2018 Group 1 GPS calibration trip (Cal_Id 1001-2018)

Summary

The 2018 visit to Group 1 laboratories is the third Group 1 trip and started in March 2018.
The trip is decomposed into several phases, each enclosed with closure at the BIPM. Some phases may be run in parallel.

- Phase 1 (March-September 2018). BIPM-TL-NICT-NIM-BIPM with the traveling receivers BP1C and BP0U;
- Phase 2 (April-October 2018): BIPM-SU-BIPM with the traveling receivers BP1K;
- Phase 3 (November-xxxx): BIPM-PTB-ROA-OP-BIPM with the traveling receivers BP1C and BP1X;
- Phase 4 (To Be Continued)

The full report of the Group 1 trip is split in several sub-reports

All files indexed in this report can be accessed here

- **Reports of operations and raw data processing (one for each phase)**

- 1001-2018-Phase1-cv.pdf
- 1001-2018-Phase2-cv.pdf

- **Excel sheet for differential calibration computations**

- 1001-2018-calcul.xls

- **Reports of differential calibration computations (one for each phase)**

- 1001-2018-Phase1-report.pdf
- 1001-2018-Phase2-report.pdf (draft as of 15/11/2018)

- **Report on selecting reference values to compute final results of this trip**

TM266_Group1-followon-values.pdf

- **Final results for the visited systems**

Table 1 lists the final values of P1/P2/C1 INTDLY values from the 1001-2018 Group 1 trip, along with information on the REFDLY and CABDLY values used in the processing of the calibration results.

For any link A-B, the uncertainty resulting from the calibration, U_B(A-B), is computed as
$U_B(A\text{-}B)^2 = (U_{CAL0}{}^2 + \Delta U_{CAL}(A)^2 + \Delta U_{CAL}(B)^2)^{1/2}$ (1)
where U_{CAL0} is the conventional value chosen for the whole calibration trip and where ΔU_{CAL} is generally zero, except for some systems for specific reasons. See the reports of differential calibration computations for all information on U_{CAL0} and ΔU_{CAL}. The values ΔU_{CAL} are indicated in Table 1.
For P3 links, U_{CAL0} is 1.5 ns.
For single frequency links, U_{CAL0} is 1.2 ns but should be complemented by an additional component to represent systematic errors in the ionospheric model.

Table 1. Final P1/P2/C1 INTDLY values from the 1001-2018 Group 1 trip. Values of REFDLY and CABDLY at the epoch of calibration 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 code	Meas. Date	INTDLY P1	INTDLY P2	INTDLY C1	REFDLY	CABDLY	Note	Implem. date	ΔU_{CAL}
BP1J	BP1J		53.0	52.6	54.4			(1)		
PHASE 1 (TL, NICT, NIM)										
TLT1	TLT1	2018/04/21	415.3	424.3	415.1	N/A	N/A	(2)	58421	0.0
TLT2	TLT2	2018/04/21	-35.6	-36.5	-33.8	24.5	140.3		58421	0.0
TLT4	TLT4	2018/04/21	117.8	117.3	119.2	0.0	N/A	(3)	58421	0.0
NC01	NC01	2018/06/01	218.3	222.3	221.4	406.0	213.4		58421	0.8
NC5G	NC5G	2018/06/01	-31.0	-24.1	-38.5	168.3	268.7	(4)	58421	0.8
NC4S	NC4S	2018/06/01	276.7	276.4	278.1	312.7	N/A	(3)	58421	0.8
BJNM	IM05	2018/08/15	74.4	81.7	76.1	331.6	125.0		58421	0.0
IM20	IM20	2018/08/15	-22.0	-3.6	-20.5	147.1	205.1		58421	0.0
IM21	IM21	2018/08/15	-25.9	-33.4	-24.9	131.5	215.0		58421	0.0
IMEJ	IM06	2018/08/15	-31.8	-18.4	-31.0	121.7	248.7	(4)	58421	0.0
IMEL	IM12	2018/08/15	-40.9	-40.4	-38.9	147.1	201.4	(4)	58421	0.5
IMEU	IM03	2018/08/15	-24.8	-12.1	-23.4	120.1	250.3		58421	0.0
TF01	IM30	2018/08/15	-26.6	-37.8	-25.7	153.0	215.0		58421	0.0
TF11	IM31	2018/08/15	-29.8	-40.3	-28.6	130.5	215.0		58421	0.0
PHASE 2 (SU)										
SU19	SU19	2018/05/26	-30.3	-28.9	-28.3	194.5	48.2		58451	0.0
SU31	SU31	2018/05/26	36.5	34.5	38.5	207.5	143.2	(4)	58451	0.0
SUCL	SUCL	2018/05/26	-35.6	-35.4	-33.6	207.5	128.2	(4)	58451	0.0

Notes:
(1) BP1J is included in order to provide reference for BIPM-led specific calibrations.
(2) Results are Total Delay values (TOTDLY).
(3) Results are System Delay values (SYSDLY).
(4) For GTR50/51 the listed INTDLY values are total values. Direct results of the calibration are changes with respect to the values previously entered in the receiver (all values in ns):

BIPM code	P1	P2	C1
NC5G	0.1	0.2	0.0
IM06	-0.5	-0.5	-0.6
IM12	-7.4	-5.2	-11.5
SU31	-1.8	-2.3	-0.7
SUCL	-1.0	-0.9	0.2

Version history

V1.0 2018/11/15: Final APMP results from version V1.1 of the report 1001-2018-Phase1-report.pdf, to be implemented in G1 receivers as coordinated by the BIPM Time Department.
Draft COOMET results from V1.0 of the report 1001-2018-Phase2-report.pdf.

V1.1 2018/11/30: APMP results unchanged, but link to version V1.2 of the report 1001-2018-Phase1-report.pdf.
Final COOMET results, unchanged from draft, from V1.0 of the report 1001-2018-Phase2-report.pdf.