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

Electronic Meeting, May 9 – 20, 2022

**Agenda item:** 6.11.2.8

**Source:** Qualcomm Incorporated

**Title:** [AT118-e][631][POS] Remaining PropDisc LPP RIL items (Qualcomm)

**Document for:**  Discussion

# 1. Introduction

This document summarizes the following email discussion:

* [AT118-e][631][POS] Remaining PropDisc LPP RIL items (Qualcomm)

      Scope: Check company views and discuss the RIL items marked for discussion and not covered by contributions:

* H004: Expected AoA/AoD per TRP or per resource
* N013: Uncertainty mandatory or optional for expected AoA/AoD
* H059: DL-PRS ID in the TEG timestamp
* H024, H032, H033, H046: BIT STRING for UE-based assistance data per method

      Intended outcome: Report to Monday (week 2) session

      Deadline:  Friday 2022-05-13 1800 UTC

##### References:

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

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

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

[4] R2-2203737, "LS on updated Rel-17 LTE and NR higher-layers parameter list", RAN1.

# 2. Discussion

## 2.1 Expected AoA/AoD

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| **[RIL]**: H004 **[Delegate]**: Huawei, HiSilicon (GuoYinghao) **[WI]**: **[Class]**: 2 **[Status]**: ToDo **[TDoc]**: None **[Proposed Conclusion]**: propDisc**[Description]**: We think this indication should be per resource not per TRP**[Proposed Change]**: Change the field to the resource level configuration of DL-PRS. We can send an LS to R1 for clarification, if needed**[Comments]**: [Rap] Can't see this is in the RAN1 parameter List. |

The current LPP implementation [3] is as follows:

-- ASN1START

NR-DL-PRS-AssistanceData-r16 ::= SEQUENCE {

 nr-DL-PRS-ReferenceInfo-r16 DL-PRS-ID-Info-r16,

 nr-DL-PRS-AssistanceDataList-r16 SEQUENCE (SIZE (1..nrMaxFreqLayers-r16)) OF

 NR-DL-PRS-AssistanceDataPerFreq-r16,

 nr-SSB-Config-r16 SEQUENCE (SIZE (1..nrMaxTRPs-r16)) OF

 NR-SSB-Config-r16 OPTIONAL, -- Need ON

 ...

}

NR-DL-PRS-AssistanceDataPerFreq-r16 ::= SEQUENCE {

 nr-DL-PRS-PositioningFrequencyLayer-r16

 NR-DL-PRS-PositioningFrequencyLayer-r16,

 nr-DL-PRS-AssistanceDataPerFreq-r16 SEQUENCE (SIZE (1..nrMaxTRPsPerFreq-r16)) OF

 NR-DL-PRS-AssistanceDataPerTRP-r16,

 ...

}

NR-DL-PRS-AssistanceDataPerTRP-r16 ::= SEQUENCE {

 dl-PRS-ID-r16 INTEGER (0..255),

 nr-PhysCellID-r16 NR-PhysCellID-r16 OPTIONAL, -- Need ON

 nr-CellGlobalID-r16 NCGI-r15 OPTIONAL, -- Need ON

 nr-ARFCN-r16 ARFCN-ValueNR-r15 OPTIONAL, -- Need ON

 nr-DL-PRS-SFN0-Offset-r16 NR-DL-PRS-SFN0-Offset-r16,

 nr-DL-PRS-ExpectedRSTD-r16 INTEGER (-3841..3841),

 nr-DL-PRS-ExpectedRSTD-Uncertainty-r16

 INTEGER (0..246),

 nr-DL-PRS-Info-r16 NR-DL-PRS-Info-r16,

 ...,

 [[

 prs-OnlyTP-r16 ENUMERATED { true } OPTIONAL -- Need ON

 ]],

 [[

 nr-DL-PRS-ExpectedAoD-or-AoA-r17

 NR-DL-PRS-ExpectedAoD-or-AoA-r17 OPTIONAL -- Need ON

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}

[parts omitted]

The RAN1 parameter list [4] includes the following:

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| Agreement For the purpose of both UE-B and UE-A DL-AoD, and with regards to the support of AOD measurements with an expected uncertainty window, the following is supported  • Indication of expected angle value and uncertainty (of the expected azimuth and zenith angle value) range(s) is signaled by the LMF to the UE • The type of expected angle and uncertainty can be requested by the UE, between the following options Option 1: Indication of expected DL-AoD/ZoD value and uncertainty (of the expected DL-AoD/ZoD value) range(s) is signaled by the LMF to the UE Option 2: Indication of expected DL-AoA/ZoA value and uncertainty (of the expected DL-AoA/ZoA value) range(s) is signaled by the LMF to the UE |

At RAN2#117, the following was agreed:

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| Proposal 20: RAN2 to agree that the angle assistance information (expected angel value and uncertainty) should be per TRP (12/12). |

**Question 1:** Which of the following options is preferred to resolve H004:

 (a) Angle assistance information (expected angle value and uncertainty (*NR-DL-PRS-ExpectedAoD-or- AoA-r17*)) should be per TRP (as agreed at RAN2#117) and as implemented in current LPP [3].

 (b) Agree the proposed change in H004: "Change the field to the resource level configuration of DL- PRS".

 (c) Ask RAN1 for clarification (via LS).

 (d) Other (please specify).

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| **[RIL]**: N013 **[Delegate]**: Nokia (Mani) **[WI]**: **[Class]**: 2 **[Status]**: ToDo **[TDoc]**: None **[Proposed Conclusion]**: propDisc**[Description]**: Is the uncertainty fields mandatory?**[Proposed Change]**: Clarify if it is possible to provide expected AoD and expected AoA without the uncertainty info.**[Comments]**: [Rap] Is not clear from the RAN1 parameter list, but I assume Yes (seems not very useful otherwise (similar to expected RSTD)). |

The current LPP implementation [3] is as follows:

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)

 }

}

The RAN1 parameter list [4] includes the following:

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| Agreement For the purpose of both UE-B and UE-A DL-AoD, and with regards to the support of AOD measurements with an expected uncertainty window, the following is supported  • Indication of expected angle value and uncertainty (of the expected azimuth and zenith angle value) range(s) is signaled by the LMF to the UE • The type of expected angle and uncertainty can be requested by the UE, between the following options Option 1: Indication of expected DL-AoD/ZoD value and uncertainty (of the expected DL-AoD/ZoD value) range(s) is signaled by the LMF to the UE Option 2: Indication of expected DL-AoA/ZoA value and uncertainty (of the expected DL-AoA/ZoA value) range(s) is signaled by the LMF to the UEAgreementOnly GCS is supported for reference angle for expected angle and uncertainty of DL-AoD positioningAgreementFor the configuration of the AoA/AoD uncertainty window:The granularity is set as: Option 1: the granularity of the uncertainty range and expected AOD/AOA for AoD/AoA is 1 degree The uncertainty range is Option 1: Expected Azimuth DL-AoD/DL-AoA uncertainty range is configurable within [-60 0,60] with an step size of 1 degrees. Expected Zenith DL-AoD/DL-AoA uncertainty range is configurable within [-30 0,30] with an step size of 1 degrees. Option 2: the angles are configurable interpreted as follow  Range of Expected azimuth angle of arrival as (φAOA – ΔφAOA/2, φAOA + ΔφAOA/2) φAOA – expected azimuth angle of arrival, ΔφAOA – uncertainty range for expected azimuth angle of arrival. Range of Expected zenith angle of arrival as (θAOA – ΔθAOA/2, θAOA + ΔθAOA/2) θAOA – expected zenith angle of arrival, ΔθAOA – uncertainty range for expected zenith angle of arrival. Range of Expected azimuth angle of departure as (φAOD – ΔφAOD/2, φAOD + ΔφAOD/2) φAOD – expected azimuth angle of departure, ΔφAOD – uncertainty range for expected azimuth angle of departure. Range of Expected zenith angle of departure as (θAOD- ΔθAOD/2, θAOA + ΔθAOA/2) θAOD – expected zenith angle of departure, ΔθAOD – uncertainty range for expected zenith angle of departure. |

Rapporteur's Comments:

- The RAN1 agreements above do not indicate that the uncertainty of the expected AoA/AoD should be optional present.

**Question 2:** Which of the following options is preferred to resolve N013:

 (a) Uncertainty of expected AoA/AoD is mandatory present as implemented in current LPP [3].

 (b) Uncertainty of expected AoA/AoD is changed to OPTIONAL present.

 (c) Ask RAN1 for clarification (via LS).

 (d) Other (please specify).

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| Company | Option (a), (b), (c), or (d) | Comments |
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## 2.2 TEG timestamp

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| **[RIL]**: H059 **[Delegate]**: Huawei, HiSilicon (GuoYinghao) **[Class]**: 3 **[Status]**: ToDo **[TDoc]**: Nones **[Proposed Conclusion]**: propDisc**[Description]**: Within the IE NR-TImeStamp, there is PRS-ID defined, which is mandatory present. but it is unnecessary for TEG reporting. **[Proposed Change]:** Define a new IE for time stampe with SFN, slot and symbol**[Comments]:** [Rap:] A reference for a time stamp seems always needed. This must not necessarily be the same TRP as for the measurement time stamp. |

The current LPP implementation [3] is as follows:

NR-SRS-TxTEG-Element-r17 ::= SEQUENCE {

 nr-TimeStamp-r17 NR-TimeStamp-r16 OPTIONAL, -- Need OP

 nr-UE-Tx-TEG-ID-r17 INTEGER (0..maxNumOfTxTEGs-1-r17),

 carrierFreq-r17 ARFCN-ValueNR-r15,

 srs-PosResourceList-r17 SEQUENCE (SIZE (1..maxNumOfSRS-PosResources-r17)) OF

 INTEGER (0..maxNumOfSRS-PosResources-1-r17),

 ...

}

-- ASN1START

NR-TimeStamp-r16 ::= SEQUENCE {

 dl-PRS-ID-r16 INTEGER (0..255),

 nr-PhysCellID-r16 NR-PhysCellID-r16 OPTIONAL, -- Need ON

 nr-CellGlobalID-r16 NCGI-r15 OPTIONAL, -- Need ON

 nr-ARFCN-r16 ARFCN-ValueNR-r15 OPTIONAL, -- Need ON

 nr-SFN-r16 INTEGER (0..1023),

 nr-Slot-r16 CHOICE {

 scs15-r16 INTEGER (0..9),

 scs30-r16 INTEGER (0..19),

 scs60-r16 INTEGER (0..39),

 scs120-r16 INTEGER (0..79)

 },

 ...

}

-- ASN1STOP

Rapporteur's comments:

- A time stamp based on NR time (SFN/slot) appears useless/ambiguous if no TRP ID is included. The time stamp for the TxTEG may not be the same as the measurement time stamp (e.g., a UE may be moving).

- Not clear why symbol level time stamp is needed. In current RRC, the time stamp is also not on symbol level.

**Question 3:** Do you agree with the proposed change in H059:
 "Define a new IE for time stamp with SFN, slot and symbol"
 and use this time stamp definition within the *NR-SRS-TxTEG-Element-r17* instead of *NR-TimeStamp-r16.*

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## 2.3 Request Assistance Data BIT STRING

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| **[RIL]**: H024 **[Delegate]**: Huawei, HiSilicon (GuoYinghao) **[WI]**: **[Class]**: 2 **[Status]**: ToDo **[TDoc]**: **[Proposed Conclusion]**: propDisc**[Description]**: R16 fields. not sure why they are introduced in R17**[Proposed Change]**: Remove them. if really needed, can be added with a R16 Cat F CR plus R17 shadow**[Comments]**: [Rap:] Because otherwise it is not clear anymore what the bit posCalc in nr-AdType-r16 would mean/refer to. For example, if the UE requests beamAntennaInfo only how should the posCalc bit be set?  |

The current LPP implementation [3] for the *method-RequestAssistanceData* (where method can be DL-TDOA, DL-AoD, or Multi-RTT) is using a BIT STRING with a bit for each assistance data element defined in IE *NR-PositionCalculationAssistance*:

-- ASN1START

NR-DL-TDOA-RequestAssistanceData-r16 ::= SEQUENCE {

 nr-PhysCellID-r16 NR-PhysCellID-r16 OPTIONAL,

 nr-AdType-r16 BIT STRING { dl-prs (0),

 posCalc (1) } (SIZE (1..8)),

 ...,

 [[

 nr-PosCalcAssistanceRequest-r17 BIT STRING { trpLoc (0),

 beamInfo (1),

 rtdInfo (2),

 beamAntInfo (3),

 losNlosInfo (4),

 trpTEG-Info (5)

 } (SIZE (1..8)) OPTIONAL,

[parts omitted]

| *NR-DL-TDOA-RequestAssistanceData* field descriptions |
| --- |
| ***nr-AdType***This field indicates the requested assistance data. *dl-prs* means requested assistance data is *nr-DL-PRS-AssistanceData*, *posCalc* means requested assistance data is *nr-PositionCalculationAssistance* for UE based positioning. |
| ***nr-PosCalcAssistanceRequest***This field indicates the Position Calculation Assistance Data requested. This is represented by a bit string, with a one‑value at the bit position means the particular assistance data is requested; a zero‑value means not requested.- bit 0 indicates whether the field *nr-TRP-LocationInfo* in IE *NR-PositionCalculationAssistance* is requested or not;- bit 1 indicates whether the field *nr-DL-PRS-BeamInfo* in IE *NR-PositionCalculationAssistance* is requested or not;- bit 2 indicates whether the field *nr-RTD-Info* in IE *NR-PositionCalculationAssistance* is requested or not;- bit 3 indicates whether the field *nr-TRP-BeamAntennaInfo* in IE *NR-PositionCalculationAssistance* is requested or not;- bit 4 indicates whether the field *nr-DL-PRS-Expected-LOS-NLOS-Assistance* in IE *NR-PositionCalculationAssistance* is requested or not;- bit 5 indicates whether the field *nr-DL-PRS-TRP-TEG-Info* in IE *NR-PositionCalculationAssistance* is requested or not.This field may only be present if the '*posCalc*' bit in *nr-AdType* is set to value '1'. |

#### *– NR-PositionCalculationAssistance*

The IE *NR-PositionCalculationAssistance* is used by the location server to provide assistance data to enable UE‑based downlink positioning.

-- ASN1START

NR-PositionCalculationAssistance-r16 ::= SEQUENCE {

 nr-TRP-LocationInfo-r16 NR-TRP-LocationInfo-r16 OPTIONAL, -- Need ON

 nr-DL-PRS-BeamInfo-r16 NR-DL-PRS-BeamInfo-r16 OPTIONAL, -- Need ON

 nr-RTD-Info-r16 NR-RTD-Info-r16 OPTIONAL, -- Need ON

 ...,

 [[

 nr-TRP-BeamAntennaInfo-r17 NR-TRP-BeamAntennaInfo-r17 OPTIONAL, -- Need ON

 nr-DL-PRS-Expected-LOS-NLOS-Assistance-r17

 NR-DL-PRS-ExpectedLOS-NLOS-Assistance-r17

 OPTIONAL, -- Need ON

 nr-DL-PRS-TRP-TEG-Info-r17 NR-DL-PRS-TRP-TEG-Info-r17 OPTIONAL -- Need ON

 ]]

}

-- ASN1STOP

Rapporteur's comments:

- The *nr-AdType* in Rel-16 essentially distinguishes between UE-assisted mode ('*dl-prs*') and UE-based mode ('*posCalc*'), where for UE-based, the '*dl-prs*' may or may not be set to '1' (dependent on what is available/needed at the target device).

- Therefore, if the '*posCalc*' bit in Rel-16 is set to value '1', it means the target device requests:

-  *NR-TRP-LocationInfo-r16*

- *NR-DL-PRS-BeamInfo-r16*

- *NR-RTD-Info-r16*

- For Rel-17, the following additional position calculation assistance data are introduced:

-  *NR-TRP-BeamAntennaInfo-r17*

- *NR-DL-PRS-Expected-LOS-NLOS-Assistance-r17*

- *NR-DL-PRS-TRP-TEG-Info-r17*

- Therefore, with the Rel-16 specification that "*posCalc* means requested assistance data is *nr-PositionCalculationAssistance"*, the UE requests all 6 six assistance data types if the '*posCalc*' bit is set to value '1'.

- To allow a UE to request any of the (Rel-17) assistance data individually, there seems to be two general implementation options for Rel-17:

(a) Extend the Rel-16 framework where the *nr-AdType-r16* distinguishes between *nr-DL-PRS-AssistanceData*, and *nr-PositionCalculationAssistance* (which is the current LPP implementation [3]).

The target device would set the *nr-AdType-r16* to '*posCalc*' (as in Rel-16) and includes the *nr-PosCalcAssistanceRequest* BIT STRING in addition with the individual bits set according to the need/request. A legacy server not supporting Rel-17 would provide the Rel-16 assistance data (*NR-TRP-LocationInfo-r16*, *NR-DL-PRS-BeamInfo-r16*, *NR-RTD-Info-r16)*; a Rel-17 server would take the received BIT STRING into account.

(b) Add the Rel-17 positioning calculation assistance data separately (which seems to be the suggestion in H024). This could be achieved by removing the Rel-16 assistance data from the BIT STRING; i.e.:

 nr-PosCalcAssistanceRequest-r17 BIT STRING { beamAntInfo (1),

 losNlosInfo (2),

 trpTEG-Info (3)

 } (SIZE (1..8)) OPTIONAL,

 or simply by using an ENUMERATED list:

 beamAntInfoRequest-r17 ENUMERATED { true } OPTIONAL,

 losNlosInfoRequest-r17 ENUMERTAED { true } OPTIONAL,

 trpTEG-InfoRequest-r17 ENUMERATED { true } OPTIONAL,

 For backwards compatibility, the field description must then clarify that the Rel-16 '*posCalc*' bit in *nr-AdType-r16* applies to Rel-16 assistance data only; e.g.:

| *NR-DL-TDOA-RequestAssistanceData* field descriptions |
| --- |
| ***nr-AdType***This field indicates the requested assistance data. *dl-prs* means requested assistance data is *nr-DL-PRS-AssistanceData*, *posCalc* means requested assistance data are the IEs *NR-TRP-LocationInfo,* *NR-DL-PRS-BeamInfo* and *NR-RTD-Info* for UE based positioning. |

 This would allow a UE to request the Rel-16 assistance data via the Rel-16 mechanism by setting the '*posCalc*' bit in *nr-AdType-r16* to '1' (which means *NR-TRP-LocationInfo*, *NR-DL-PRS-BeamInfo* and *NR-RTD-Info*), and any of the Rel-17 assistance data separately by setting the '*posCalc'* bit in *nr-AdType-r16* to '0'.
A Rel-16 server may then receive a request assistance data with all bits in the *nr-AdType-r16* set to '0' when only Rel-17 assistance data are requested, which may be treated as an error/exception at the server.

- Both options seem functioning and can be implemented backwards compatible. However, it is Rapporteur's understanding that the current LPP implementation [3] is more clear, flexible and future proof.

- Regarding the comment "*can be added with a R16 Cat F CR plus R17 shadow*", it is Rapporteur's understanding that this is a Rel-17 issue on how the additional position calculation assistance data are introduced by re-using (or not re-using) the *nr-AdType-r16* BIT STRING for the Rel-17 assistance data as described above. Whether this is desired for Rel-16 as well should be a separate discussion.

**Question 4:** Do you agree with the proposed change in H024:
 "Remove the Rel-16 assistance data elements from the *nr-PosCalcAssistanceRequest-r17* BIT STRING".
 NOTE: This may require clarification on the definition/applicability of the '*posCalc*' bit in *nr-AdType- r16* as well.

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## 2.4 Assistance Data Support Indication

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| **[RIL]**: H032 **[Delegate]**: Huawei, HiSilicon (GuoYinghao) **[WI]**: **[Class]**: 3 **[Status]**: ToDo **[TDoc]**: **[Proposed Conclusion]**: propDisc**[Description]**: Beam antenna information request is not needed for DL-TDOA**[Proposed Change]**: Remove beam antenna information capabiltiy reporting for DL-TDOA**[Comments]**: [Rap:] Request and Capabilities are proposed to be unified (and being future proof). What is needed/supported/desired or not should depend on implementation. |

The current LPP implementation [3] for the *method-ProvideCapabilities* (where method can be DL-TDOA, DL-AoD, or Multi-RTT) is using a BIT STRING indicating the UE supported position calculation assistance data analogous to the assistance data request discussed in section 2.3 above:

NR-DL-TDOA-ProvideCapabilities-r16 ::= SEQUENCE {

 nr-DL-TDOA-Mode-r16 PositioningModes,

 nr-DL-TDOA-PRS-Capability-r16 NR-DL-PRS-ResourcesCapability-r16,

 nr-DL-TDOA-MeasurementCapability-r16 NR-DL-TDOA-MeasurementCapability-r16,

 nr-DL-PRS-QCL-ProcessingCapability-r16 NR-DL-PRS-QCL-ProcessingCapability-r16,

 nr-DL-PRS-ProcessingCapability-r16 NR-DL-PRS-ProcessingCapability-r16,

 additionalPathsReport-r16 ENUMERATED { supported } OPTIONAL,

 periodicalReporting-r16 PositioningModes OPTIONAL,

 ...,

 [[

 ten-ms-unit-ResponseTime-r17 PositioningModes OPTIONAL,

 nr-PosCalcAssistanceSupport-r17 BIT STRING { trpLocSup (0),

 beamInfoSup (1),

 rtdInfoSup (2),

 beamAntInfoSup (3),

 losNlosInfoSup (4),

 trpTEG-InfoSup (5)

 } (SIZE (1..8)) OPTIONAL,

[parts omitted]

Rapporteur's comments:

- This issue is similar to H024 discussed in section 2.3 above. The assistance data support BIT STRING resembles the assistance data request BIT STRING.

- If the Rel-16 assistance data will be removed from the request BIT STRING discussed in section 2.3 above, they must also be removed from the support BIT STRING.

- The reason for the proposal provided in H032 is:

 "Beam antenna information request is not needed for DL-TDOA"

Although, it may depend on implementation, it seems likely the case that "Beam antenna information request is not needed for DL-TDOA". However, the same argumentation may already apply to Rel-16:

"*NR-RTD-Info-r16* request is not needed for DL-AoD".

 I.e., for all NR positioning methods the same assistance data request mechanism is used as discussed in section 2.3 above (*nr-AdType-r16* BIT STRING). Also for DL-AoD, "*posCalc* means requested assistance data is *nr-PositionCalculationAssistance* for UE based positioning".

- It is Rapporteur's understanding that the Rel-16 implementation has been chosen to support hybrid positioning e.g., DL-TDOA and DL-AoD more efficiently (i.e., with a single request instead of two). Otherwise, if assistance data for hybrid DL-TDOA and DL-AoD are needed, the UE would have to send *NR-DL-TDOA-RequestAssistanceData-r16* and *NR-DL-AoD-RequestAssistanceData-r16*, both with '*posCalc*' bit in *nr-AdType-r16* set to value '1', which is (a) suboptimal and (b) ambiguous (duplicated request) at the server.

- Further, it should generally be up to implementation on which assistance data are needed in a given situation (i.e., similar to A-GNSS).

- Although, the issue is about capabilities, the description mentions the assistance data request as reason. In any case, the specification needs to be consistent at the end with respect to Request/Provide and capability messages.

**Question 5:** Do you agree with the proposed change in H032:
 "Remove beam antenna information capability reporting for DL-TDOA".

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| **[RIL]**: H033 **[Delegate]**: Huawei, HiSilicon (GuoYinghao) **[WI]**: **[Class]**: 3 **[Status]**: ToDo **[TDoc]**: **[Proposed Conclusion]**: propDisc**[Description]**: If this is present, the losNlosInfoSup in nr-PosCalcAsssitanceSupport is duplicated. **[Proposed Change]**: remove the field nr-posCalcAsssitanceSupport. **[Comments]**: [Rap:] See H032. Mechanism is similar to GNSS: General support bit, and support granularity, if needed/sensible. |

The current LPP implementation [3] for the LOS/NLOS assistance data granularity is as follows (e.g., for DL-TDOA):

-- ASN1START

NR-DL-TDOA-ProvideCapabilities-r16 ::= SEQUENCE {

 [parts omitted]

 ten-ms-unit-ResponseTime-r17 PositioningModes OPTIONAL,

 nr-PosCalcAssistanceSupport-r17 BIT STRING { trpLocSup (0),

 beamInfoSup (1),

 rtdInfoSup (2),

 beamAntInfoSup (3),

 losNlosInfoSup (4),

 trpTEG-InfoSup (5)

 } (SIZE (1..8)) OPTIONAL,

 nr-los-nlos-AssistanceDataSupport-r17 SEQUENCE {

 type-r17 LOS-NLOS-IndicatorType2,

 granularity-r17 LOS-NLOS-IndicatorGranularity2,

 ...

 } OPTIONAL, -- Cond losNlosInfoSup

 [parts omitted]

| Conditional presence | Explanation |
| --- | --- |
| *losNlosInfoSup* | The field is mandatory present if the *losNlosInfoSup* bit-4 in *nr-PosCalcAssistanceSupport* is set to value '1'; otherwise it is not present. |

Rapporteur's comments:

- As discussed under H032 above, the assistance data support BIT STRING resembles the assistance data request BIT STRING. In the case of finer granularity for support indication is needed (e.g., for *nr-los-nlos-AssistanceDataSupport*) additional fields are proposed, which are conditional present (this is essentially the same mechanism as used for A-GNSS). Note, if this should also be needed for assistance data requests in the future, the same mechanism/implementation would apply.

- Resolution of this issue depends also on the resolution of H024/32. I.e., depends on whether we have a common indication across all NR methods (as currently implemented) or not.

**Question 6:** Do you agree with the proposed change in H033:
 "remove the *losNlosInfoSup* field in *nr-posCalcAsssitanceSupport*".

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| Company | Yes/No | Comments |
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| **[RIL]**: H046 **[Delegate]**: Huawei, HiSilicon (GuoYinghao) **[WI]**: **[Class]**: 3 **[Status]**: ToDo **[TDoc]**: **[Proposed Conclusion]**: propDisc**[Description]**: This bit not needed for DL-AoD**[Proposed Change]**: remove trpTEG-InfoSup from the capability reporting of DL-AOD**[Comments]**: [Rap:] Discuss whether we should have this (and capabilities) common, or whether method specific restrictions should apply. |

The current LPP implementation [3] for the assistance data support indication is as follows:

NR-DL-AoD-ProvideCapabilities-r16 ::= SEQUENCE {

 [parts omitted]

 nr-PosCalcAssistanceSupport-r17 BIT STRING { trpLocSup (0),

 beamInfoSup (1),

 rtdInfoSup (2),

 beamAntInfoSup (3),

 losNlosInfoSup (4),

 trpTEG-InfoSup (5)

 } (SIZE (1..8)) OPTIONAL,

 [parts omitted]

Rapporteur's comments:

- This is essentially the same issue as H033 discussed above.

- The same argument may apply to *rtdInfoSup* and *losNlosInfoSup* as well.

- As mentioned above, the current implementation has a common assistance data request BIT STRING and a common assistance data support BIT STRING. If this is not desired, care needs to be taken on what is "allowed" to indicate for each method, also because in practice a position calculation is often using multiple methods (aka "hybrid positioning" as discussed under H032).

- If individual/"non-applicable" assistance data support indicator should be removed, then the corresponding assistance data request indicator should be removed as well to have a consistent specification. I.e., implementation of the proposed change has impacts on other parts of the specification as well.

**Question 7:** Do you agree with the proposed change in H046:
 "Remove *trpTEG-InfoSup* from the capability reporting of DL-AOD".

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# 3. Summary

TBD