**3GPP TSG-RAN WG3 Meeting #114-e R3-21xxxx**

**E-meeting, 01-11 Nov 2021**

**Title:** (TP for POS BL CR for TS 38.473) on UL AoA

**Source:** Huawei

**Agenda item:** 19.2.1

**Document Type:** Other

1. Introduction

The TP is the TS 38.473 related to open issues for UL AoA

TP for BL CR for TS 38.473

<<<<<<<<<<<<<<<<<<<< Changes Begin >>>>>>>>>>>>>>>>>>>>

8.13.7 Positioning Measurement Update

8.13.7.1 General

The purpose of the Positioning Measurement Update procedure is to modify one or more periodic positioning measurements performed by the gNB-DU. The procedure uses non-UE-associated signalling.

8.13.7.2 Successful Operation

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**Figure 8.13.7.2-1: Positioning Measurement Update procedure: successful operation**

The gNB-CU initiates the procedure by generating a POSITIONING MEASUREMENT UPDATE message. If the *SRS Configuration* IE is included in the POSITIONING MEASUREMENT UPDATE the message, the gNB-DU shall overwrite the previously stored SRS configuration for the corresponding measurements.

If the *AoA Search Window Information* IE is included in the *TRP Measurement Update List* IE in the POSITIONING MEASUREMENT UPDATE message, the NG-RAN node shall clear any previously stored AoA search window information and store the newly received information.

8.13.7.3 Unsuccessful Operation

Not applicable.

8.13.7.4 Abnormal Conditions

If the gNB-DU cannot identify the given positioning measurements, it shall regard the procedure as failed and initiate local error handling.

If the NG-RAN node receives a *TRP Measurement Update Item* IE in the POSITIONING MEASUREMENT UPDATE message containing a TRP ID that was not included in the previously configured measurement, it shall consider the procedure as failed and initiate local error handling [FFS].

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9.2.12.3 POSITIONING MEASUREMENT REQUEST

This message is sent by the gNB-CU to request the gNB-DU to configure a positioning measurement.

Direction: gNB-CU → gNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.3.1.1 |  | YES | reject |
| Transaction ID | M |  | 9.3.1.23 |  | YES | reject |
| LMF Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| RAN Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| **TRP Measurement Request List** |  | 1 |  |  | YES | reject |
| >TRP Measurement Request Item |  | 1..<maxnoofMeasTRPs> |  |  |  |  |
| >>TRP ID | M |  | 9.3.1.197 |  |  |  |
| >>Search Window Information | O |  | 9.3.1.204 |  |  |  |
| >>NR CGI | O |  | 9.3.1.12 | The Cell ID of the TRP identified by the *TRP ID* IE. | YES | ignore |
| >>AoA Search Window Information | O |  | UL-AoA Assistance Information 9.3.1.Y1 |  | YES | ignore |
| Positioning Report Characteristics | M |  | ENUMERATED (OnDemand, Periodic, …) |  | YES | reject |
| Positioning Measurement Periodicity | C-ifReportCharacteristicsPeriodic |  | ENUMERATED (120ms, 240ms, 480ms, 640ms, 1024ms, 2048ms, 5120ms, 10240ms, 1min, 6min, 12min, 30min, …, 20480ms, 40960ms) |  | YES | reject |
| **Positioning Measurement Quantities** |  | *1* |  |  | YES | reject |
| **> Positioning Measurement Quantities Item** |  | *1..<maxnoofPosMeas>* |  |  | EACH |  |
| >> Positioning Measurement Type | M |  | ENUMERATED (gNB RX-TX, UL-SRS-RSRP, UL AoA, UL RTOA, …)  |  |  | - |
| >>Timing Reporting Granularity Factor | O |  | INTEGER (0..5) | TS 38.133 [38] |  |  |
| SFN Initialisation Time | O |  | Relative Time 19009.3.1.183 | If this IE is not present, the TRP may assume that the value is same as its own SFN initialisation time. | YES | ignore |
| SRS Configuration | O |  | 9.3.1.192 |  | YES | ignore |
| Measurement Beam Information Request | O |  | ENUMERATED (true, ...) |  | YES | ignore |
| System Frame Number | O  |  | INTEGER(0..1023) |  | YES | ignore |
| Slot Number | O |  | INTEGER(0..79) |  | YES | ignore |
| Response Time | O |  | 9.3.1.x |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofPosMeas | Maximum no. of measured quantities that can be configured and reported with one message. Value is 16384. |
| maxnoofMeasTRPs | Maximum no. of TRPs that can be included within one measurement message. Value is 64. |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifReportCharacteristicsPeriodic | This IE shall be present if the *Positioning Report Characteristics* IE is set to the value "Periodic". |

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9.2.12.9 POSITIONING MEASUREMENT UPDATE

This message is sent by the gNB-CU to update a previously configured measurement.

Direction: gNB-CU → gNB-DU.

| 1. **IE/Group Name**
 | 1. **Presence**
 | 1. **Range**
 | 1. **IE type and reference**
 | 1. **Semantics description**
 | 1. **Criticality**
 | 1. **Assigned Criticality**
 |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.3.1.1 |  | 1. YES
 | 1. ignore
 |
| Transaction ID | M |  | 9.3.1.23 |  | 1. YES
 | 1. reject
 |
| LMF Measurement ID | M |  | INTEGER (1..65536,…) |  | 1. YES
 | 1. reject
 |
| RAN Measurement ID | M |  | INTEGER (1..65536,…) |  | 1. YES
 | 1. reject
 |
| SRS Configuration | O |  | 9.3.1.192 |  | 1. YES
 | 1. ignore
 |
| **TRP Measurement Update List** |  | *0..1* |  |  | 1. YES
 | 1. reject
 |
| **>TRP Measurement Update Item**  |  | 1..<*maxnoofMeasTRPs*> |  |  | 1. EACH
 | 1. reject
 |
| >>TRP ID | M |  | 9.3.1.197 |  | 1. -
 |  |
| >> AoA Search Window Information | O |  | UL-AoA Assistance Information 9.3.1.Y1 |  | 1. YES
 | 1. ignore
 |

|  |  |
| --- | --- |
| maxnoofMeasTRPs | Maxmum no. of TRPs that can be included within one message. Value is 64.  |

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9.3.1.Y1 UL-AoA assistance information

This information element contains the expected uplink Angle of Arrival and uncertainty range.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE Type and Reference** | **Semantics Description** |
| CHOICE *AngleMeasurement* | M |  |  |  |
| >*Expected UL Angle of Arrival* |  |  |  |  |
| >>Expected Azimuth AoA |  | *1* |  | Defined as(φAOA - ΔφAOA/2, φAOA + ΔφAOA/2) |
| >>Expected Azimuth AoA Value | M |  | INTEGER(0..3599) | φAOA component of Expected Azimuth AoA |
| >>Expected Azimuth AoA Uncertainty Range | M |  | INTEGER(0..3599) | ΔφAOA component of Expected Azimuth AoA |
| >>Expected Zenith AoA |  | *0..1* |  | Defined as(θZOA – ΔθZOA/2, θZOA + ΔθZOA/2) |
| >>Expected Zenith AoA Value | M |  | INTEGER(0..1799) | θZOA component of Expected Zenith AoA |
| >>Expected Zenith AoA Uncertainty Range | M |  | INTEGER(0..1799) | ΔθZOA component of Expected Zenith AoA |
| >*Expected UL Angle of Arrival Zenith Only* |  |  |  | Defined as(θZOA – ΔθZOA/2, θZOA + ΔθZOA/2) |
| >>Expected Zenith AoA Value | M |  | INTEGER(0..1799) | θZOA component of Expected Zenith AoA |
| >>Expected Zenith AoA Uncertainty Range | M |  | INTEGER(0..1799) | ΔθZOA component of Expected Zenith AoA |
| **LCS to GCS Translation** |  | *0..1* |  | If absent, the azimuth and zenith are provided in GCS. |
| >Alpha | M |  | INTEGER (0..3599) |  |
| >Beta | M |  | INTEGER (0..3599) |  |
| >Gamma | M |  | INTEGER (0..3599) |  |

9.3.1.Y2 Zenith Angle of Arrival

This information element contains the Zenith Angle of Arrival, which can correspond to linear array measurement.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE Type and Reference** | **Semantics Description** |
| Zenith Angle of Arrival | M |  | INTEGER(0..1799) | TS 38.133 [16] |
| **LCS to GCS Translation** | O |  | 9.3.1.x6 | If absent, the zenith is provided in GCS.The z-axis of LCS is defined along the linear array axis  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

9.3.1.x6 LCS to GCS Translation

This information element contains the LCS to GCS Translation information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE Type and Reference** | **Semantics Description** |
| Alpha | M |  | INTEGER (0..3599) |  |
| Beta | M |  | INTEGER (0..3599) |  |
| Gamma | M |  | INTEGER (0..3599) |  |

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Expected-Azimuth-AoA ::= SEQUENCE {

 expected-Azimuth-AoA-value Expected-Value-AoA,

 expected-Azimuth-AoA-uncertainty Uncertainty-range-AoA,

 ...

}

Expected-Zenith-AoA ::= SEQUENCE {

 expected-Zenith-AoA-value Expected-Value-ZoA,

 expected-Zenith-AoA-uncertainty Uncertainty-range-ZoA,

 ...

}

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PosMeasurementType ::= ENUMERATED {

 gnb-rx-tx,

 ul-srs-rsrp,

 ul-aoa,

 ul-rtoa,

 ...

}

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