**3GPP TSG-RAN WG2 Meeting #116bis-e R2-220xxxx**

**Electronic Meeting, January 17 – 25, 2022**

**Agenda item:** 8.11.1

**Source:** InterDigital Inc.

**Title:** Email discussion report on [Post116bis-e][627][POS] 36.305/38.305 integrity running CRs (InterDigital)

**Document for:**  Discussion

# 1. Introduction

This document summarizes the following email discussion:

* [Post116bis-e][627][POS] 36.305/38.305 integrity running CRs (InterDigital)

      Scope: Check and endorse the running CRs considering decisions of RAN2#116bis-e.

      Intended outcome: Endorsed CRs

      Deadline:  Friday 2022-01-28 0800 UTC

The draft running CRs are attached with this email discussion.

Please provide the contact information in the following Table:

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| --- | --- | --- |
| **Company** | **Point of contact** | **Email address** |
| Qualcomm | Sven Fischer | sfischer@qti.qualcomm.com |
| Swift Navigation | Grant Hausler | grant@swiftnav.com |
| CATT | Jianxiang Li | Jianxiang Li (lijianxiang@catt.cn) |
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# 2. Discussion

The scope of this email discussion is to discuss the Stage 2 description included in the running CRs for TS 38.305 and TS 36.305, in [1] and [2], respectively.

The previously submitted running CRs (prior to start of RAN2#116bis-e meeting) are [3] and [4].

## 2.1 Discussion

The text proposal provided in the running CRs are based on the descriptions discussed during [AT116bis-e][611][POS] discussions [3][4] and agreed during RAN2#116bis-e meeting [5].

Given the agreements in [5] and the open issues/FFS listed in [AT116bis-e][611][POS] GNSS integrity - Extended Discussion (Stage 3) [4], the following parameters related to Integrity alerts, and orbit and clock integrity bounds are excluded from Table 8.1.2.1b-1 (Mapping of Integrity Parameters) in the running CRs:

* Integrity Alerts
  + Service DNU, Constellation DNU, Satellite Vehicle DNU
* Integrity Bounds (Mean)
  + Mean Orbit Clock Residual Error Shape Vector, Mean Orbit Clock Residual Rate Error Shape Vector, Mean Orbit Clock Residual Error Scale Factor, Mean Orbit Clock Residual Rate Error Scale Factor
* Integrity Bounds (StdDev)
  + Covariance Orbit Clock Residual Error Shape Matrix, Covariance Orbit Clock Residual Rate Error Shape Matrix, Covariance Orbit Clock Residual Error Scale Factor, Covariance Orbit Clock Residual Rate Error Scale Factor

The open issues related to the above parameters, provided in [4], are as follows:

* **Proposal 3 (Open Issue): RAN2 to discuss whether to modify the existing GNSS-RealTimeIntegrity IE or create a new IE to accommodate the Alerts for the satellite/constellation specific DNUs under *GNSS-GenericAssistData*.**
  + **Discuss whether a Constellation DNU and per-signal DNU should be included in addition to the SV DNU.**
* **Proposal 5 (Open Issue): RAN2 to discuss whether or not the cross-covariance should be included for the Orbit and Clock integrity bounds and whether these bounds should be included as a new IE or within the existing SSR Orbit and Clock IEs.**

Q1: Please provide your comments on the CRs, as well as your suggested changes and corresponding clause/section where the comments/changes may apply.

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| **Company** | **Comments** | **Suggested Changes** | **Clause/Section** |
| Qualcomm | Section 3.1, Definition of "Positioning integrity" could be improved. The relation between "integrity" and "warning messages" is confusing/unclear. E.g., who provides these warnings? Are these the DNU flags? | Exclude signalling of messages from the integrity definition. E.g., just:  "A measure of the trust in the accuracy of the position-related data". | 3.1 |
| Table 8.1.2.1-1: Integrity Residual Risk Parameters and  Integrity Orbit Clock Error Bounds need an FFS/Editor's Note, since not clear yet whether this will be new assistance data or integrated into existing SSR assistance data. | Add FFS/Editor's Note. | Table 8.1.2.1-1 |
| Integrity Residual Risk Parameters can also be integrated into existing assistance data per agreement:  Proposal 5: RAN2 agrees to include the Integrity Residual Risk Parameters into their existing corresponding GNSS IEs (as per Appendix A (R2-2201761). This discussion is also subject to the Stage 3 outcomes regarding which IEs and associated fields to define for integrity. | Include Integrity Residual Risk description in sections 8.1.2.1.25/26.  Or add an Editor's Note for now. | 8.1.2.1.31 |
| Editorial: 3GPP styles need to be used |  | All text seems Normal Style (even headings and Notes), use justified paragraphs, etc. (see 21.801 for 3GPP styles). |
| Huawei, HiSilicon | Definitions for error, bound, DNU, residual risk, irMax,Min | Put the definitions under the clause 3.1 | 8.1.1a |
| Huawei, HiSilicon | Two notes at the end of 8.1.1a | Should not be put under NOTE | 8.1.1a |
| Swift Navigation | Agree with QC that we could be more specific about the Alerts in the positioning integrity definition | **Positioning integrity:** A measure of the trust in the accuracy of the position-related data and the ability to provide associated Alerts (e.g. DNU) | 3.1 |
| Agree with QC on adding FFS to Orbit/Clock Alerts and Bounds in Table 8.1.2.1b-1 | We proposed track changes to the draft CR for 38.305 | Table 8.1.2.1b-1 |
| Agree with QC on also integrating residual risks into the STEC and Gridded Correction Descriptions 8.1.2.1.25/26 | 8.1.2.1.25/26 |
| In Table 8.1.2.1b-1 the word ‘Static’ needs to be removed from the ‘…Vertical Wet Delay…’ fields (this was an error in the initial Table) | Table 8.1.2.1b-1 |
| The Mean Duration parameters from Table 3.2-2 need to be added to the Residual Risks column in Table 8.1.2.1b-1, as per Proposal 6 (R2-2201765). | Table 8.1.2.1b-1 |
| We made some minor editorials in 8.1.1a to tighten the wording and grammar etc. If it’s too late to include, that’s ok, but hopefully it helps overall. | 8.1.1a |
| In Section 8.1.1a (Principle of Operation) the text and equations will need to be updated if we adopt the combined orbit/clock covariance approach, to show how the bound can be computed using the covariance matrix, FFS. | FFS | 8.1.1a |
| CATT | Agree with QC. Integrity Residual Risk Parameters IE should be deleted or add FFS/Editor's Note. Since this IE will be included in the existing GNSS IEs. | Delete or add add FFS/Editor's Note. | able 8.1.2.1-1 |
| The SSR STEC Corrections IE also provides Ionosphere Range Error Correlation Time and  Ionosphere Range Rate Error Correlation Time information according to Table 8.1.2.1b-1. | Include integrity correlation times description. | 8.1.2.1.25 |
| SSR Gridded Correction also provides the Troposphere Range Error Correlation Time and Troposphere Range Rate Error Correlation Time information according to Table 8.1.2.1b-1. | Include integrity correlation times description. | 8.1.2.1.26 |
| The description of the Mean Fault Duration parameters should be kept, but not in the Integrity Residual Risk Parameters IE. RAN2 agrees to include the Integrity Residual Risk Parameters into their existing corresponding GNSS IEs. This clause should be deleted. | Delete clause 8.1.2.1.31 and move the description of the Mean Fault Duration parameters to the suitable clause. | 8.1.2.1.31 |
| It is better to indicate the Protection Level in the integrity results, since RAN2 agrees that the PL will be reported in the Integrity Results. | Include the PL in the description. | 8.1.3.3.1 |
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# 3 Summary

The following is the summary containing the companies and rapporteur’s views derived from the discussion above:

# 4 Reference

1. R2-220xxxx, Running CR of 38.305 GNSS Positioning Integrity (InterDigital, Inc), Jan 2022
2. R2-220xxxx, Running CR of 36.305 GNSS Positioning Integrity (InterDigital, Inc), Jan 2022
3. R2-2201390, Running CR of 36.305 for GNSS Positioning Integrity (InterDigital, Inc), Jan 2022
4. R2-2201391 Running CR of 38.305 for GNSS Positioning Integrity (InterDigital, Inc), Jan 2022
5. R2-2201761, Report of [AT116bis-e][611][POS] GNSS integrity (Swift)
6. R2-2201765, [AT116bis-e][611][POS] GNSS integrity - Extended Discussion (Stage 3) (Swift)
7. RAN2 chairman notes RAN2#116bis-e, January 2022