Quality Assurance of EPOS-GNSS data quality monitoring web portal provided by ROB

https://gnssquality-epos.oma.be

epos@oma.be

April 2023

The aim of the EPOS-GNSS data monitoring web portal is to provide the necessary information to monitor the availability and quality of daily GNSS data that are discoverable through the EPOS TCS "GNSS data and products" (EPOS-GNSS) via the EPOS-GNSS data nodes and the GNSS Data Gateway (DGW).

GNSS datafiles are made discoverable in the RINEX format through the EPOS-GNSS data nodes and the EPOS-GNSS Data Gateway (DGW) using the GLASS system. For this purpose, GNSS RINEX file metadata are created and stored at the EPOS-GNSS nodes. In addition, these nodes process the RINEX files using the G-nut/Anubis software (https://gnutsoftware.com/software/anubis/) to generate for each file daily data quality metrics that are also stored at the node. G-nut/Anubis is a high-quality GNSS data quality check software that is wide used within the International GNSS Service (IGS).

The EPOS-GNSS data monitoring web portal is retrieving:

- from the EPOS-GNSS Data Gateway and the EPOS-GNSS data nodes, using GLASS APIs: the metadata of the RINEX files;
- from the EPOS-GNSS data nodes, using GLASS APIs: the data quality metrics of the RINEX files;
- from the "Metadata Management and Distribution System for Multiple GNSS Networks" (M^3G, https://gnss-metadata.eu/), using the M^3G APIs: the GNSS station metadata, the EPOS-GNSS data node(s) associated to each GNSS station, and the networks associated to each GNSS station.

This retrieval process has been developed to ensure the highest possible reliability. The GNSS station metadata, RINEX file metadata, and quality metrics are retrieved daily in order to ensure that they reflect the actual RINEX files discoverable from the EPOS-GNSS nodes and DGW. In case of connection issues or abnormal behavior, the members of the EPOS-GNSS data quality monitoring service are automatically warned by email and take actions to remedy the problem.

The retrieved GNSS station metadata, RINEX file metadata and data quality metrics are then stored in the local database of the data quality monitoring web portal. For each RINEX file at each EPOS-GNSS node, the data quality metrics are then used to calculate data quality indicators (QI). Selected QIs are plotted and published on the data quality monitoring web portal. The web portal is divided into two main sections, that are:

- **RINEX data availability** section that allows to check the distribution of EPOS-GNSS stations by data node, GNSS network, and M^3G metadata maintainer, and the RINEX file availability of these GNSS stations.
- **RINEX data quality** section that provides plots of the GNSS QIs, such as the number of observed versus expected observations, the number of missing epochs, the number of observed satellites,

the maximum number of observations, the number of cycle slips, the Standard Point Positioning (SPP) results, and the multipath values on code observations.

The plots on the data quality web portal are updated on a daily basis and the timestamp is visible on the plots.