3GPP TSG-RAN WG2 #118-e R2-22xxxxx

Online Meeting, May 9th – May 20th, 2022

Agenda Item: 6.21.2

Source: Ericsson

Title: [Post118-e][601][TEI17] NMEA GGA sentence info (Ericsson)

Document for: Discussion, Decision

# Introduction

This email discussion will discuss the details of the draft CR that was the converging during the at meeting email discussion 628 about adding NMEA GGA sentence info to HA-GNSS reporting:

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| [R2-2206395](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Inbox/R2-2206395.zip) | [AT118-e][628][POS] NMEA GGA string for HA-GNSS reporting | Ericsson |
| [R2-2206444](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Inbox/R2-2206444.zip) | NMEA GGA sentence info in high accuracy GNSS location estimates [HA-GNSS-NMEA] | ESA, Ericsson, Deutsche Telekom, T-Mobile USA, Swift Navigation, Hexagon, MediaTek Inc., u-blox |

based on the following original contribution

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| [R2-2206329](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Inbox/R2-2206329.zip) (revision of R2-2205845) | Remaining details for high-precision GNSS reporting | ESA, Ericsson, Deutsche Telecom, T-Mobile USA, Swift Navigation, Hexagon, MediaTek Inc., u-blox |

* [Post118-e][601][TEI17] NMEA GGA sentence info (Ericsson)

Scope: Review the CR in R2-2206444 and determine what parts are agreeable.

Intended outcome: Agreed CR

With a short deadline, please comments in consideration the deadline ***Thursday 2022-05-26 1800 UTC.***

#  Contact Information

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| Ericsson | fredrik.gunnarsson@ericsson.com, ritesh.shreevastav@ericsson.com  |
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| MediaTek | nathan.tenny@mediatek.com |
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# Discussion

The draft CR [R2-2206444](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Inbox/R2-2206444.zip) is also provided separately as “R2-22xxxxx\_37.355\_CRnnnn\_(Rel-17)” in the drafts folder. A new version R2-22xxxxx\_37.355\_CRnnnn\_(Rel-17)\_v22 has been uploaded to reflect the comments made in v01-v03.

To structure the comments, consider the following questions:

*Question 1. In the email discussion 628 at the meeting, the following companies ESA, Ericsson, Deutsche Telekom, T-Mobile USA, Swift Navigation, Hexagon, MediaTek Inc., u-blox,,Intel, Huawei, HiSilicon, Apple, CATT and vivo expressed support for adding the remaining NMEA GGA information to location information reports. In addition to those companies, do you support the CR*?

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| Company | Comments |
| Swift Navigation | We agree with the motivation but highlight that NMEA GGA is a legacy protocol meaning it only addresses a subset of the GNSS positioning methods in LPP. Therefore, we believe there is merit in expanding the CR to provide for extensibility as new positioning modes and metrics are identified. We are OK to start with a smaller subset of functionality that can be built upon over time.In particular we would suggest leaving the LocationSource as is, and putting any more granular information about the fix type into HA-GNSS-Metrics (see Q5). It will become cumbersome to continue to extend LocationSource if we need to introduce different or more granular fix types. |
| MediaTek | Support as a cosigner. We are OK with the general approach of taking information from the NMEA GGA string into other existing fields where possible, as discussed in RAN2#118-e. |
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*Question 2. Comments to the* nrOfUsedSatellites *field of HA-GNSS-Metrics* IE?

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*Question 3. Comments to the* *dilution of precision fields* hdopi *and* pdopi *of HA-GNSS-Metrics* IE?

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| Company | Comments |
| Swift Navigation | Representation as an unsigned 8-bit integer with a multiplier of 0.1 (i.e. 0.0 – 25.5) would allow for easier encoding and decoding compared to the discrete values in the proposal, with minimal additional number of bits. |
| Ericsson | Agree, this can be a better solution hdopi-r17 INTEGER (1..256) OPTIONAL, pdopi-r17 INTEGER (1..256) OPTIONAL,with field descriptions***hdopi***This field specifies the horizontal dilution of precision for the location estimate, scale factor 0.1***pdopi***This field specifies the 3D position dilution of precision, scale factor 0.1. |
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*Question 4. Comments to the* age *field of HA-GNSS-Metrics* IE?

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| Company | Comments |
| Ericsson | It seems some GNSS devices in the industry is reporting age in relation to the most recent used high accuracy and some do not provide age information, possibly by considering this only related to DGNSS messages. Therefore, we suggest that this field should be OPTIONAL and the field description changed to***age***This field, if supported by the device, specifies the age of the most recent used assistance data for high accuracy GNSS, scale factor 0.1 second. |
| Swift Navigation | Agree it should be an optional field if included |
| MediaTek | Agree it should be optional. |
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*Question 5. Comments to the two new location source alternatives* ha-gnss-float *and* ha-gnss-fix *of field LocationSource-r13 in CommonIEsProvideLocationInformation* IE?

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| Company | Comments |
| Ericsson | At this stage, it seems relevant to start by adding the fix and float alternatives that are in use in the GNSS industry today and discuss later if refinements by adding more alternatives would be recommended.  |
| Swift Navigation | We prefer to introduce a ‘fix type’ field into HA-GNSS-Metrics and leave the LocationSource as ha-gnss-v1510 as this will allow for more extensibility. We see the fix type as a separate concept from the LocationSource.We would suggest starting with the following, modified from those previously identified by Ericsson (R2-2206395):* Autonomous
* DGNSS
* Carrier-phase Float
* Carrier-phase Fixed

Additional modes can be added over time. |
| Ericsson | Sounds good. That makes it more clean and the fix type becomes subclasses under the master class of ha-gnss-v1510. That would go back to the HA-GNSS-Metrics IE as the complete container for the information:Some comments to the suggested elements:* *autonomous* – that would not be represented as ha-gnss location source but a-gnss so could be omitted from this list?
* *dgnss* – The NMEA GGA alternative combines DGNSS and SBAS which is a bit strange. We could leave this alternative out for the time being until we have clarified its meaning as a fix type under ha-gnss location source?

If we start from the other two fields, we start from what we had in the draft CR from the at meeting email discussion:-- ASN1STARTHA-GNSS-Metrics-r17 ::= SEQUENCE { nrOfUsedSatellites-r17 INTEGER (0..64), hdopi-r17 INTEGER (1..256) OPTIONAL, pdopi-r17 INTEGER (1..256) OPTIONAL, age-r17 INTEGER (0..99) OPTIONAL, fixType-r17 ENUMERATED (carrier-phase-float, carrier-phase-fix, ...}, ...}-- ASN1STOPWith a suggested field description:***fixType***This field specifies the positioning fix type, based on the positioning fix quality indicators of [xx]. Specifically* *carrier-phase-float* - converged carrier phase integer ambiguity resolution
* *carrier-phase-fix* - converging carrier phase floating point ambiguity resolution

Thereby, the fix type can be extended with more options later.  |
| MediaTek | OK with the suggestion above from Swift/Ericsson. |
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*Question 6. Any other comments*?

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| Company | Comments |
| MediaTek | In relation to the discussions of the principle of the CR from RAN2#118-e, we understand that “officially” the NMEA GGA sentence was not conceived as related to HA-GNSS, but also that it is used that way in practice. The rationale for using specific information for performance assessment/optimisation is necessarily dependent on deployments and implementations, but the support for the CR from a combination of operators, infra vendors, UE vendors, and GNSS experts argues that there actually is a practical end-to-end use for this information. |
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# Conclusion

# References

[1] [R2-2206329](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Inbox/R2-2206329.zip) Remaining details for high-precision GNSS reporting, ESA, Ericsson, Deutsche Telecom, T-Mobile USA, Swift Navigation, Hexagon, MediaTek Inc., u-blox

[2] Draft R2-2206444 CR#0349 NMEA GGA sentence info in high accuracy GNSS location estimates [HR-GNSS-NMEA]

[3] Draft R2-2206444 v2 CR#0349 NMEA GGA sentence info in high accuracy GNSS location estimates [HR-GNSS-NMEA]

[4] R2-2206444 CR#0349 NMEA GGA sentence info in high accuracy GNSS location estimates [HA-GNSS-NMEA]