

GNSS calibration of NRC receivers with respect to NIST G1 (1015-2023)

Summary

From June to August 2023, the National Institute of Standards and Technology (NIST) conducted a trip to calibrate GNSS equipment owned by the National Research Council of Canada (NRC). The trip started and finished at NIST, providing closure with respect to the NIST Group1 reference receiver NISX. The operations and report of measurements are described in the [report by NIST](#).

- **Final results for the calibrated systems**

The INTDLY values of the receivers given in Table 1 have been computed by NIST based on the results of the Group 1 trip [1001-2020](#) for NISX (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, $U_B(A-B)$, 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 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 [Calibration guidelines](#).

Table 1. Final P1/P2/E1/E5a INTDLY values from the 1015-2023 exercise. Values of REF DLY 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	CABDLY	Note	ΔU_{CAL}	Impl. date
NRC4	NRC4	2023/07/08	62.2	61.0	65.2	62.4	66.1	228.8	269.3		0.0	60370
NRCC	NRCC	2023/07/08	34.3	32.2	27.7	34.4	32.1	58.7	314.9		0.0	60370
NRC6	NRC6	2023/07/20	34.5	32.3	30.9	34.6	32.0	50.0	37.6		0.0	60370

Notes:

Version history

V1.0 2024/03/06: Publication of results from V1.0 of the NIST report.