

GPS calibration of NIMT, NMLS and VMI equipment with respect to TL G1 (1013-2017)

Summary

Over January-June 2017, the TL conducted a trip to calibrate GPS equipment owned by NIMT, NMLS and VMI. The trip started and finished at the TL, providing closure with respect to TL Group1 reference receiver TLT1.

The operations and report of measurements are described in the [report by TL](#). Note that the UTC laboratory NMLS is referred to in the report as NMIM.

• Final results for the calibrated equipment

The INTDLY values given in Table 1 have been computed by TL using TOTDLY values of TLT1 from the Group 1 trip [1001-2016](#). These INTDLY values should not be updated to reflect later changes in the conventional INTDLY values of TLT1.

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

Calibration results in Table 1 correspond to the set-up during the measurements, from the date indicated as “Meas. Date”. 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/>.

Table 1. Final P1/P2/C1 INTDLY values from the 1013-2017 trip. Values of REFDLY (with respect to the indicated REF) and CABDLY during the calibration and the resulting P3 Total delay TOTDLY 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.

System	BIPM	Meas. date	INTDLY P1	INTDLY P2	INTDLY C1	REF	REFDLY	CABDLY	Note	TOTDLY P3	ΔU_{CAL}
MTTO	MTT0	2017/01/30	NA	NA	31.2	UTC(NIMT)	7.1	165.4		NA	0.0
LSM1	LSM1	2017/03/24	NA	NA	35.1	UTC(NMLS)	10.8	155.4		NA	0.0
LS2P	LS2P	2017/03/24	219.1	220.0	222.4	UTC(NMLS)	259.1	157.5		116.1	0.0
VM__	VM__	2017/04/24	NA	NA	16.2	UTC(VMI)	33.9	256.8		NA	0.0
VN3P	VM12	2017/04/24	49.0	51.6	48.9	UTC(VMI)	243.9	124.3		-74.6	0.0

Notes:

Version history

V1.0 2017/09/27: Final results from Version 1.3 of the TL Calibration report, to be implemented in G2 receivers: IMPLEMENTATION DATE = MJD 58026.