

GPS calibration of NIMB and SIQ receivers with respect to PTB G1 (1013-2019)

Summary

From November 2019 to January 2020, the Physikalisch-Technische Bundesanstalt (PTB) conducted a trip to calibrate GNSS equipment owned by the National Institute of Metrology Bucharest (UTC code NIMB) and the Slovenian Institute of Quality and Metrology (UTC code SIQ). The trip started and finished at the PTB, providing results with respect to PTB Group1 reference receiver PT13 (however the closure could not be fully completed, see the report by PTB).

The operations and report of measurements are described in in the [report by PTB](#).

Version 1 of the report provides results for SIQ only. Results for NIMB will be provided in a later version.

• Final results for the calibrated systems

The INTDLY values of the receivers given in Table 1 have been computed by PTB based on the results of the [1001-2018](#) Group 1 trip for PT13 and should not be updated to reflect later changes in the conventional INTDLY values of the reference receivers.

For a P3/PPP UTC link A-B involving any Group 1 and any receiver in this trip, the uncertainty resulting from the calibration, $U_B(A-B)$, is computed as

$$U_B(A-B) = (U_{CAL0}^2 + \Delta U_{CAL}(A)^2 + \Delta U_{CAL}(B)^2)^{1/2} \quad (1)$$

where $U_{CAL0} = 2.5$ ns at the time of calibration, as given conventionally to Group 2, and where ΔU_{CAL} (generally zero) is specified for each system.

For single frequency C1 links, U_{CAL0} is 2.5 ns but could be complemented by an additional component to represent systematic errors in the ionospheric model.

Changes in the set-up of the receivers after the calibration must be accounted for as described in section A.3.6 of the most recent Calibration guidelines in <ftp://ftp2.bipm.org/pub/tai/publication/gnss-calibration/guidelines/>.

Table 1. Final P1/P2/C1 INTDLY values from the 1013-2019 trip. Values of REFDLY with respect to UTC(k) and of CABDLY during the calibration are also indicated for reference. All values are in ns. “Meas. Date” refers to the first day of the differential calibration, to which the calibration results can be applied. “Impl. Date” is the MJD when the results should be implemented in the receiver.

System	BIPM	Meas. date	INTDLY P1	INTDLY P2	INTDLY C1	REFDLY	CABDLY	Note	ΔU_{CAL}	Impl. date
SI01	SI01	2020/01/22	35.0	32.4	36.6	6.0	249.5	(1,2)	2.5	58908
SI02	SI02	2019/12/17	34.6	34.9	36.2	6.0	249.5	(1,2)	2.5	58908

Notes:

(1) SI01 and SI02 correspond to the same receiver with two different antennas. See the report by PTB.

(2) ΔU_{CAL} corresponds to the lack of proper closure for the trip and to the use of another antenna cable for the traveling receiver at SIQ.

Version history

V1.0 2020/03/23: Publication of SIQ results from Issue 1.0 of the Calibration report, to be implemented in the receivers.