**3GPP TSG-RAN2 Meeting #109 electronic *R2-2001940***

**Elbonia 24 Feb – 6 Mar 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **37.355** | **CR** | **0002** | **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:*** | Sensor Provide Location Information Elements Correction | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Polaris Wireless | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16 | | | | |  | ***Date:*** | | | 2020-02-25 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | To allow a UE to report to the Location Server not only the uncompensated barometric pressure but also the barometric pressure sensor’s bias (adjustment). This allows for more accurate altitude determination based on the UE’s barometric pressure measurements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Adding an IE representing the UE’s barometric pressure sensor’s bias (adjustment) to *Sensor-MeasurementInformation.*  Adding an IE representing the UE’s barometric pressure sensor’s bias (adjustment) capability to *Sensor-ProvideCapabilities.*  Adding an IE representing the server’s request for the UE’s barometric pressure sensor’s bias (adjustment) to *Sensor-RequestLocationInformation*  This CR is identical to R2-1914074 (endorsed as baseline CR at RAN2#107bis) but is applied to 37.355 which replaces 36.355 (36.355 was deprecated at RAN#86).  This CR is an update to R2-2000007 with the following changes:   * Updated 37.355 version number to 15.0.0. on the cover page. * *adjustment-r16* IE in *Sensor-RequestLocationInformation* renamed to *adjustmentReq-r16*. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The location server will only be able to calculate the UE’s altitude based on the reported uncompensated barometric pressure but not based on the actual “true” barometric pressure (“true” barometric pressure = reported uncompensated barometric pressure + sensor bias). Therefore the calculated altitude of the UE may be inaccurate (the larger the pressure sensor’s bias, the larger the altitude error). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.5.5.2, 6.5.5.3, 6.5.5.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **x** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | This CR is a revision of R2-2000007. | | | | | | | | |

**START OF CHANGES**

#### 6.5.5.2 Sensor Location Information Elements

#### – *Sensor-MeasurementInformation*

The IE *Sensor-MeasurementInformation* is used by the target device to provide UE sensor measurements to the location server.

-- ASN1START

Sensor-MeasurementInformation-r13 ::= SEQUENCE {

measurementReferenceTime-r13 UTCTime OPTIONAL,

uncompensatedBarometricPressure-r13 INTEGER (30000..115000) OPTIONAL, -- Cond Barometer

...,

[[

uncertainty-r14 SEQUENCE {

range-r14 INTEGER (0..1000),

confidence-r14 INTEGER (1..100)

} OPTIONAL

]],

[[ adjustment-r16 INTEGER (-5000..5000) OPTIONAL

]]

}

-- ASN1STOP

| Conditional presence | Explanation |
| --- | --- |
| *Barometer* | The field is mandatory present if the *Sensor-MeasurementInformation* is provided for barometric pressure; otherwise it is not present. |

| *Sensor-MeasurementInformation* field descriptions |
| --- |
| ***measurementReferenceTime***  This field provides the UTC time when the sensor measurements are performed and should take the form of *YYMMDDhhmmssZ.* |
| ***uncompensatedBarometricPressure***  This field provides the uncompensated barometric pressure as measured by the UE sensor, in units of Pa. |
| ***uncertainty***  This field provides the expected range for the pressure measurement in units of Pa and the confidence as a percentage that the true pressure lies in a range of (measurement – range) to (measurement + range). |
| ***adjustment***  This field specifies any adjustment in units of Pa to produce a compensated atmospheric pressure measurement. The adjustment may be obtained through previous calibration by the UE of the sensor using a known reference atmospheric pressure for a known location and altitude or by other means. A compensated atmospheric pressure is obtained as follows and is not reported directly but only via the uncompensated barometric pressure measurement and adjustment component:    compensated atmospheric pressure = *uncompensatedBarometricPressure* + *adjustment* . |

**UNCHANGED PARTS OMITED**

**END OF CHANGES**

**START OF CHANGES**

#### 6.5.5.3 Sensor Location Information Request

#### – *Sensor-RequestLocationInformation*

The IE *Sensor-RequestLocationInformation* is used by the location server to request location information for sensor-based methods from a target device.

-- ASN1START

Sensor-RequestLocationInformation-r13 ::= SEQUENCE {

uncompensatedBarometricPressureReq-r13 BOOLEAN,

...,

[[ assistanceAvailability-r14 BOOLEAN OPTIONAL -- Need ON

]],

[[ sensor-MotionInformationReq-r15 BOOLEAN OPTIONAL -- Need ON

]],

[[ adjustmentReq-r16 BOOLEAN OPTIONAL -- Need ON

]]

}

-- ASN1STOP

| *Sensor-RequestLocationInformation* field descriptions |
| --- |
| ***uncompensatedBarometricPressureReq***  This field indicates whether the target device is requested to report Barometric pressure measurements in *Sensor‑MeasurementInformation* IE or not. TRUE means requested. |
| ***assistanceAvailability***  This field indicates whether the target device may request additional Sensor assistance data from the server. TRUE means allowed and FALSE means not allowed. |
| ***sensor-MotionInformationReq***  This field indicates whether the target device is requested to report movement information in IE *Sensor‑MotionInformation* or not. TRUE means requested. |
| ***adjustment***  This field indicates whether the target device is requested to report *adjustment* in IE *Sensor-MeasurementInformation* or not. TRUE means requested. |

**END OF CHANGES**

**START OF CHANGES**

#### 6.5.5.4 Sensor Capability Information

#### *– Sensor-ProvideCapabilities*

The IE *Sensor-ProvideCapabilities* is used by the target device to provide capabilities for sensor-based methods from to the location server.

-- ASN1START

Sensor-ProvideCapabilities-r13 ::= SEQUENCE {

sensor-Modes-r13 BIT STRING { standalone (0),

ue-assisted (1),

ue-based (2)} (SIZE (1..8)),

...,

[[ sensor-AssistanceDataSupportList-r14 Sensor-AssistanceDataSupportList-r14 OPTIONAL,

periodicalReportingSupported-r14 PositioningModes OPTIONAL,

idleStateForMeasurements-r14 ENUMERATED { required } OPTIONAL

]],

[[ sensor-MotionInformationSup-r15 ENUMERATED { true } OPTIONAL

]],

[[ adjustmentSupported-r16 ENUMERATED { true } OPTIONAL

]]

}

Sensor-AssistanceDataSupportList-r14 ::= SEQUENCE {

...,

[[ validityPeriodSupported-v1520 ENUMERATED { true } OPTIONAL,

validityAreaSupported-v1520 ENUMERATED { true } OPTIONAL

]]

}

-- ASN1STOP

| *Sensor-ProvideCapabilities* field descriptions |
| --- |
| ***sensor-Modes***  This field specifies the sensor mode(s) supported by the target device. This is represented by a bit string, with a one‑value at the bit position means the particular sensor mode is supported; a zero‑value means not supported. |
| ***sensor-AssistanceDataSupportList***  This field specifies a list of sensor assistance data supported by the target device. This field shall be present if the target device supports assistance data for Barometric pressure sensor. |
| ***validityPeriodSupported***  This field, if present, indicates that the target device supports *period* i.e. pressure validity period and pressure rate as part of the *Sensor-AssistanceDataList*. |
| ***valitidyAreaSupported***  This field, if present, indicates that the target device supports *area* i.e. pressure validity area and North/East pressure gradient as part of the *Sensor-AssistanceDataList*. |
| ***periodicalReportingSupported***  This field, if present, specifies the positioning modes for which the target device supports *periodicalReporting.* This is represented by a bit string, with a one‑value at the bit position means *periodicalReporting* for the positioning mode is supported; a zero‑value means not supported. If this field is absent, the location server may assume that the target device does not support *periodicalReporting* in *CommonIEsRequestLocationInformation*. |
| ***idleStateForMeasurements***  This field, if present, indicates that the target device requires idle state to perform sensor measurements. |
| ***sensor-MotionInformationSup***  This field, if present, indicates that the target device supports displacement reporting in IE *Sensor-MotionInformation*. |
| ***adjustmentSupported***  This field, if present, indicates that the target device supports the *adjustment* IE in *Sensor-MeasurementInformation*. |

**END OF CHANGES**