3GPP TSG-RAN WG2 Meeting #121***R2-23xxxxx***

Athens, Greece, 27th February – 3th March, 2023

**Agenda item:** 5.3.3

**Source:** CATT (Rapporteur)

**Title:** Summary of Rel-15 and Rel-16 NR Positioning Support AIs 5.3.2 and 5.3.3

**Document for:**  Discussion

# 1. Introduction

This document summarizes the following contributions submitted for Agenda Item 5.3.2 (RRC corrections) and 5.3.3 (LPP corrections).

AI 5.3.2 – RRC corrections:

[1] R2-2300107 Correction for SRS-PosResourcesPerBand Huawei, HiSilicon CR Rel-16 38.331 16.11.0 3772 - F NR\_pos-Core

[2] R2-2300108 Correction for SRS-PosResourcesPerBand Huawei, HiSilicon CR Rel-17 38.331 17.3.0 3773 - A NR\_pos-Core

[3] R2-2300109 Correction on PosSIB broadcasting Huawei, HiSilicon CR Rel-16 38.331 16.11.0 3774 - F NR\_pos-Core

[4] R2-2300110 Correction on PosSIB broadcasting Huawei, HiSilicon CR Rel-17 38.331 17.3.0 3775 - A NR\_pos-Core

[5] R2-2300937 Correction on SRS for positioning ZTE Corporation CR Rel-16 38.331 16.11.0 3852 - F NR\_pos-Core

[6] R2-2300938 Correction on SRS for positioning ZTE Corporation CR Rel-17 38.331 17.3.0 3853 - F NR\_pos\_enh-Core

[7] R2-2301347 Conditional inclusion of SBAS ID in posSIBs MediaTek Inc. CR Rel-16 38.331 16.11.0 3882 - F NR\_pos-Core To:True Cc:True

[8] R2-2301348 Conditional inclusion of SBAS ID in posSIBs MediaTek Inc. CR Rel-17 38.331 17.3.0 3883 - A NR\_pos-Core To:True Cc:True

[9] R2-2301349 Mapping of posSIB/SIB segments to SI messages MediaTek Inc., Nokia, Nokia Shanghai Bell, Ericsson discussion Rel-16 NR\_pos-Core

AI 5.3.3 – LPP corrections:

[10] R2-2300328 Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData IE Lenovo CR Rel-16 37.355 16.9.0 0406 - F NR\_pos-Core To:True Cc:False

[11] R2-2300329 Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData IE Lenovo CR Rel-17 37.355 17.3.0 0407 - A NR\_pos-Core To:True Cc:False

[12] R2-2301431 Adding GNSS Types in GNSS-SSR-OrbitCorrections to clarify SSR clock correction signal reference and clarification of GNSS Troposperic Delay Correction Ericsson CR Rel-16 37.355 16.9.0 0410 - F NR\_pos-Core To:True Cc:False

[13] R2-2301432 Correction of Note in NR-DL-PRS-AssistanceData field descriptions Ericsson CR Rel-16 37.355 16.9.0 0411 - F NR\_pos-Core To:False Cc:False

[14] R2-2301433 Adding GNSS Types in GNSS-SSR-OrbitCorrections to clarify SSR clock correction signal reference and clarification of GNSS Troposperic Delay Correction Ericsson CR Rel-17 37.355 17.3.0 0412 - A NR\_pos-Core To:True Cc:False

[15] R2-2301434 Correction of Note in NR-DL-PRS-AssistanceData field descriptions Ericsson CR Rel-17 37.355 17.3.0 0413 - A NR\_pos-Core To:False Cc:False

# 2. Essential Corrections to NR Positioning Technologies

## 2.1 SRS-PosResourcesPerBand

|  |  |  |  |
| --- | --- | --- | --- |
| [1] | **R2-**[**2300107**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300107.zip) | Correction for SRS-PosResourcesPerBand | Huawei, HiSilicon |
| [2] | **R2-**[**2300108**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300108.zip) | Correction for SRS-PosResourcesPerBand | Huawei, HiSilicon |

According to [1] [2], "The per-band capability and per-band combination capability may not be consistent, which may cause improper SRS configuration. So, it should clarify that UE only include SRS-PosResourcesPerBand-r16 for each band on which UE support SRS for positioning resources transmission for the configured CA band combination."

|  |  |
| --- | --- |
| NR-UL-SRS-Capability-r16 ::= SEQUENCE { srs-CapabilityBandList-r16 SEQUENCE (SIZE (1..nrMaxBands-r16)) OF SRS-CapabilityPerBand-r16, srs-PosResourceConfigCA-BandList-r16 SEQUENCE (SIZE (1..nrMaxConfiguredBands-r16)) OF SRS-PosResourcesPerBand-r16 OPTIONAL, maxNumberSRS-PosPathLossEstimateAllServingCells-r16  ENUMERATED {n1, n4, n8, n16} OPTIONAL, maxNumberSRS-PosSpatialRelationsAllServingCells-r16  ENUMERATED {n0, n1, n2, n4, n8, n16} OPTIONAL, ...}

|  |
| --- |
| ***sr******s-PosResourceConfigCA-BandList***This field indicates the number of SRS for positioning resources supported by the target device. The target device includes this field for each band which belongs to the *srs-CapabilityBandList* for the current configured CA band combination. The capability signalling comprises the following parameters.- ***freqBandIndicatorNR***indicates the current configured NR band of the target device.- ***maxNumberSRS-PosResourceSetsPerBWP***indicates the maximum number of SRS Resource Sets for positioning supported by the target device per BWP. Enumerated values *n1*, *n2*, *n4*, *n8*, *n12*, *n16* correspond to 1, 2, 4, 8, 12, 16 SRS Resource Sets for positioning, respectively.- ***maxNumberSRS-PosResourcesPerBWP***indicates the maximum number of periodic, semi-persistent, and aperiodic SRS Resources for positioning supported by the target device per BWP. Enumerated values *n1, n2, n4, n8, n16, n32, n64* correspond to 1, 2, 4, 8, 16, 32, 64 SRS Resources for positioning, respectively.- ***maxNumberPeriodicSRS-PosResourcesPerBWP***indicates the maximum number of periodic SRS Resources for positioning supported by the target device per BWP. Enumerated values *n1, n2, n4, n8, n16, n32, n64* correspond to 1, 2, 4, 8, 16, 32, 64 periodic SRS Resources for positioning, respectively.- ***maxNumberAP-SRS-PosResourcesPerBWP***indicates the maximum number of aperiodic SRS Resources for positioning supported by the target device per BWP. Enumerated values *n1, n2, n4, n8, n16, n32, n64* correspond to 1, 2, 4, 8, 16, 32, 64 aperiodic SRS Resources for positioning, respectively.- ***maxNumberSP-SRS-PosResourcesPerBWP***indicates the maximum number of semi-persistent SRS Resources for positioning supported by the target device per BWP. Enumerated values *n1, n2, n4, n8, n16, n32, n64* correspond to 1, 2, 4, 8, 16, 32, 64 semi-persistent SRS Resources for positioning, respectively. |

 |

Rapporteur's Comment:

- The changes are correct, so from the rapporteur’s perspective, these CRs can be agreed.

- Cover sheet issues:

Wrong tdoc number.

The proposed change affects should be ME and Core Network.

The impact analysis should be moved to Summary of change

Check the CR's revision history

These two CRs were submitted with wrong spec number.

**Proposal 1:** The CRs in
R2-2300107 Correction for SRS-PosResourcesPerBand Huawei, HiSilicon CR Rel-16 38.331 16.11.0 3772 - F NR\_pos-Core
R2-2300108 Correction for SRS-PosResourcesPerBand Huawei, HiSilicon CR Rel-17 38.331 17.3.0 3773 - A NR\_pos-Core
are essential corrections. Update the Cover Sheet and the submitted spec number as 37.355.

## 2.2 Correction on posSIB segment

|  |  |  |  |
| --- | --- | --- | --- |
| [3] | **R2-**[**2300109**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300109.zip) | Correction on PosSIB broadcasting | Huawei, HiSilicon |
| [4] | **R2-**[**2300110**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300110.zip) | Correction on PosSIB broadcasting | Huawei, HiSilicon |
| [9] | **R2-**[**2301349**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301349.zip) | Mapping of posSIB/SIB segments to SI messages | MediaTek Inc., Nokia, Nokia Shanghai Bell, Ericsson |

According to 38.331, each posSIB can only be contained at most once in a single SI message:

|  |
| --- |
| - The mapping of SIBs to SI messages is configured in *schedulingInfoList* and *schedulingInfoList2*, while the mapping of posSIBs to SI messages is configured in *posSchedulingInfoList* and *schedulingInfoList2.* SIBs and posSIBs are mapped to separate SI messages even when configured using a common *schedulingInfoList2*. Each SIB is contained only in a single SI message. In the case of posSIB, a posSIB carrying GNSS Generic Assistance Data for different GNSS/SBAS [49] is contained in different SI messages. Each SIB and posSIB, including a posSIB carrying GNSS Generic Assistance Data for one GNSS/SBAS, is contained at most once in that SI message; |

In 38.455, the posSIB segment is described as follow:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9.2.20 PosSIB SegmentsThis IE provides one posSIB or two or more posSIB segments which must be scheduled in series in consecutive transmissions of the same SI message.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **PosSIB Segments** |  | *1..<maxNrOfSegments>* |  |  |
| >Assistance Data SIB Element | M |  | OCTET STRING | TS 37.355 [14] |

 |

According to [9], the contribution gives two ways on how to schedule the segmented posSIB, shown as follow. The contribution [9] thinks the description in both 38.455 and 38.331 refer to Alt2.



According to [3] and [4], the company thinks in 38.455, the schedule of posSIB segments refer to Alt1. While in 38.331, the posSIB segments are scheduled in way of Alt2. To transmit posSIB more efficiently, [3] and [4] suggest changing the description that “each posSIB” is contained at most once in that SI message to “each posSIB segment”.

|  |
| --- |
| - The mapping of SIBs to SI messages is configured in *schedulingInfoList*, while the mapping of posSIBs to SI messages is configured in *posSchedulingInfoList.* Each SIB is contained only in a single SI message. In the case of posSIB, a posSIB carrying GNSS Generic Assistance Data for different GNSS/SBAS [49] is contained in different SI messages. Each SIB, posSIB and posSIB segment, if the posSIB is segmented, including a posSIB or a posSIB segment carrying GNSS Generic Assistance Data for one GNSS/SBAS, is contained at most once in that SI message; |

Rapporteur's Comment:

- The proponents of [3][4] and [9] tend to agree the current description in 38.331 means a single SI message contains only one instance of a given posSibType. However, they have divergence views on whether to support scheduling two or more segments of a given posSibType in a single SI message. RAN2 needs to discuss and decide whether the modifications in R2-2300109 and R2-2300110 are essential corrections.

**Proposal 2:** RAN2 to discuss and decide whether the CRs in
R2-2300109 Correction on PosSIB broadcasting Huawei, HiSilicon CR Rel-16 38.331 16.11.0 3774 - F NR\_pos-Core
R2-2300110 Correction on PosSIB broadcasting Huawei, HiSilicon CR Rel-17 38.331 17.3.0 3775 - A NR\_pos-Core
are essential corrections or not:

Each SIB, posSIB and posSIB segment, if the posSIB is segmented, including a posSIB or a posSIB segment carrying GNSS Generic Assistance Data for one GNSS/SBAS, is contained at most once in that SI message;

## 2.3 *Supplements and modifications on the field description of SRS-Config*

|  |  |  |  |
| --- | --- | --- | --- |
| [5] | **R2-**[**2300937**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300937.zip) | Correction on SRS for positioning | ZTE Corporation |
| [6] | **R2-**[**2300938**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300938.zip) | Correction on SRS for positioning | ZTE Corporation |

According to [5] [6], some supplements and modifications on the field description of *SRS-Config* are proposed.

For change 1, “the sub-field name of serving cell’s SSB index in the field description should be ssb-IndexServing to align with the name in ASN.1, rather than ssb-IndexSevingcell.”. The CR also suggest limiting the serving cell to the cell where the SRS is configured to avoid misunderstanding in CA scenario.

|  |
| --- |
| ***ssb-IndexServing***Indicates SSB index belonging to a serving cell where the SRS is configured. |

For change 2, “For the field resourceType in SRS-PosResource, it can also configure the slot offset for aperiodic SRS resource for positioning, so the missing field description should be added.”

|  |
| --- |
| ***resourceType***Periodicity and offset for semi-persistent and periodic SRS resource, or slot offset for aperiodic SRS resource for positioning (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, only 'periodic' is applicable for *resourceType*. |

For change 3-4, add the missing field description of *cyclicShift-n8* and *dl-PRS*.

|  |
| --- |
| ***cyclicShift-n8***Cyclic shift configuration (see TS 38.214 [19], clause 6.2.1).***dl-PRS***This field indicates a PRS configuration. |

For change 5, the modification is propose to “re-organise the field description for *servingCellId*, *ssb-IndexServing*, *csi-RS-IndexServing*, *resourceSelection*, *ssb-NCell* and *dl-PRS* in *SRS-SpatialRelationInfoPos* into a separate table.”.

Rapporteur's Comment:

- For change 1, modify the “ssb-IndexSevingcell” as “ssb-IndexServing” is an essential correction. For the consideration of whether the serving cell is the cell where the SRS is configured in scenario of CA, in view of rapporteur, it can be up to implementation to decide which serving cell to use if there are multiple serving cells. RAN2 can further discuss this issue.

- For change 2, add the missed aperiodic SRS in the field description of resourceType is an essential correction.

- For change 3-4, add the missing field descriptions of *cyclicShift-n8* and *dl-PRS* is an essential correction. The newly added parameters need to follow alphabetical order.

- For change 5, “re-organise the field description of *SRS-SpatialRelationInfoPos* into a separate table” is not an essential correction.

- Submit issue:

R2-2300938 is submitted with wrong category.

* According to the pre-discussion in reflector, RAN1 specification (38.213, section 7.3.1) specifies the issue which serving cell to use if there are multiple serving cells :
	+ If a UE transmits SRS based on a configuration by *SRS-PosResourceSet* on active UL BWP $b$ of carrier $f$ of serving cell $c$, the UE determines the SRS transmission power $P\_{SRS,b,f,c}\left(i,q\_{s}\right)$ in SRS transmission occasion $i$ as
*  [dBm]
	+ where,
		- - $P\_{O\\_SRS,b,f,c}\left(q\_{s}\right)$ and $α\_{SRS,b,f,c}\left(q\_{s}\right)$ are provided by *p0-r16* and *alpha-r16* respectively, for active UL BWP $b$ of carrier $f$ of serving cell $c$, and SRS resource set $q\_{s}$ is indicated by *SRS-PosResourceSetId* from *SRS-PosResourceSet*, and
		- - $PL\_{b,f,c}\left(q\_{d}\right)$ is a downlink pathloss estimate in dB calculated by the UE, as described in clause 7.1.1 in case of an active DL BWP of a serving cell $c$, using RS resource indexed $q\_{d}$ in a serving or non-serving cell for SRS resource set $q\_{s}$ [6, TS 38.214]. A configuration for RS resource index $q\_{d}$ associated with SRS resource set $q\_{s}$ is provided by *pathlossReferenceRS-Pos*

Rapporteur recommends to add the reference to TS38.213 for *pathlossReferenceRS-Pos* in the description.

**Proposal 3:** For the CRs in
R2-2300937 Correction on SRS for positioning ZTE Corporation CR Rel-16 38.331 16.11.0 3852 - F NR\_pos-Core
R2-2300938 Correction on SRS for positioning ZTE Corporation CR Rel-17 38.331 17.3.0 3853 - F NR\_pos\_enh-Core
the essential corrections inlcude:

 ***resourceType***

Periodicity and offset for semi-persistent and periodic SRS resource, or slot offset for aperiodic SRS resource for positioning (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, only 'periodic' is applicable for *resourceType*.

***cyclicShift-n8***

Cyclic shift configuration (see TS 38.214 [19], clause 6.2.1).

***dl-PRS***

This field indicates a PRS configuration.

***ssb-IndexServing***

Update the submitted tdoc information of R2-2300938.

**Proposal 3-1:** Further discuss whether the description of *ssb-IndexServing* in *pathlossReferenceRS-Pos* and *SRS-SpatialRelationInfoPos* is essential or just refers to TS38.213.

## 2.4 Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData

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| --- | --- | --- | --- |
| [10] | **R2-**[**2300328**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300328.zip) | Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData IE | Lenovo |
| [11] | **R2-**[**2300329**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300329.zip) | Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData IE | Lenovo |

According to CR of [7] and [8], the field ‘nr-AdType-r16’ is specified in ASN.1 but its field description is missing in *NR-Multi-RTT-RequestAssistanceData* field descriptions. So it is proposed to add the missing field description like the following in *NR-Multi-RTT-RequestAssistanceData*:

***nr-AdType***

This field indicates the requested assistance data and/or configuration. *dl-prs* means requested assistance data is *nr-DL-PRS-AssistanceData*, *ul-srs* means a request for UL-SRS configuration.

NOTE: UL-SRS is configured via NRPPa and RRC signalling as specified in clause 8.10.4 of TS 38.305 [40].

Rapporteur's Comment:

* The changes are correct and make the spec clearer, so from the rapporteur’s perspective, these CRs can be agreed.

**Proposal 4:** The CRs in

R2-2300328 Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData IE Lenovo CR Rel-16 37.355 16.9.0 0406 - F NR\_pos-Core

R2-2300329 Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData IE Lenovo CR Rel-17 37.355 17.3.0 0407 - A NR\_pos-Core

are essential corrections.

## 2.5 Correction of Note in NR-DL-PRS-AssistanceData field descriptions

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| --- | --- | --- | --- |
| [13] | **R2-**[**2301432**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301432.zip) | Correction of Note in NR-DL-PRS-AssistanceData field descriptions | Ericsson |
| [15] | **R2-**[**2301434**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301434.zip) | Correction of Note in NR-DL-PRS-AssistanceData field descriptions | Ericsson |

According to CR of [13] and [15], the informative note wrongly use the shall requirement, which is conflicted with the 3GPP spec drafting rule. So it is proposed to change the “shall” to “should” as the following:

NOTE: The location server should set the value in accordance with the defined search window for the target device using *nr-DL-PRS-ExpectedRSTD* and *nr-DL-PRS-ExpectedRSTD-Uncertainty.*

Rapporteur's Comment:

* According to the following description extracted from TR 21.801, the informative elements shall not contain normative content. So from the rapporteur’s view, the CRs can be agreeable.

|  |
| --- |
| NOTE 2: Informative elements shall not contain normative content. Normative elements may additionally contain informative content. |

**Proposal 5:** The CRs in

R2-2301432 Correction of Note in NR-DL-PRS-AssistanceData field descriptions Ericsson CR Rel-16 37.355 16.9.0 0411 - F NR\_pos-Core

R2-2301434 Correction of Note in NR-DL-PRS-AssistanceData field descriptions Ericsson CR Rel-17 37.355 17.3.0 0413 - A NR\_pos-Core

are essential corrections.

# 3. Essential Corrections to GNSS SSR Assistance Data

## 3.1 Conditional inclusion of SBAS ID in posSIBs

|  |  |  |  |
| --- | --- | --- | --- |
| [7] | **R2-**[**2301347**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301347.zip) | Conditional inclusion of SBAS ID in posSIBs | MediaTek Inc. |
| [8] | **R2-**[**2301348**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301348.zip) | Conditional inclusion of SBAS ID in posSIBs | MediaTek Inc. |

According to [7][8], “The Need R condition on *sbas-id* in *PosSIB-Type* is changed to a condition indicating that *sbas-id* is mandatory present if *gnss-id* is set to *sbas*, and absent otherwise.”

PosSIB-Type-r16 ::= SEQUENCE {

 encrypted-r16 ENUMERATED { true } OPTIONAL, -- Need R

 gnss-id-r16 GNSS-ID-r16 OPTIONAL, -- Need R

 sbas-id-r16 SBAS-ID-r16 OPTIONAL, -- Cond GNSS-ID-SBAS

| Conditional presence | Explanation |
| --- | --- |
| *GNSS-ID-SBAS* | The field is mandatory present if *gnss-id* is set to *sbas*. It is absent otherwise. |

Rapporteur's Comment:

- The network could indicate *gnss-id*=*sbas*, but then fail to include the *sbas-id*, and the UE would not know which SBAS the assistance data applied to.

- The CRs in [7][8] are essential corrections

- Cover sheet issues:

Impact analysis, Impacted functionality and Inter-operability should be moved to ***Summary of change.***

Impacted 5G architecture options: NR SA, (NG)EN-DC, NE-DC,NR-DC are missed in Impact Analysis.

**Proposal 6:** The CRs in

R2-2301347 Conditional inclusion of SBAS ID in posSIBs MediaTek Inc. CR Rel-16 38.331 16.11.0 3882 - F NR\_pos-Core

R2-2301348 Conditional inclusion of SBAS ID in posSIBs MediaTek Inc. CR Rel-17 38.331 17.3.0 3883 - A NR\_pos-Core

are essential corrections. Update the Cover Sheet.

## 3.2 Missing GNSS Types in GNSS-SSR-OrbitCorrections

|  |  |  |  |
| --- | --- | --- | --- |
| [12] | **R2-**[**2301431**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301431.zip) | Adding GNSS Types in GNSS-SSR-OrbitCorrections to clarify SSR clock correction signal reference and clarification of GNSS Troposperic Delay Correction | Ericsson |
| [14] | **R2-**[**2301433**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301433.zip) | Adding GNSS Types in GNSS-SSR-OrbitCorrections to clarify SSR clock correction signal reference and clarification of GNSS Troposperic Delay Correction | Ericsson |

There are two corrections in [12], [14]:

* GNSS SSR Clock Corrections:

According to [12], [14], the SSR orbit corrections are relative to broadcasted Ephemeris and should be provided for GNSS Type Galileo to ensure that there is no ambiguity with the clock correction reference, since Galileo has both F/NAV and I/NAV messages.

*Summary of change:* “Note 2 for GNSS-SSR-OrbitCorrections have been updated to include Galileo I/NAV”

NOTE 2: In the cases that *gnss-ID* indicates 'gps', 'qzss', galileo, the *iod* refers to the specific broadcast ephemeris (GPS L1 C/A, QZSS L1 C/A, Galileo I/NAV, respectively, in table GNSS to iod Bit String(11) relation in IE *GNSS‑NavigationModel).*

* GNSS SSR Gridded Corrections:

According to [12], [14], The tropospheric changes are:

- Conditional presence of the tropospheric delay corrections of the GNSS-SSR-GriddedCorrection introduced

- Clarifying text describing the applicability of the tropospheric delay corrections applicability to all

The parameters provided in IE *GNSS-SSR-GriddedCorrection* are used as specified for Compact SSR Gridded Correction Message (e.g., message type 4073,9) in [43] and apply to all GNSSs, where the troposphere delay correction is provided for one GNSS and valid for all other GNSSs.

GridElement-r16 ::= SEQUENCE {

 tropospericDelayCorrection-r16 TropospericDelayCorrection-r16 OPTIONAL, -- Cond NotProvidedForOther

| **Conditional presence** | **Explanation** |
| --- | --- |
| *NotProvidedForOther* | This field is not present if the t*ropospericDelayCorrection* is provided for another GNSS in the same epoch |

|  |
| --- |
| ***tropospericDelayCorrection***This field specifies information element with the troposphere vertical delay components. It is only provided with at most one GNSS constellation, and if provided it is valid for all GNSS constellations. If it is provided with a different GNSS constellation the field is not provided with other GNSS constellations for the same epoch. |

Rapporteur's Comment:

* GNSS SSR Clock Corrections:

- The proposed change on Galileo in NOTE 2 is essential correction.

- However the change on “ QZSS L1 C/A,” is not aligned with GNSS NavigationModel, therefore this changes is not an essential correction.

GNSS to svHealth Bit String(8) relation

|  |  |
| --- | --- |
| **GNSS** | ***svHealth* Bit String(8)** |
| **Bit 1****(MSB)** | **Bit 2** | **Bit 3** | **Bit 4** | **Bit 5** | **Bit 6**  | **Bit 7** | **Bit 8 (LSB)** |
| GPS L1/CA(1) | SV Health [4] | '0'(reserved) | '0'(reserved) |
| Modernized GPS(2) | L1C Health[6] | L1 Health [4,5] | L2 Health[4,5] | L5 Health [4,5] | '0'(reserved) | '0'(reserved) | '0'(reserved) | '0'(reserved) |
| SBAS(3) | RangingOn (0),Off(1) [10] | Corrections On(0),Off(1) [10] | IntegrityOn(0),Off(1)[10] | '0'(reserved) | '0'(reserved) | '0'(reserved) | '0'(reserved) | '0'(reserved) |
| QZSS(4)QZS-L1 | SV Health [7] | '0'(reserved) | '0'(reserved) |
| QZSS(5)QZS‑L1C/L2C/L5 | L1C Health[7] | L1 Health[7] | L2 Health[7] | L5 Health[7] | '0'(reserved) | '0'(reserved) | '0'(reserved) | '0'(reserved) |
| GLONASS | Bn (MSB)[9, page 30] | FT [9, Table 4.4] | '0'(reserved) | '0'(reserved) | '0'(reserved) |
| Galileo[8, clause 5.1.9.3] | E5a Data Validity Status | E5b Data Validity Status | E1-B Data Validity Status | E5a Signal Health Status | '0'(reserved) | '0'(reserved) | '0'(reserved) |

* GNSS SSR Gridded Corrections:

- The statement of “, where the troposphere delay correction is provided for one GNSS and valid for all other GNSSs” is not accurate if other GNSSs don't share the same troposphere.

- The change on Conditional presence of the tropospheric delay corrections may save the signaling of *GNSS-SSR-GriddedCorrection.* It is an essential correction.

**Proposal 7:** For the CRs in

R2-2301431 Adding GNSS Types in GNSS-SSR-OrbitCorrections to clarify SSR clock correction signal reference and clarification of GNSS Troposperic Delay Correction Ericsson

R2-2301433 Adding GNSS Types in GNSS-SSR-OrbitCorrections to clarify SSR clock correction signal reference and clarification of GNSS Troposperic Delay Correction Ericsson CR Rel-17 37.355 17.3.0 0412 - A NR\_pos-Core

* + The change on Galileo is an essential correction in “NOTE 2: In the cases that *gnss-ID* indicates 'gps', 'qzss', galileo, the *iod* refers to the specific broadcast ephemeris (GPS L1 C/A, QZSS L1 C/A, Galileo I/NAV, respectively, in table GNSS to iod Bit String(11) relation in IE *GNSS‑NavigationModel).”*
	+ The change on Conditional presence of the tropospheric delay corrections for GNSS SSR Gridded Corrections is an essential correction.

**Proposal 7-1:** The change on QZSS in NOTE2 is not essential, and the statement of “, where the troposphere delay correction is provided for one GNSS and valid for all other GNSSs” is not essential as well.

# 4. Summary

*[SRS-PosResourcesPerBand]*

**Proposal 1:** The CRs in
R2-2300107 Correction for SRS-PosResourcesPerBand Huawei, HiSilicon CR Rel-16 38.331 16.11.0 3772 - F NR\_pos-Core
R2-2300108 Correction for SRS-PosResourcesPerBand Huawei, HiSilicon CR Rel-17 38.331 17.3.0 3773 - A NR\_pos-Core
are essential corrections. Update the Cover Sheet and the submitted tdoc information.

 *[*Correction on posSIB segment*]*

**Proposal 2:** RAN2 to discuss and decide whether the CRs in
R2-2300109 Correction on PosSIB broadcasting Huawei, HiSilicon CR Rel-16 38.331 16.11.0 3774 - F NR\_pos-Core
R2-2300110 Correction on PosSIB broadcasting Huawei, HiSilicon CR Rel-17 38.331 17.3.0 3775 - A NR\_pos-Core
are essential corrections or not:

Each SIB, posSIB and posSIB segment, if the posSIB is segmented, including a posSIB or a posSIB segment carrying GNSS Generic Assistance Data for one GNSS/SBAS, is contained at most once in that SI message;

 *[field description of SRS-Config]*

**Proposal 3:** For the CRs in
R2-2300937 Correction on SRS for positioning ZTE Corporation CR Rel-16 38.331 16.11.0 3852 - F NR\_pos-Core
R2-2300938 Correction on SRS for positioning ZTE Corporation CR Rel-17 38.331 17.3.0 3853 - F NR\_pos\_enh-Core
the essential corrections are:

 ***resourceType***

Periodicity and offset for semi-persistent and periodic SRS resource, or slot offset for aperiodic SRS resource for positioning (see TS 38.214 [19], clause 6.2.1). For CLI SRS-RSRP measurement, only 'periodic' is applicable for *resourceType*.

***cyclicShift-n8***

Cyclic shift configuration (see TS 38.214 [19], clause 6.2.1).

***dl-PRS***

This field indicates a PRS configuration.

***ssb-IndexServing***

Update the submitted tdoc information of R2-2300938.

**Proposal 3-1:** Further discuss whether the description of *ssb-IndexServing* in *pathlossReferenceRS-Pos* and *SRS-SpatialRelationInfoPos* is essential or just refers to TS38.213.

*[Addition of missing field description for ‘nr-AdType-r16’]*

**Proposal 4:** The CRs in

R2-2300328 Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData IE Lenovo CR Rel-16 37.355 16.9.0 0406 - F NR\_pos-Core

R2-2300329 Addition of missing field description for ‘nr-AdType-r16’ in NR-Multi-RTT-RequestAssistanceData IE Lenovo CR Rel-17 37.355 17.3.0 0407 - A NR\_pos-Core

are essential corrections.

 *[Note in NR-DL-PRS-AssistanceData field descriptions]*

**Proposal 5:** The CRs in

R2-2301432 Correction of Note in NR-DL-PRS-AssistanceData field descriptions Ericsson CR Rel-16 37.355 16.9.0 0411 - F NR\_pos-Core

R2-2301434 Correction of Note in NR-DL-PRS-AssistanceData field descriptions Ericsson CR Rel-17 37.355 17.3.0 0413 - A NR\_pos-Core

are essential corrections.

 *[SBAS ID in posSIBs]*

**Proposal 6:** The CRs in

R2-2301347 Conditional inclusion of SBAS ID in posSIBs MediaTek Inc. CR Rel-16 38.331 16.11.0 3882 - F NR\_pos-Core

R2-2301348 Conditional inclusion of SBAS ID in posSIBs MediaTek Inc. CR Rel-17 38.331 17.3.0 3883 - A NR\_pos-Core

are essential corrections. Update the Cover Sheet.

 *[Missing GNSS Types]*

**Proposal 7:** For the CRs in

R2-2301431 Adding GNSS Types in GNSS-SSR-OrbitCorrections to clarify SSR clock correction signal reference and clarification of GNSS Troposperic Delay Correction Ericsson

R2-2301433 Adding GNSS Types in GNSS-SSR-OrbitCorrections to clarify SSR clock correction signal reference and clarification of GNSS Troposperic Delay Correction Ericsson CR Rel-17 37.355 17.3.0 0412 - A NR\_pos-Core

* + The change on Galileo is an essential correction in “NOTE 2: In the cases that *gnss-ID* indicates 'gps', 'qzss', galileo, the *iod* refers to the specific broadcast ephemeris (GPS L1 C/A, QZSS L1 C/A, Galileo I/NAV, respectively, in table GNSS to iod Bit String(11) relation in IE *GNSS‑NavigationModel).”*
	+ The change on Conditional presence of the tropospheric delay corrections for GNSS SSR Gridded Corrections is an essential correction.

**Proposal 7-1:** The change on QZSS in NOTE2 is not essential, and the statement of “, where the troposphere delay correction is provided for one GNSS and valid for all other GNSSs” is not essential as well.