

Initial Group 1 calibration trip

Summary

Several visits of the BIPM equipment 'METODE' to Group 1 laboratories have been carried out between April 2013 and September 2014 to carry out tests of the equipment. These visits were successful and it was decided to consider them as the start of the initial Group 1 calibration trip.

Because the set-up of the METODE was not constant in all visits, the trip is actually separated in several phases:

- Phase 1 (March-April 2013). BIPM-OP-BIPM with the two traveling receivers BPOT and BPOU;
- Phase 2 (April 2013-September 2014). BIPM-PTB-BIPM-TL-BIPM-NMIJ-NICT-BIPM-NIM-BIPM-ROA-BIPM with the two traveling receivers BP1C and BPOU

The starting session (at BIPM) for the second phase corresponds to the closing session of the first phase.

- Phase 3 (XXXX 2014). BIPM-SU-BIPM with the traveling receiver BP1K
- Phase 4 (starting January 2015). BIPM-NIST-USNO-BIPM

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)**

- [Group1-201401-Phase1-cv.pdf](#)

- [Group1-201401-Phase2-cv.pdf](#)

- **Excel sheet for differential calibration computations**

(presently in COMMUN.Tai/calib/Group1/2013-2014 with name)

- Group1-201401-calcul.xls

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

(presently in COMMUN.Tai/calib/Group1/2013-2014 with following names)

- [Group1-201401-Phase1-report.pdf](#)

- [Group1-201401-Phase2-report.pdf](#)

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

[TM243_Group1-reference-values_V3.pdf](#) (to be finalized)

- **Final results for the visited systems**

Table 1 lists the final values of P1/P2 INTDLY values from the 2013-2014 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

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

where $U_{CAL} = 1.7$ ns is the general value for the 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_{CAL} and ΔU_{CAL} . The values ΔU_{CAL} are indicated in Table 1.

Table 1. P1/P2 INTDLY values from the 2013-2014 Group 1 trip. Values of REFDLY and CABDLY at the epoch of calibration and the resulting P3 Total delay are also indicated for reference (all values in ns). The values ΔU_{CAL} are to be used in equation (1).

System	BIPM	Date	INTDLY P1	INTDLY P2	REFDLY	CABDLY	Note	TOTDLY P3	ΔU_{CAL}
PHASE 1									
OPMT	OPO2	2013.3	308.7	320.2	117.2	156.5	(1)	330.2	0.0
PHASE 2									
PTBB	PTO2	2014.6	305.8	321.2	75.3	301.7	(1)	508.4	0.0
PTBG	PTO3	2014.6	303.3	325.8	48.2	251.4	(1)	471.7	0.0
TWTF	TL1Z	2014.0	305.5	314.0	52.0	119.8	(2)	360.2	0.4
NC02	NC02	2014.2	219.5	225.9	429.7	248.5	(3)	28.4	0.0
SEPA	????	2014.2	217.3	222.3	406.1	213.4	(3)	16.9	0.0
IMEJ	IM06	2014.4	2.1	4.5	0.0	0.0	(3,4)	-1.6	0.0
IMEU	IMEU	2014.4	-25.9	-12.7	115.5	250.3	(3,5)	88.5	0.0
BJNM	????	2014.4	73.7	81.7	315.3	125.0	(3)	-129.0	0.0
RO_4		2014.7	199.4	203.9	218.9	217.5	(3)	191.0	0.0
RO_5	RO_5	2014.7	2.0	-0.4	0.3	0.0	(3,4)	5.4	0.0
RO_6	ROAP	2014.7	54.5	51.9	218.3	66.7	(3)	-93.1	0.0
RO_7		2014.7	55.3	53.3	171.5	61.9	(3)	-31.2	0.0
NMOC (G2)	NMOC	2014.2	307.7	320.3	32.4	234.1	(2)	489.9	0.0
PHASE 3									
PHASE 4									

Notes:

- (1) REFDLY value corresponding to the calibration set-up but measured prior to the calibration.
- (2) REFDLY value measured before a change of set-up and not corresponding to the calibration set-up. Results are expressed as INTDLY for consistency with the CGTTS V2 format but **they should NOT be used as true INTDLY values**: Only the “Total delay” as defined in CGTTS V3 format ($TOTDLY = INTDLY + CABDLY - REFDLY$) is a meaningful result.
- (3) REFDLY value corresponding to the calibration and measured during the calibration.
- (4) For GTR50, the reported values are corrections with respect to the internal values.
- (5) Javad E-GGD. Details to be checked.