

# GPS calibration of BIM, UME, BOM, DMDM, IMBH, INRIM equipment with respect to ROA G1 (1011-2016)

## Summary

Over the period February-August 2016, the ROA conducted a trip to calibrate GNSS equipment owned by BIM, UME, BOM, DMDM, IMBH and INRIM. The trip started and finished at ROA, providing closure with respect to ROA Group1 reference receiver RO\_5.

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

### • Final results for the calibrated equipment

The INTDLY values given in Table 1 have been computed by ROA using INTDLY values of RO\_5 available at the time of the calibration. They should not be updated to reflect later changes in the conventional INTDLY values of RO\_5.

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.

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

Table 1. Final P1/P2 INTDLY values from the 1011-2016 trip. Values of REFDLY and CABDLY during the calibration and the resulting P3 Total delay TOTDLY are also indicated for reference (all values in ns).

System	BIPM	Date	INTDLY P1	INTDLY P2	REFDLY	CABDLY	Note	TOTDLY P3	$\Delta U_{CAL}$
BGB	BM37	2016.2	-15.7	-2.7	8.2	147.1		103.1	0.0
UME4	UM01	2016.3	-33.0	-33.8	6.0	139.9	(1)	102.1	0.0
TTS	MA__	2016.4	-31.1	-35.2	11.3	203	(1)	166.9	0.0
DMDM	ZM68	2016.4	0.4	0.5	40.1	212.5	(2)	172.6	0.0
BH01	BH01	2016.5	-21.8	-26.0	11.1	146.0	(3)	119.6	99.9
GTRB	IT__	2016.6	-1.2	-1.6	22.8	131	(2)	107.6	0.0
GTRI	IT2_	2016.6	-1.4	-2.4	19.4	210.9	(2)	191.6	0.0
IENG	IT1Z	2016.6	307.1	316.4	384.3	136.6		45.0	0.0
INR5	IT5_	2016.6	220.1	221.2	523.2	0	(4)	-304.8	0.0
INR6	IT6_	2016.6	229.4	228.4	539.8	0	(4)	-308.9	0.0

Notes:

(1) REFDLY value corresponding to the calibration setup and measured after the calibration.

(2) INTDLY values for ZM68, IT\_\_ and IT2\_ (GTR50 receivers) are changes with respect to the a priori values used in the receiver, see the [report](#).

(3) The REFDLY value of the BH01 TTS4 receivers has not been measured in full accordance with the Annex 1 of the [calibration guidelines](#), see the [report](#). The set-up has been changed since the calibration so that the calibration results should not be used.

(4) Values reported in INTDLY columns are  $SYSDLY = INTDLY + CABDLY$ .

Version history

V1.1 2017/01/17: Final results from V5 of the Calibration report, to be implemented in participating G2 receivers (except BH01).