

GNSS calibration of ORB equipment with respect to PTB G1 (1011-2020)

Summary

In Spring 2020, the PTB conducted a trip to calibrate GNSS equipment owned by ORB. The trip started and finished at the PTB, providing closure with respect to PTB Group1 reference receiver PT13.

GPS results were published in V1.0 of this summary.

After PT13 Galileo delays were determined, Galileo results were published in V2.0 of this summary.

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

- **Final results for the equipment calibrated in the original trip**

The INTDLY values given in Table 1 have been computed by PTB using INTDLY values of PT13 from the Group 1 trip [1001-2018](#). These INTDLY values should not be updated to reflect later changes in the conventional INTDLY values of OP71.

For a P3/E3/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.

Changes in the set-up of the receivers after the calibration must be accounted for as described in section A.3.6 of the Calibration guidelines v3.2 in [ftp://ftp2.bipm.org/pub/tai/publication/gnss-calibration/guidelines/](http://ftp2.bipm.org/pub/tai/publication/gnss-calibration/guidelines/).

Table 1. Final P1/P2/E1/E5a INTDLY values from the 1011-2020 trip. Values of REFDLY with respect to UTC(ORB) and of CABDLY during the calibration are also indicated for reference (all values 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 E1	INTDLY E5a	REF DLY	CAB DLY	Note	ΔU_{CAL}	Impl. date
BRUX	OR5Z	2020/04/02	28.0	23.8	30.4	29.6	68.5	237.5		0.0	Note 2
ORBA	OR4Z	2020/04/02	55.1	55.1	56.2	65.6	158.4	149.2		0.0	Note 2
GRCB	OR20	2020/04/02	33.0	27.8	35.8	33.7	70.2	96.3		0.0	Note 2
RTBS	OR21	2020/04/02	245.4	240.6	248.0	247.6	69.9	N/A	(1)	0.0	Note 2

Notes:

(1) Results are SYSDLY values.

(2) MJD 59032 for GPS values; MJD 59122 for Galileo values.

Version history

V1.0 2020/06/10: Final GPS results from V1.1 of the PTB Calibration report, to be implemented in the receivers:

V2.0 2020/10/06: Galileo results added in Table 1 from V1.2 of the PTB Calibration report.