**3GPP TSG-RAN2 Meeting #128 *R2-24XXXXX***

**Orlando, United States, 18th Nov 2024 - 22nd Nov 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **37.355** | **CR** | **0531** | **rev** | 1 | **Current version:** | **16.13.0** |  |
|  |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <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:***  | Correction on NavIC almanac set IE, and field descriptions under KlobucharModelParamater, and GNSS-SystemTime.  |
|  |  |
| ***Source to WG:*** | Reliance Jio, MediaTek, Ericsson, Qualcomm Incorporated, CEWiT |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** |

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| LCS\_NAVIC-Core |

 |  | ***Date:*** | 2024-11-05 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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 canbe 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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | In Current LPP specification, the below corrections are needed:* GNSS-SystemTime field description of NavIC system time interpretation under *gnss-DayNumber* is incorrect with reference to the NavIC System Time start epoch, as defined in the NavIC L5 ICD.
* KlobucharModelParameter parameters field descriptions have incosistency with name definitions in the IE names.
* NavIC Almanac set misses one parameter (AlmanacSet inclination) as per the L5 ICD.
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| ***Summary of change:*** | 1. The field description of following fields have been corrected/updated:
* For NavIC, GNSS-SystemTime field *gnss-DayNumber field* description indicating the Days from NavIC System Time start epoch, is corrected to 23:59:47 UTC (BIPM) as per L5 ICD.
* IE names in KlobucharModelParamater field descriptions are made consistent with names used in IE. It is updated as alfa0, alfa1, alfa2, & alfa3.
1. .. Added the missing *AlmanacNavIC-Almanacset* parameter related to almanac inclination consistent with NavIC L5 ICD i.e. *navicL5-i0.*

**Impact analysis**Impacted 5G architecture options: SA, (NG)EN-DC, NE-DC, NR-DCImpacted functionality:A-GNSS positioning with NavICInter-operability: - If the UE is implemented according to this CR while the network is not, network assistance data for NavIC Almanac will be incomplete.- If the network is implemented according to this CR while the UE is not, UE will receive incomplete network assistance data for NavIC Almanac. |
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| ***Consequences if not approved:*** | Imprecise interpretation of NavIC L5 visible satellite location at UE |
|  |  |
| ***Clauses affected:*** | 6.5.2.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | R2-2409714 |

*START OF CHANGE*

**6.5.2 A-GNSS Positioning**

**< Unchanged parts are omitted >**

6.5.2.2 GNSS Assistance Data Elements

**< Unchanged parts are omitted >**

– *GNSS-SystemTime*

-- ASN1START

GNSS-SystemTime ::= SEQUENCE {

 gnss-TimeID GNSS-ID,

 gnss-DayNumber INTEGER (0..32767),

 gnss-TimeOfDay INTEGER (0..86399),

 gnss-TimeOfDayFrac-msec INTEGER (0..999) OPTIONAL, -- Need ON

 notificationOfLeapSecond BIT STRING (SIZE(2)) OPTIONAL, -- Cond gnss-TimeID-glonass

 gps-TOW-Assist GPS-TOW-Assist OPTIONAL, -- Cond gnss-TimeID-gps

 ...

}

-- ASN1STOP

| **Conditional presence** | **Explanation** |
| --- | --- |
| *gnss-TimeID-glonass* | The field may be present if *gnss-TimeID*=`glonass′; otherwise it is not present. |
| *gnss-TimeID-gps* | The field may be present if *gnss-TimeID*=`gps′; otherwise it is not present. |

| ***GNSS-SystemTime* field descriptions** |
| --- |
| ***gnss-TimeID***This field specifies the GNSS for which the *GNSS-SystemTime* is provided. |
| ***gnss-DayNumber***This field specifies the sequential number of days (with day count starting at 0) from the origin of the GNSS System Time as follows: GPS, QZSS, SBAS – Days from January 6th 1980 00:00:00 UTC (USNO); Galileo – Days from Galileo System Time (GST) start epoch, defined as 13 seconds before midnight between 21st August and 22nd August 1999; i.e., GST was equal to 13 seconds at August 22nd 1999 00:00:00 UTC; GLONASS – Days from December 31st 1995 21:00:00 UTC (SU), which is local UTC Moscow January 1st 1996 00:00:00, defined as UTC(SU) + 3 hours in [9]; BDS – Days from January 1st 2006 00:00:00 UTC (NTSC). NavIC – Days from NavIC System Time start epoch, defined as 13 seconds before midnight between 21st August and 22nd August 1999; i.e., NavIC System Time was equal to 00:00:00 at August 21st, 1999 23:59:47 UTC (BIPM). |
| ***gnss-TimeOfDay***This field specifies the integer number of seconds from the GNSS day change. |
| ***gnss-TimeOfDayFrac-msec***This field specifies the fractional part of the *gnssTimeOfDay* field in 1‑milli‑seconds resolution. The total GNSS TOD is *gnss-TimeOfDay + gnssTimeOfDayFrac-msec.* |
| ***notificationOfLeapSecond***This field specifies the notification of forthcoming leap second correction, as defined by parameter KP in [9, Table 4.7]. |
| ***gps-TOW-Assist***This field contains several fields in the Telemetry (TLM) Word and Handover Word (HOW) that are currently being broadcast by the respective GPS satellites. Combining this information with GPS TOW enables the target device to know the entire 1.2-second (60-bit) pattern of TLM and HOW that is transmitted at the start of each six-second NAV subframe by the particular GPS satellite. |

*NEXT CHANGE*

– *KlobucharModelParameter*

-- ASN1START

KlobucharModelParameter ::= SEQUENCE {

 dataID BIT STRING (SIZE (2)),

 alfa0 INTEGER (-128..127),

 alfa1 INTEGER (-128..127),

 alfa2 INTEGER (-128..127),

 alfa3 INTEGER (-128..127),

 beta0 INTEGER (-128..127),

 beta1 INTEGER (-128..127),

 beta2 INTEGER (-128..127),

 beta3 INTEGER (-128..127),

 ...

}

-- ASN1STOP

| *KlobucharModelParamater* field descriptions |
| --- |
| ***dataID***When dataID has the value ′11′ it indicates that the parameters have been generated by QZSS, and the parameters have been specialized and are applicable within the area defined in [7]. When dataID has the value ′01′ it indicates that the parameters have been generated by BDS B1I, and UE shall use these parameters according to the description given in 5.2.4.7 in [23]. When the dataID has the value ′10′, it indicates that the parameters have been generated by NavIC, and UE shall use these parameters according to the description given in [38]. When dataID has the value ′00′ it indicates the parameters are applicable worldwide [4], [7]. |
| ***alfa0***This field specifies the 0 parameter of the Klobuchar model, as specified in [4], [23], [38].Scale factor 2-30 seconds. |
| ***alfa1***This field specifies the 1 parameter of the Klobuchar model, as specified in [4], [23], [38].Scale factor 2-27 seconds/semi-circle. |
| ***alfa2***This field specifies the 2 parameter of the Klobuchar model, as specified in [4], [23], [38].Scale factor 2-24 seconds/semi-circle2. |
| ***alfa3***This field specifies the 3 parameter of the Klobuchar model, as specified in [4], [23], [38].Scale factor 2-24 seconds/semi-circle3. |
| ***beta0***This field specifies the 0 parameter of the Klobuchar model, as specified in [4], [23], [38].Scale factor 211 seconds. |
| ***beta1***This field specifies the 1 parameter of the Klobuchar model, as specified in [4], [23], [38].Scale factor 214 seconds/semi-circle. |
| ***beta2***This field specifies the 2 parameter of the Klobuchar model, as specified in [4], [23], [38].Scale factor 216 seconds/semi-circle2. |
| ***beta3***This field specifies the 3 parameter of the Klobuchar model, as specified in [4], [23], [38].Scale factor 216 seconds/semi-circle3. |

*NEXT CHANGE*

– *AlmanacNavIC-AlmanacSet*

The IE AlmanacNavIC-AlmanacSet is used for NavIC L5 as defined in [38].

-- ASN1START

AlmanacNavIC-AlmanacSet-r16 ::= SEQUENCE {

 svID-r16 SV-ID,

 navic-AlmToa-r16 INTEGER (0..65535) OPTIONAL, -- Cond NotSameForAllSV

 navic-AlmE-r16 INTEGER (0..65535),

 navic-AlmOMEGADOT-r16 INTEGER (-32768..32767),

 navic-AlmSqrtA-r16 INTEGER (0..16777215),

 navic-AlmOMEGAo-r16 INTEGER (-8388608..8388607),

 navic-AlmOmega-r16 INTEGER (-8388608..8388607),

 navic-AlmMo-r16 INTEGER (-8388608..8388607),

 navic-Almaf0-r16 INTEGER (-1024..1023),

 navic-Almaf1-r16 INTEGER (-1024..1023),

 ...,

 [[

 navicL5-i0-v16xy INTEGER (-8388608..8388607) OPTIONAL -- Need ON

 ]]

}

-- ASN1STOP

| **Conditional presence** | **Explanation** |
| --- | --- |
| *NotSameForAllSV* | This field is optionally present, need ON, if the toa is not the same for all SVs; otherwise it is not present and the toa is provided in *GNSS-Almanac*. |

| *AlmanacNavIC-AlmanacSet* field descriptions |
| --- |
| ***svID***This field identifies the satellite for which the Almanac model is given |
| ***navic-AlmToa***This field provides the time of almanac set [38].Scale factor 16 seconds. |
| ***navic-AlmE***Parameter e, eccentricity, dimensionless [38].Scale factor 2-21. |
| ***navic-AlmOMEGADOT***Parameter , rate of right ascension, semi-circles/sec [38].Scale factor 2-38 semi-circles/second |
| ***navic-AlmSqrtA***Parameter , square root of the semi-major axis, metres1/2[38].Scale factor 2-11 metres1/2. |
| ***navic-AlmOMEGAo***Parameter 0, longitude of ascending node of orbit plane at weekly epoch, semi-circles [38].Scale factor 2-23 semi-circles. |
| ***navic-AlmOmega***Parameter ω, argument of perigee semi-circles [38].Scale factor 2-23 semi-circles. |
| ***navic-AlmMo***Parameter M0, mean anomaly at reference time semi-circles [38].Scale factor 2-23 semi-circles. |
| ***navic-Almaf0***Parameter af0, apparent satellite clock correction seconds [38].Scale factor 2-20 seconds. |
| ***navic-Almaf1***Parameter af1, apparent satellite clock correction sec/sec [38].Scale factor 2-38 semi-circles seconds/second. |
| ***navicL5-i0***Parameter I0, inclination (semi-circles) as described in clause 6 of [38]Scale factor 2-23 semi-circles. |

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*END OF CHANGE*