**3GPP TSG-RAN WG2 Meeting #109 electronic *R2-2000426***

**Online, 24 Feb – 6 Mar 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **37.355** | **CR** | **0249** | **rev** | **-** | **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:*** | Addition of broadcast TBS assistance data | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | NextNav, AT&T, FirstNet, Polaris Wireless | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16, LCS\_LTE\_acc\_enh-Core | | | | |  | ***Date:*** | | | 2020-02-13 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **C** |  | | | | | ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Broadcast of network assistance data for various wide area positioning methods have been supported for some time to reduce network load, latency and energy consumption. This will add support for the broadcast of TBS (Terrestrial Beacon System) assistance data leveraging the existing framework. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Support for broadcast of TBS assistance data is added with the addition of a new positioning SIB type enumeration value.  Based on the online and offline discussion [RAN2#107bis Offline-404], added an additional change to 7.4.2, which is necessary to support assistance data for more than one beacon. Supporting text also added in section 7.2 and clarification that it is TBS (based on MBS signals).  Also, since the CR in R2-1914076 was endorsed as a baseline CR, RAN#86 has approved the LPP specification (TS 36.355) is upgraded to 37.355, which is the new specification under change control. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No support for broadcast of Terrestrial Beacon System (TBS) assistance data, which is inconsistent with other wide area positioning methods. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.2, 7.4.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 36.331 CR 4134, TS 36.455 CR0105 | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Unchanged Text omitted>

<Start of first changed section>

## 7.2 Mapping of *posSibType* to assistance data element

The supported *posSibType*'s are specified in Table 7.2-1. The GNSS Common and Generic Assistance Data IEs are defined in sub-clause 6.5.2.2. The OTDOA Assistance Data IEs are defined in sub-clause 7.4.2. The TBS (based on MBS signals) Assistance Data IEs are defined in sub-clause 7.4.2.

Table 7.2-1: Mapping of posSibType to assistanceDataElement

|  |  |  |
| --- | --- | --- |
|  | *posSibType* [12] | *assistanceDataElement* |
| GNSS Common Assistance Data (clause 6.5.2.2) | *posSibType1-1* | *GNSS-ReferenceTime* |
| *posSibType1-2* | *GNSS-ReferenceLocation* |
| *posSibType1-3* | *GNSS-IonosphericModel* |
| *posSibType1-4* | *GNSS-EarthOrientationParameters* |
| *posSibType1-5* | *GNSS-RTK-ReferenceStationInfo* |
| *posSibType1-6* | *GNSS-RTK-CommonObservationInfo* |
| *posSibType1-7* | *GNSS-RTK-AuxiliaryStationData* |
| GNSS Generic Assistance Data (clause 6.5.2.2) | *posSibType2-1* | *GNSS-TimeModelList* |
| *posSibType2-2* | *GNSS-DifferentialCorrections* |
| *posSibType2-3* | *GNSS-NavigationModel* |
| *posSibType2-4* | *GNSS-RealTimeIntegrity* |
| *posSibType2-5* | *GNSS-DataBitAssistance* |
| *posSibType2-6* | *GNSS-AcquisitionAssistance* |
| *posSibType2-7* | *GNSS-Almanac* |
| *posSibType2-8* | *GNSS-UTC-Model* |
| *posSibType2-9* | *GNSS-AuxiliaryInformation* |
| *posSibType2-10* | *BDS-DifferentialCorrections* |
| *posSibType2-11* | *BDS-GridModelParameter* |
| *posSibType2-12* | *GNSS-RTK-Observations* |
| *posSibType2-13* | *GLO-RTK-BiasInformation* |
| *posSibType2-14* | *GNSS-RTK-MAC-CorrectionDifferences* |
| *posSibType2-15* | *GNSS-RTK-Residuals* |
| *posSibType2-16* | *GNSS-RTK-FKP-Gradients* |
| *posSibType2-17* | *GNSS-SSR-OrbitCorrections* |
| *posSibType2-18* | *GNSS-SSR-ClockCorrections* |
| *posSibType2-19* | *GNSS-SSR-CodeBias* |
| OTDOA Assistance Data (clause 7.4.2) | *posSibType3-1* | *OTDOA-UE-Assisted* |
| TBS Assistance Data  (clause 7.4.2) | *posSibTypeX-Y* | *TBS-AssistanceDataList* |

<End of changed section>

<Start of next changed section>

## 7.4 Broadcast information elements

### 7.4.1 Basic production

This clause defines the broadcast information elements which are encoded as 'basic production' for other purposes than encoding the IE within an LPP message.

The 'basic production' is obtained from their ASN.1 definitions by use of Basic Packed Encoding Rules (BASIC-PER), Unaligned Variant, as specified in ITU-T Rec. X.691 [22]. It always contains a multiple of 8 bits.

### 7.4.2 Element definitions

#### – *AssistanceDataSIBelement*

The IE *AssistanceDataSIBelement* is used in the IE *SystemInformationBlockPos* as specified in TS 36.331 [12].

-- ASN1START

AssistanceDataSIBelement-r15 ::= SEQUENCE {

valueTag-r15 INTEGER (0..63) OPTIONAL,

expirationTime-r15 UTCTime OPTIONAL,

cipheringKeyData-r15 CipheringKeyData-r15 OPTIONAL,

segmentationInfo-r15 SegmentationInfo-r15 OPTIONAL,

assistanceDataElement-r15 OCTET STRING,

...

}

CipheringKeyData-r15 ::= SEQUENCE {

cipherSetID-r15 INTEGER (0..65535),

d0-r15 BIT STRING (SIZE (1..128)),

...

}

SegmentationInfo-r15 ::= SEQUENCE {

segmentationOption-r15 ENUMERATED {pseudo-seg, octet-string-seg},

assistanceDataSegmentType-r15 ENUMERATED {notLastSegment, lastSegment},

assistanceDataSegmentNumber-r15 INTEGER (0..63),

...

}

-- ASN1STOP

| *AssistanceDataSIBelement* field descriptions |
| --- |
| ***valueTag***  This field is used to indicate to the target device any changes in the broadcast assistance data content. The *valueTag* is incremented by one, by the location server, every time a modified assistance data content is provided. This field is not included if the broadcast assistance data changes too frequently. If *valueTag* and *expirationTime* are absent, the UE assumes that the broadcast assistance data content changes at every broadcast interval. |
| ***expirationTime***  This field indicates how long the broadcast assistance data content is valid. It is specified as UTC time and indicates when the broadcast assistance data content will expire. |
| ***cipheringKeyData***  If present, indicates that the *assistanceDataElement* octet string is ciphered. |
| ***segmentationInfo***  If present, indicates that the *assistanceDataElement* is one of many segments. |
| ***assistanceDataElement***  The *assistanceDataElement* OCTET STRING depends on the *posSibType* and is specified in Table 7.2-1. NOTE. |
| ***cipherSetID***  This field identifies a cipher set comprising a cipher key value and the first component C0 of the initial counter C1. |
| ***d0***  This field provides the second component for the initial ciphering counter C1. This field is defined as a bit string with a length of 1 to 128 bits. A target device first pads out the bit string if less than 128 bits with zeroes in least significant bit positions to achieve 128 bits. C1 is then obtained from D0 and C0 (defined by the *cipherSetID*) as:  C1 = (D0 + C0) mod 2128 (with all values treated as non-negative integers). |
| ***segmentationOption***  Indicates the used segmentation option. |
| ***assistanceDataSegmentType***  Indicates whether the included *assistanceDataElement* segment is the last segment or not. |
| ***assistanceDataSegmentNumber***  Segment number of the *assistanceDataElement* segment. A segment number of zero corresponds to the first segment, one corresponds to the second segment, and so on. Segments numbers wraparound should there be more than 64 segments |

NOTE: For example, if the *posSibType* in IE *PosSIB-Type* defined in TS 36.331 [12] indicates '*posSibType1-7*', the *assistanceDataElement* OCTET STRING includes the LPP IE *GNSS‑RTK‑AuxiliaryStationData*.

#### – *OTDOA-UE-Assisted*

The IE *OTDOA-UE-Assisted* is used in the *assistanceDataElement* if the *posSibType* in IE *PosSIB-Type* defined in TS 36.331 [12] indicates '*posSibType3-1*'.

-- ASN1START

OTDOA-UE-Assisted-r15 ::= SEQUENCE {

otdoa-ReferenceCellInfo-r15 OTDOA-ReferenceCellInfo,

otdoa-NeighbourCellInfo-r15 OTDOA-NeighbourCellInfoList,

...

}

-- ASN1STOP

| *OTDOA-UE-Assisted* field descriptions |
| --- |
| ***otdoa-ReferenceCellInfo***  LPP IE *OTDOA-ReferenceCellInfo* as defined in clause 6.5.1.2. |
| ***otdoa-NeighbourCellInfo***  LPP IE *OTDOA-NeighbourCellInfoList* as defined in clause 6.5.1.2. |

#### – *TBS-AssistanceDataList*

The IE *TBS-AssistanceDataList* is used in the *assistanceDataElement* if the *posSibType* in IE *PosSIB-Type* defined in TS 36.331 [12] indicates '*posSibTypeX-Y*'.

-- ASN1START

TBS-AssistanceDataList-r16 ::= SEQUENCE {

mbs-AssistanceDataList-r16 MBS-AssistanceDataList-r14,

...

}

-- ASN1STOP

| *TBS-AssistanceDataList* field descriptions |
| --- |
| ***mbs-AssistanceDataList***  The IE *mbs-AssistanceDataList* as defined in clause 6.5.4.8. |

<End of changes>