GPS calibration of BIRM equipment with respect to NIM G1 (1015-2016)

Summary

In October-November 2016, the NIM conducted a trip to calibrate GPS equipment owned by BIRM. The trip started and finished at the NIM, providing closure with respect to NIM Group1 reference receiver IMEJ.

The operations and report of measurements are described in the report by NIM.

- **Final results for the calibrated equipment**

The INTDLY values given in Table 1 have been computed by NIM using INTDLY values of IMEJ from the Group 1 trip 1001-2016. These INTDLY values should not be updated to reflect later changes in the conventional INTDLY values of IMEJ.

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

$$U_B(A\text{-}B) = (U_{CAL0}^2 + \Delta U_{CAL}(A)^2 + \Delta U_{CAL}(B)^2)^{1/2} \quad (1)$$

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.
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.

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 C1 and P3 INTDLY values from the 1015-2016 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 C1	INTDLY P3	REFDLY	CABDLY	Note	TOTDLY P3	ΔU_{CAL}
BIRM	BI01	2016/10	**-54.7**	**-30.4**	10.0	218.9	(1,2)	178.5	0.0
BM52	BI02	2016/10	**-66.4**	**-54.7**	11.7	225.4	(1)	159.0	0.0

Notes:
(1) REFDLY values measured at the time of the calibration, corresponding to the calibration set-up.
(2) The REFDLY value of BI01 (TTS4) has not been measured in full accordance with the Annex 1 of the calibration guidelines, see the report. Results are expressed as INTDLY for consistency with the CGGTTS V2 format but **care should be taken if the set-up is changed**: Only the "Total delay" (TOTDLY = INTDLY + CABDLY – REFDLY) is a strictly meaningful result.

Version history
V1.0 2017/05/19: Final results from Version 2.6 of the NIM Calibration report, to be implemented in G2 receivers.