

# GPS calibration of KRISS equipment with respect to NICT G1 (1017-2017)

## Summary

Over April 2017, the NICT conducted a trip to calibrate GPS equipment owned by KRISS. 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 equipment

The INTDLY values given in Table 1 have been computed by NICT using INTDLY values of NC01 and NC4S from the Group 1 trip [1001-2016](#). These INTDLY values should not be updated to reflect later changes in the conventional INTDLY values of NC01 or NC4S.

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  $\Delta U_{CAL}$  (generally zero) is specified for each system.

For single frequency links,  $U_{CAL0}$  is 2.5 ns but should be complemented by an additional component to represent systematic errors in the ionospheric model.

Calibration results in Table 1 correspond to the set-up during the measurements, from the date indicated as “Meas. Date”. Changes in the set-up of the receivers after the calibration must be accounted for as described in section A.3.6 of the Calibration guidelines v3.2 in <ftp://ftp2.bipm.org/pub/tai/publication/gnss-calibration/guidelines/>.

Table 1. Final P1/P2/C1 INTDLY values from the 1017-2017 trip. Values of REFDLY (with respect to the indicated REF) and CABDLY during the calibration and the resulting P3 Total delay TOTDLY are also indicated for reference (all values in ns). “Meas. Date” refers to the first day of the differential calibration, to which the calibration results can be applied.

System	BIPM	Meas. date	INTDLY P1	INTDLY P2	INTDLY C1	REF	REFDLY	CABDLY	Note	TOTDLY P3	$\Delta U_{CAL}$
KRT1	KRT1	2017/04/19	-38.0	-41.4	-36.7	UTC(KRIS)	100.0	193.2		60.5	0.0
KRG1	KRG1	2017/04/19	-35.7	-37.9	-33.7	UTC(KRIS)	109.6	193.1	(1)	51.2	0.0
KRZ1	KRZ1	2017/04/19	306.8	315.5	307.5	UTC(KRIS)	139.1	182.6		336.9	0.0

Notes:

(1) KRG1 is a Dicom GTR51: Listed INTDLY are total values. Direct results of the calibration are changes (-3.1 ns P1, -1.6 ns P2, -7.1 ns C1) with respect to the values entered in the receiver.

### Version history

V1.0 2017/08/29: First results from Version 1.2 of the NICT Calibration report.

V1.1 2017/09/28: Final results from Version 1.3 of the NICT Calibration report, to be implemented in G2 receivers: IMPLEMENTATION DATE = MJD 58056.