GNSS calibration of NPLI receivers with respect to TL G1 (1011-2024)

Summary

From January to May 2024, National Standard Time and Frequency Lab Telecommunication Laboratories (TL) conducted a trip to calibrate GNSS equipment owned by National Physical Laboratory of India (NPLI). The trip started and finished at TL, providing closure with respect to the TL Group1 reference receivers.

The operations and report of measurements are described in the report by TL.

- **Final results for the calibrated systems**

The INTDLY values of the receivers given in Table 1 have been computed by TL based on the results of the Group 1 trip 1001-2020 for TLT5 (GPS and Galileo) and should not be updated to reflect later changes in the conventional INTDLY values of the reference receiver.

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, $U_B(A\text{-}B)$, is computed as

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

where $U_{CAL0} = 2.5$ ns is the conventional Group 2 value, 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 most recent BIPM calibration guidelines.

Table 1. Final P1/P2/E1/E5a INTDLY values from the 1018-2024 exercise. Values of REFDLY and CABDLY during the calibration are also indicated for reference. All values are in ns date in YYYY/MM/DD format. "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 C1	INTDLY P1	INTDLY P2	INTDLY E1	INTDLY E5a	REF DLY	CAB DLY	Note	ΔU_{CAL}	Impl. date
liti	LI2P	2024/05/25	54.2	55.1	60.5			299.1	150.0		0.0	60522
liaa	LIAA	2024/05/25	37.7	37.3	35.6	38.2	37.3	96.7	132.9		0.0	60523
liab	LIAB	2024/05/25	37.7	37.2	34.7	38.4	36.9	96.5	132.2		0.0	
liac	LIAC	2024/05/25	38.4	37.9	35.5	39.1	37.2	46.8	133.0		0.0	
liaf	LIAF	2024/05/25	52.3	51.4	52.6	52.1	62.7	247.1	168.9		0.0	60522

Notes:

Version history
V1.0 2024/09/05: Publication of results from V1.1 of the TL report.