GPS calibration of MASM and SG equipment with respect to NIM G1 (1019-2018)

Summary

Over September 2018 to March 2019, the National Institute of Metrology, China (NIM) conducted a trip to calibrate GNSS equipment owned by the Mongolian Agency of Standardization and Measurement, Mongoliaa (BIPM acronym MASM) and by the National Metrology Centre - Agency for Science Technology and Research, Singapore (BIPM acronym SG). The trip started and finished at the NIM, providing closure with respect to NIM Group1 reference receiver IM06.
The operations and report of measurements are described in in the report by NIM.

- **Final results for the calibrated systems**

The INTDLY values of the MASM and SG receivers given in Table 1 have been computed by NIM based on the results of the 1001-2018 Group 1 trip for IM06 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

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

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/.

Table 1. Final P1/P2 INTDLY values from the 1019-2018 trip. Values of REFDLY with respect to UTC(k) and of CABDLY during the calibration are also indicated for reference as available. 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
MN__	MN__	2018/10/12	**-23.0**	**-22.4**	0.0	131.4	(1)	0.5	58696
SG01	SG01	2018/12/29	**61.2**	**57.7**	38.2	376.0	(2)	0.5	58696
SG02	SG02	2018/12/29	**68.6**	**64.3**	38.2	328.0	(2)	0.5	58696
SG2P	SG2P	2018/12/29	**221.3**	**220.8**	243.8	272.0	(2)	0.5	58696
SGBK	SGBK	2018/12/29	**219.0**	**216.2**	236.6	413.0	(2)	0.5	58696

Notes:
(1) ΔU_{CAL} = 0.5 ns due to discrepancy between the two travelling receivers.
(2) ΔU_{CAL} = 0.5 ns due to the use of specific antenna cables for the travelling receivers.

Version history
V1.0 2019/07/18: Publication of results from V2.7 of the Calibration report, to be implemented in the receivers.