3GPP TSG-RAN WG2 #109-e R2-2001256

Electronic meeting, 24 February – 6 March 2020 Revision of R2-1916412

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **37.355** | **CR** | **0252** | **rev** | **1** | **Current version:** | **15.0.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Introducing support for GNSS Integer Ambiguity Level Indications | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16 | | | | |  | ***Date:*** | | | 2020-02-13 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | If the location server implements support to align the GNSS RTK integer ambiguity level, then significant benefits can be realized in the UE positioning during the transition phase when switching reference stations. | | | | | | | | |
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| ***Summary of change:*** | | An optional indication *equalIntegerAmbiguityLevel* is added in the IE *GNSS-RTK-ReferenceStationInfo*, that can be provided to the target device to inform that integer ambiguity levels are aliogned  The CR was endorsed at RAN2#108 as  R2-1916412 GNSS Integer Ambiguity Level Indications Ericsson draftCR Rel-16 36.355 15.5.0 B TEI16 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The target device cannot get the information that intereger ambiguiry levels of two reference station are aligned, and can therefore not take the benefit from understanding that they aligned when transiting between them. | | | | | | | | |
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| ***Clauses affected:*** | | 6.5.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |

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| ***This CR's revision history:*** |  |

Beginning of change

#### 6.5.2.2 GNSS Assistance Data Elements

*[…]*

#### – *GNSS-RTK-ReferenceStationInfo*

The IE *GNSS-RTK-ReferenceStationInfo* is used by the location server to provide the Earth-centered, Earth-fixed (ECEF) coordinates of the antenna reference point (ARP) of the stationary reference station for which the *GNSS‑RTK‑Observations* assistance data are provided together with reference station antenna description.

The parameters provided in IE *GNSS-RTK-ReferenceStationInfo* are used as specified for message type 1006, 1033 and 1032 in [30].

-- ASN1START

GNSS-RTK-ReferenceStationInfo-r15 ::= SEQUENCE {

referenceStationID-r15 GNSS-ReferenceStationID-r15,

referenceStationIndicator-r15 ENUMERATED {physical, non-physical},

antenna-reference-point-ECEF-X-r15 INTEGER (-137438953472..137438953471),

antenna-reference-point-ECEF-Y-r15 INTEGER (-137438953472..137438953471),

antenna-reference-point-ECEF-Z-r15 INTEGER (-137438953472..137438953471),

antennaHeight-r15 INTEGER (0..65535) OPTIONAL, -- Need ON

antennaDescription-r15 AntennaDescription-r15 OPTIONAL, -- Need ON

antenna-reference-point-unc-r15 AntennaReferencePointUnc-r15 OPTIONAL, -- Need ON

physical-reference-station-info-r15 PhysicalReferenceStationInfo-r15 OPTIONAL, -- Cond NP

...,

[[

equalIntegerAmbiguityLevel-r16 EqualIntegerAmbiguityLevel-r16 OPTIONAL –- Need ON

]]

}

AntennaDescription-r15 ::= SEQUENCE {

antennaDescriptor-r15 VisibleString (SIZE (1..256)),

antennaSetUpID-r15 ENUMERATED { non-zero } OPTIONAL, -- Need OP

...

}

AntennaReferencePointUnc-r15 ::= SEQUENCE {

uncertainty-X-r15 INTEGER (0..255),

confidence-X-r15 INTEGER (0..100),

uncertainty-Y-r15 INTEGER (0..255),

confidence-Y-r15 INTEGER (0..100),

uncertainty-Z-r15 INTEGER (0..255),

confidence-Z-r15 INTEGER (0..100),

...

}

PhysicalReferenceStationInfo-r15 ::= SEQUENCE {

physicalReferenceStationID-r15 GNSS-ReferenceStationID-r15,

physical-ARP-ECEF-X-r15 INTEGER (-137438953472..137438953471),

physical-ARP-ECEF-Y-r15 INTEGER (-137438953472..137438953471),

physical-ARP-ECEF-Z-r15 INTEGER (-137438953472..137438953471),

physical-ARP-unc-r15 AntennaReferencePointUnc-r15 OPTIONAL, -- Need ON

...

}

EqualIntegerAmbiguityLevel-r16 ::= CHOICE {

allReferenceStations-r16 NULL,

referenceStationList-r16 ReferenceStationList-r16

}

ReferenceStationList-r16 ::= SEQUENCE (SIZE(1..16)) OF GNSS-ReferenceStationID-r15

-- ASN1STOP

| **Conditional presence** | **Explanation** |
| --- | --- |
| *NP* | The field is optionally present, need ON, if the *referenceStationIndicator* has the value ′*non-physical*′; otherwise it is not present. |

| ***GNSS-RTK-ReferenceStationInfo* field descriptions** |
| --- |
| ***referenceStationID***  The Reference Station ID is determined by the RTK service provider. |
| ***referenceStationIndicator***  This fields specifies type of reference station. Enumerated value *physical* indicates a real, physical reference station; value *non-physical* indicates a non-physical or computed reference station. |
| ***antenna-reference-point-ECEF-X***  This field specifies the antenna reference point X-coordinate in the World Geodetic System 1984 (WGS 84) datum.  Scale factor 0.0001 m; range ±13,743,895.3471 m. |
| ***antenna-reference-point-ECEF-Y***  This field specifies the antenna reference point Y-coordinate in the World Geodetic System 1984 (WGS 84) datum.  Scale factor 0.0001 m; range ±13,743,895.3471 m. |
| ***antenna-reference-point-ECEF-Z***  This field specifies the antenna reference point Z-coordinate in the World Geodetic System 1984 (WGS 84) datum.  Scale factor 0.0001 m; range ±13,743,895.3471 m. |
| ***antennaHeight***  This field specifies the height of the Antenna Reference Point above the marker used in the survey campaign.  Scale factor 0.0001 m; range 0–6.5535 m. |
| ***antennaDescriptor***  This field provides an ASCII descriptor of the reference station antenna using IGS naming convention [31]. The descriptor can be used to look up model specific phase center corrections of that antenna. |
| ***antennaSetUpID***  This field, if present, indicates that the standard IGS Model is not valid (≠ 0 [30]). If this field is absent the standard IGS Model is valid (′0 = Use standard IGS Model′ [30]). |
| ***antenna-reference-point-unc***  This field specifies the uncertainty of the ARP coordinates. *uncertainty-X*, *uncertainty-Y*, and *uncertainty-Z* correspond to the encoded high accuracy uncertainty of the X, Y, and Z-coordinate, respectively, as defined in TS 23.032 [15]. *confidence-X*, *confidence-Y*, and *confidence-Z* corresponds to confidence as defined in TS 23.032 [15]. |
| ***physical-reference-station-info***  This field provides the earth-centered, earth-fixed (ECEF) coordinates of the antenna reference point (ARP) for the real (or "physical") reference station used. This field may be used in case of the non-physical reference station approach to allow the target device to refer baseline vectors to a physical reference rather than to a non-physical reference without any connection to a physical point. |
| ***physicalReferenceStationID***  This field specifies the station ID of a real reference station, when the *referenceStationIndicator* has the value ′*non-physical*′. |
| ***physical-ARP-ECEF-X***  This field specifies the antenna reference point X-coordinate in the World Geodetic System 1984 (WGS 84) datum.  Scale factor 0.0001 m; range ±13,743,895.3471 m. |
| ***physical-ARP-ECEF-Y***  This field specifies the antenna reference point Y-coordinate in the World Geodetic System 1984 (WGS 84) datum.  Scale factor 0.0001 m; range ±13,743,895.3471 m. |
| ***physical-ARP-ECEF-Z***  This field specifies the antenna reference point Z-coordinate in the World Geodetic System 1984 (WGS 84) datum.  Scale factor 0.0001 m; range ±13,743,895.3471 m. |
| ***physical-ARP-unc***  This field specifies the uncertainty of the ARP coordinates. |
| ***equalIntegerAmbiguityLevel***  This field specifies the integer ambiguity level of this reference station in relation to other reference stations. Either, the target device is indicated whether the integer ambiguity level may be assumed to be aligned between all reference stations or not (interpreted as no alignment is facilitated from the location server), or the target device is provided with a list of reference stations for which the integer ambiguity level may be assumed to be the same. |

End of change