:** Qualcomm Incorporated

**Title:** [Post118-e][603][POS] 37.355 positioning CR

**Document for:**  Discussion

# 1. Introduction

This document summarizes the following email discussion:

* [Post118-e][603][POS] 37.355 positioning CR (Qualcomm)

Scope: Update and check the CR in R2-2206247.

Intended outcome: Agreed CR

Deadline: Short (for RP)

##### References:

[1] R2-2205828, "Summary of LPP Updates and Open Issues".

[2] R2-2205829, "LPP Updates".

[3] R2-2206326, "Rel-17 LPP RIL".

[4] R2-2206327, "Rel-17 LPP ASN1 Review File".

[5] R2-2206328, "LPP Updates and ASN.1 Review".

[6] R2-2206247, "LPP Updates".

[7] R2-2206472, "Updated RAN1 UE features list for Rel-17 NR after RAN1 #109-e Week1", RAN1.

[8] R2-2206396, "37.355 CR for the positioning capabilities", Intel Corporation.

# 2. Discussion

The following updates to R2-2206247 have been made:

9. Update of RAN1 capabilities according to [AT118-e][627][POS] and R2-2206472

Deleted *ppw-durationOfPRS-Processing-r17*, FG 27-3-3 Component-2, since in [ ] in R2-2206472

*supportedDL-PRS-ProcessingSamples-RRC-Inactive-r17* is moved under *NR-DL-PRS-ProcessingCapability-r16* (instead of *PRS-ProcessingCapabilityPerBand-r16* (per UE))

maxMeasInstances-r17 is set to 256

maxCellIDsPerArea-r17 is set to 256

maxNrOfAreas-r17 is set to 16

maxTxTEG-Sets-r17 is set to 256

Deleted the Note with the Protection Level definition (moved to Stage 2)

Added *absoluteFrequencyPointA* and *offsetToPointA* to *NR-SRS-TxTEG-Element*

FFS, TBD, Editor's Notes deleted

Please provide your comments on "**Draft-R2-2205847\_(CR 37355 LPP Updates)\_v03.docx**" located in the same folder as this discussion document in the Table below.

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| --- | --- | --- |
| Company | LPP Section / IE | Comments |
| Huawei, HiSilicon | *CommonIEsRequestLocationInformation* | ***scheduledLocatioTime***  typo=> location  [Rap: Thanks. Fixed in \_v3a.] |
|  | *LOS-NLOS-IndicatorGranularity2* | If we have *LOS-NLOS-IndicatorGranularity2, we may not need to have LOS-NLOS-IndicatorGranularity1? The overhead is not that large*  [Rap: I think it is clearer if we keep the *LOS-NLOS-IndicatorGranularity1*. It will be confusing if a location request includes the "both" code-point. I.e., would require additional field description and probably UE internal error handling.  However, the question is do we need the granularity/type in *nr-los-nlos-IndicatorRequest-r17* at all?  Given that we have added:  "NOTE: If the requested type or granularity in *nr-los-nlos-IndicatorRequest* is not possible, the target device may provide a different type and granularity for the estimated *LOS-NLOS-Indicator."*  the request could also be a simple BOOLEAN…? Then we don't need the IEs E *LOS-NLOS-IndicatorGranularity1* and *LOS-NLOS-IndicatorType1.*  ] |
|  | NR-DL-PRS-ExpectedAoD-or-AoA | NR-DL-PRS-ExpectedAoD-or-AoA-r17 ::= CHOICE {  expectedAoD-r17 SEQUENCE {  expectedDL-AzimuthAoD-r17 INTEGER (0..359),  expectedDL-AzimuthAoD-Unc-r17 INTEGER (0..60),  expectedDL-ZenithAoD-r17 INTEGER (0..180),  expectedDL-ZenithAoD-Unc-r17 INTEGER (0..30)  },  expectedAoA-r17 SEQUENCE {  expectedDL-AzimuthAoA-r17 INTEGER (0..359),  expectedDL-AzimuthAoA-Unc-r17 INTEGER (0..60),  expectedDL-ZenithAoA-r17 INTEGER (0..180),  expectedDL-ZenithAoA-Unc-r17 INTEGER (0..30)  }  }  RAN1 LS indicates that the uncertainty field can be optional as in R1-2205619  **Question 2**: Whether the uncertainty field for expected AoD (expected-DL-Azimuth-AoD-Unc and expected-DL-Zenith-AoD-Unc) and expected AoA (expected-DL-Azimuth-AoA-Unc and expected-DL-Zenith-AoA-Unc) can be optional?  **RAN1 Answer**: RAN1 assumes that the uncertainty field for the expected AoD (expected-DL-Azimuth-AoD-Unc and expected-DL-Zenith-AoD-Unc) and expected AoA (expected-DL-Azimuth-AoA-Unc and expected-DL-Zenith-AoA-Unc) can be optional under the condition that omitting the field means maximum uncertainty.  [Rap:.Is the suggestion to add OPTIONAL to the uncertainty fields? This would require up to 256 x 4 = 1024 bits just to indicate max uncertainty…Why can't the NW not simply set the uncertainty to max value if the uncertainty is not known…? I.e., this RAN1 agreement looks useless/obvious…and seems covered by existing ASN. Instead of "omitting the field means maximum uncertainty" the field can be present with max uncertainty…]  [HW] My understanding is that the signalling gain is in the case when you want to indicate max uncertainty. Then, the overhead is just one optionality bit instead of indicating the whole range of (0,..,60) |
|  | BeamPowerElement | We should mention in the field description that the nr-dl-prs-RelativePower and nr-dl-prs-RelativePowerFine that the UE shall ignore these two fields when received for the first element  [Rap: I don't think it should be ignored (strictly speaking). It is set by the NW to (normalized) value 1 (0dB) and all additional values are relative to the first one. Maybe we can clarify:  "The first *BeamPowerElement* in this list provides the peak power for this angle and is defined as 0dB power; i.e., the first value is set to '0' by the location server."]  [HW] but the definition/field description/field name here is “relative power”. “Normalizing it to 0dB” sounds reasonable but not aligned with the description. |
| Huawei, HiSilicon2 | *NR-On-Demand-DL-PRS-Configurations* | It seems that the following agreement has not been captured in the spec now. What we need to do is only to mention in the field description the range of the PRS parameters that can be explicitly requested by the UE.  Proposal2 (modified): For UE-initiated on-demand PRS request by explicit parameter, no new list is added to the signalling for the network to provide a list of parameters to the UE that the UE should only request within the scope of the list when such configuration is provided. If the network provides predefined OD-PRS configurations, the UE can only request explicit parameters within the scope of those configurations; can discuss in the LPP CR if something needs to be captured for this. |
| Huawei, HiSilicon2 | NR-DL-AoD-AdditionalMeasurementElement | R1 has agreed on the following  **Agreement**  For DL-AoD, the additional RSRPP measurement takes from -30 dB to 30 dB as the reporting range in reference to the first RSRPP measurement   * Send an LS to RAN2 and RAN4 informing of the agreement. |
| Huawei, HiSilicon2 | NR-DL-AoD-RequestLocationInformationNR-DL-TDoA-RequestLocationInformationNR-MultiRTT-RequestLocationInformation | R1 has agreed on the following  **Agreement**  The request from LMF on the Rx beam sweeping factor is a single bit per positioning method, which can take two values.   * Value 1: Equal to the UE’s reported Rx beam sweeping factor in the corresponding capability for the band UE supports the feature, and equal to 8 for the FR2 bands that UE does not support the feature. * Value 2: Equal to 8 (default assumption) for FR2 bands. * The bit value should be set to the same across DL-TDOA, DL-AoD, and Multi-RTT for hybrid positioning. |
| Huawei, HiSilicon2 | NR-DL-PRS-ProcessingCapability | R1 has agreed on the following. Note that the capability is only for Type1A and Type1B now.  **Agreement**   * For UE supporting Type-1A or Type-1B PRS processing window, UE may report (N, T) and (N2, N2) in the capability signalling   + The reported (N, T) in the capability signalling is similar to the legacy (N, T) in FG 13-1, which assumes to measure the N ms of PRS within a PPW but the processing of the measured PRS may be outside the PRS processing window.   + The reported (N2, T2) in the capability signalling assumes to measure and process the N2 ms of PRS only within the PRS processing window length (which covers the T2).   + Add the following Note to the corresponding FG in the UE feature spreadsheet     - Note: The (N2, T2) UE capabilities is interpreted such that the UE is capable of measuring up to N2 ms PRS within a PPW and is capable of completing the PRS processing within the PPW, e.g., if the time duration from the last symbol of the measured PRS resource(s) inside the PPW, to the end of PPW is not smaller than T2 ms * For UE supporting Type-2 PRS processing window, UE may report (N, T) in the capability signalling similar to the legacy (N, T) in FG 13-1   + Assuming the UE to measure the PRS within the PRS processing window and but the processing of the measured PRS may be outside a PRS processing window. * Note: when the processing time T exceeds the PPW length, other DL data channels/signals that are outside of the PPW but within the periodic T can be received by the UE. * Discuss in the UE feature session the values {N, T} for all types. |
| Huawei, HiSilicon2 |  | Need to check for the other update in the UE capability and LPP parameters  R1-2205406 LS on updates of RRC parameters for Rel-17 positioning enhancements RAN1, CATT  Final LS to RAN2 is endorsed in R1-2205406. UE features for NR positioning enhancements [109-e-R17-UE-features-ePos-01] Email discussion UE on features for NR positioning enhancements – Ralf (AT&T)   * 1st check point for LS to RAN2: May 13 * Final check point for any remaining issues: May 20   R1-2205510 Session Notes for Agenda Item 8.16.5 Ad-Hoc Chair (AT&T)  All agreements under this agenda item are captured in R1-2205510 |
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