

GNSS transfer of calibration at ROA (1101-2021)

Summary

In February 2021, the Real Observatorio de la Armada (Spain, UTC acronym ROA) conducted a transfer of calibration from its G1-calibrated GPS receivers RO_9 to the receivers RO_8 and RO10 which calibration was lost after a change of antenna set-up.

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

- **Final results for the calibrated systems**

The INTDLY values of the receivers given in Table 1 have been computed by ROA based on the results of the Group 1 trip [1001-2018](#) for RO_9 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 $U_{CAL0} = 1.6$ ns is composed of the conventional Group 1 value (1.5 ns) and the uncertainty of the transfer (0.5 ns), and where ΔU_{CAL} (generally zero) is specified for each system. For UTC use, the ageing uncertainty will be based on the date of original calibration of RO_9 i.e. 2018/12/14.

For single frequency C1 links, U_{CAL0} is 1.6 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 <https://webtai.bipm.org/ftp/pub/tai/publication/gnss-calibration/guidelines/>.

Table 1. Final P1/P2/C1/E1/E5a INTDLY values from the 1101-2021 exercise. Values of REFDLY and 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	INTDLY E1	INTDLY E5a	REF DLY	CAB DLY	Note	ΔU_{CAL}	Impl. date
RO_8	RO_8	2021/02/19	29.6	27.9	31.3	32.6	24.6	20.4	197.1		0.0	59276
RO10	RO10	2021/02/19	29.0	26.3	30.7	30.6	30.5	5.1	199.0	(1)	0.0	59276

Notes:

(1).RO10 is a PolaRx5 operated in mode “Autocompensation ON”.

Version history

V1.0 2021/03/05: Publication of results from version 2.0 of the ROA report on the transfer of calibration.