

GPS calibration of NPLI equipment with respect to NICT G1 (1013-2018)

Summary

In Spring 2018, the NICT conducted a trip to calibrate GPS equipment owned by the National Physical Laboratory, India (UTC acronym NPLI). The trip started and finished at the NICT, providing closure with respect to NICT Group1 reference receivers NC01 and NC4S.

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

• Final results for the calibrated systems

The INTDLY values of the NPLI receivers given in Table 1 have been computed by NICT based on the results of the [1001-2016](#) Group 1 trip for NC01 and NC4S 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 1013-2018 trip. Values of REFDLY with respect to UTC(NPLI) 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
LIAA	LIAA	2018/03/12	-32.6	-31.4	-31.6	96.7	132.9	(1)	0.0	58391
LIAB	LIAB	2018/03/12	-32.4	-32.1	-31.6	96.5	132.2	(1)	0.0	58391
LIAF	LIAF	2018/03/12	49.6	50.5	50.8	247.1	168.9		0.0	58391
LITF	LIT4	2018/03/12	-26.7	-26.6	-24.6	90.1	142.2		0.0	58391
LITI	LI2P	2018/03/12	53.1	58.3	52.9	284.1	150.0		0.0	58391

Notes:

(1) Results for LIAA and LIAB (GTR51 receivers) are full INTDLY values, **NOT** changes with respect to values entered in the receiver.

Version history

V1.0 2018/09/27: Publication of results from Version 1.1 of the NICT calibration report, to be implemented in the NPLI receivers:

