

GPS calibration of DLR, RISE and INRIM equipment with respect to OP G1 (1014-2019)

Summary

Over January-July 2019, the LNE-SYRTE (UTC acronym OP) conducted a trip to calibrate GNSS equipment owned by the Deutsches Zentrum für Luft und Raumfahrt (DLR), the Research Institute of Sweden (RISE, UTC acronym SP) and the Istituto Nazionale Ricerca Metrologica (INRIM, UTC acronym IT). The trip started and finished at the OP, providing closure with respect to OP Group1 reference receiver OP71.

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

• Final results for the calibrated systems

The INTDLY values of the receivers given in Table 1 have been computed by OP based on the results of the [1001-2018](#) Group 1 trip for OP71 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.

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/](http://ftp2.bipm.org/pub/tai/publication/gnss-calibration/guidelines/).

Table 1. Final P1/P2 INTDLY values from the 1014-2019 trip. Values of REFDLY with respect to UTC(k) 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	REFDLY	CABDLY	Note	ΔU_{CAL}	Impl. date
OBET	DL05	2019/03/21	61.5	58.8	157.3	524.1		0.0	58906
UTC4	DL04	2019/03/21	62.8	61.1	154.8	524.2		0.0	58906
UTC7	DL07	2019/03/21	36.2	34.3	64.9	545.0		0.0	58906
UTC8	DL08	2019/03/21	38.4	34.5	67.8	547.3		0.0	58906
RIT1	SP06	2019/03/30	273.5	269.7	N/A	N/A	(1)	0.0	58906
SP01	SP01	2019/03/30	235.5	250.9	N/A	N/A	(1)	0.0	58906
SP02	SP02	2019/03/30	236.0	250.1	N/A	N/A	(1)	0.0	58906
SP05	SP05	2019/03/30	201.4	195.6	N/A	N/A	(1)	0.0	58906
IENG	IT10	2019/05/03	54.9	55.3	483.7	130.5		0.0	58906
GR01	IT11	2019/05/03	57.0	55.0	483.8	298.6		0.0	58906
GR02	IT12	2019/05/03	353.7	353.1	483.6	N/A	(2)	0.0	58906
GR03	IT13	2019/05/03	283.0	280.4	210.5	N/A	(2)	0.0	58906
INR5	IT08	2019/05/03	310.0	309.1	484.1	N/A	(2)	0.0	58906
INR6	IT09	2019/05/03	55.6	55.8	484.1	130.5		0.0	58906

Notes:

- (1) Results are TOTDLY values.
- (2) Results are SYSDLY values.

Version history

V1.0 2020/02/14: Publication of results from Issue 1.1 of the Calibration report, to be implemented in the receivers.

V1.1 2020/03/30: Use the BIPM code SP06 for the system RIT1 in Table 1.