

BUREAU INTERNATIONAL DES POIDS ET MESURES  
ORGANISATION INTERGOUVERNEMENTALE DE LA CONVENTION DU METRE  
PAVILLON DE BRETEUIL F-92312 SEVRES CEDEX TEL. +33 1 45 07 70 70 FAX. +33 1 45 34 20 21 tai@bipm.org

1 - Coordinated Universal Time UTC and its local realizations UTC(k). Computed values of  $[UTC-UTC(k)]$  and uncertainties valid for the period of this Circular. From 2012 July 1, 0h UTC,  $TAI-UTC = 35$  s.

Date 2013	0h UTC	JUN 26	JUL 1	JUL 6	JUL 11	JUL 16	JUL 21	JUL 26	JUL 31	Uncertainty/ns Notes		
MJD		56469	56474	56479	56484	56489	56494	56499	56504	$u_A$	$u_B$	$u$
Laboratory $k$		$[UTC-UTC(k)]/ns$										
AOS (Borowiec)		2.0	1.2	0.1	-0.6	-1.0	-1.1	-1.4	-1.2	0.3	5.2	5.2
APL (Laurel)		-1.1	-1.6	-2.8	-1.5	0.5	2.0	2.1	2.2	0.3	5.2	5.2
AUS (Sydney)		330.1	310.7	304.2	298.5	294.2	285.3	286.0	282.7	0.3	5.2	5.2
BEV (Wien)		22.4	34.2	28.2	29.8	35.8	39.8	46.5	49.8	0.3	3.4	3.4
BIM (Sofiya)		325.0	333.4	361.8	347.6	342.1	358.4	376.1	367.3	1.5	7.1	7.3
BIRM (Beijing)		219.4	221.1	216.7	216.0	229.0	227.2	228.2	227.8	1.5	20.1	20.1
BY (Minsk)		-	-	-	-	-	-	-	-	-	-	-
CAO (Cagliari)		-	-	-	-	-	-	-	-	-	-	-
CH (Bern-Wabern)		0.1	1.5	3.1	2.3	3.8	6.2	8.2	10.1	0.3	1.8	1.9
CNM (Queretaro)		12.0	8.0	6.0	4.7	3.0	-1.2	-3.6	-6.4	2.0	5.2	5.6
CNMP (Panama)		18.2	27.3	17.7	1.2	11.1	2.2	-5.9	16.3	3.5	5.2	6.3
DLR (Oberpfaffenhofen)		18.6	29.8	25.3	17.9	22.1	17.6	-5.6	-18.1	0.7	5.2	5.3
DMDM (Belgrade)		7.5	5.3	3.0	18.0	14.4	10.9	21.9	20.8	0.3	7.1	7.1
DTAG (Frankfurt/M)		294.6	303.0	311.5	317.8	326.2	338.1	344.0	337.1	0.3	10.1	10.1
EIM (Thessaloniki)		11.4	9.2	9.7	15.2	8.6	14.1	12.2	7.3	7.5	5.2	9.1
ESTC (Noordwijk)		-5.5	-5.6	-4.9	-4.8	-6.1	-5.6	-4.6	-5.2	0.3	20.1	20.1
HKO (Hong Kong)		1499.7	1524.3	1548.7	1568.3	1597.6	1620.2	1632.0	1649.3	4.0	5.2	6.6
IFAG (Wetzell)		-651.7	-660.3	-660.4	-667.9	-676.0	-685.0	-692.6	-695.6	0.3	5.2	5.2
IGNA (Buenos Aires)		2203.6	2286.3	2376.8	2473.5	2568.1	2658.7	2761.4	2868.5	2.0	5.2	5.6
INPL (Jerusalem)		54.2	51.2	49.6	54.2	53.1	51.7	49.2	43.4	0.7	19.9	19.9
INTI (Buenos Aires)		69.7	56.8	39.0	41.2	41.2	33.2	26.7	28.4	2.5	20.1	20.2
INXE (Rio de Janeiro)		5.8	0.8	-8.4	-4.1	-5.9	-0.5	7.8	4.4	0.3	20.0	20.0
IPQ (Caparica)		-	-	-	-	-	-	-	-	-	-	-
IT (Torino)		-1.8	0.4	0.5	1.4	0.5	-1.7	-4.4	-6.8	0.3	1.9	2.0
JATC (Lintong)		-1.2	-3.1	-2.7	1.0	4.7	7.6	9.2	11.5	0.5	5.1	5.1
JV (Kjeller)		445.3	432.6	445.4	466.7	456.1	478.4	482.9	488.6	5.0	19.9	20.6
KEBS (Nairobi)		-	-	-	-	-	-	-	-	-	-	-
KIM (Serpong-Tangerang)		563.4	571.7	563.3	624.7	600.9	605.5	616.7	634.7	2.0	20.1	20.2
KRIS (Daejeon)		-3.6	-3.3	-2.6	-0.5	0.7	1.5	0.7	-1.4	0.3	5.2	5.2
KZ (Astana)		1738.0	1679.6	1631.6	1577.7	1531.5	2442.5	2397.0	2347.8	2.5	20.1	20.2 (1)

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MJD		56469	56474	56479	56484	56489	56494	56499	56504	$u_A$	$u_B$	$u$
Laboratory $k$		$[UTC-UTC(k)]/ns$										
LT (Vilnius)		369.7	398.8	404.6	405.0	431.3	440.1	431.6	450.2	2.0	5.2	5.6
MIKE (Espoo)		-1.2	-0.6	-0.9	-0.6	-0.2	0.3	0.2	0.4	0.3	7.2	7.2
MKEH (Budapest)		-2451.8	-2665.5	-2866.4	-3070.1	-3292.4	-3491.6	-3709.7	-3922.6	1.5	20.0	20.1
MSL (Lower Hutt)		737.7	741.7	739.5	730.3	719.3	710.5	728.0	720.3	1.5	20.1	20.1
MTC (Makkah)		11.2	12.2	15.4	9.7	10.1	14.6	12.4	13.7	10.0	20.1	22.4
NAO (Mizusawa)		25.9	31.6	36.0	40.4	35.8	40.4	45.6	45.4	2.0	20.0	20.1
NICT (Tokyo)		0.1	0.0	-2.4	-2.0	-0.6	1.4	1.0	0.4	0.3	4.7	4.7
NIM (Beijing)		8.5	8.7	7.3	7.0	6.8	4.4	2.4	0.8	0.7	5.1	5.2
NIMB (Bucharest)		-357.4	-378.8	-396.1	-381.3	-369.1	-385.6	-394.7	-393.6	2.0	20.1	20.2
NIMT (Pathumthani)		-15.6	-7.0	-5.1	-1.5	-7.2	-	-	1.2	1.0	20.1	20.1
NIS (Cairo)		388.6	461.2	526.8	590.9	662.6	728.8	-	-	1.5	7.2	7.3
NIST (Boulder)		12.3	13.6	13.5	13.5	14.0	14.5	14.4	14.6	0.3	5.0	5.0
NMIJ (Tsukuba)		-5.6	-7.3	-9.4	-10.6	-10.6	-10.8	-11.2	-10.4	0.4	5.2	5.2
NMLS (Sepang)		330.8	358.8	398.6	427.9	468.3	507.8	542.6	571.8	1.5	20.0	20.1
NPL (Teddington)		-8.9	-7.0	-5.3	-2.7	-1.9	-2.0	-2.7	-2.7	0.3	5.2	5.2
NPLI (New-Delhi)		10.3	8.1	3.3	-2.1	-4.9	-2.8	-0.1	0.5	0.3	7.1	7.1
NRC (Ottawa)		-35.2	-38.5	-40.6	-46.3	-43.6	-44.7	-41.2	-33.0	0.3	5.2	5.2
NRL (Washington DC)		0.6	-	-	2.6	3.6	5.2	-	5.7	0.3	5.2	5.2
NTSC (Lintong)		-2.2	-2.1	-2.8	3.0	4.3	5.0	8.0	11.4	0.5	5.0	5.0
ONBA (Buenos Aires)		-860.7	-881.8	-892.7	-912.7	-927.1	-942.1	-946.5	-955.5	2.5	5.2	5.8
ONRJ (Rio de Janeiro)		-7.8	-7.4	-5.2	-4.0	-1.8	-3.2	-4.7	-6.6	1.0	7.0	7.1
OP (Paris)		2.7	2.7	1.9	1.6	1.5	1.4	2.0	1.7	0.3	1.8	1.9
ORB (Bruxelles)		-1.3	-0.8	-1.3	-4.4	0.1	1.1	-4.9	-10.8	0.3	5.2	5.2
PL (Warszawa)		-5.2	-3.2	-8.9	-7.1	3.0	12.3	23.0	40.3	0.3	5.1	5.1
PTB (Braunschweig)		-2.4	-2.5	-2.9	-3.7	-3.7	-2.8	-2.6	-1.9	0.1	1.5	1.5
ROA (San Fernando)		-9.0	-7.8	-8.7	-7.3	-5.3	-4.5	-3.3	-1.1	0.3	5.1	5.1
SCL (Hong Kong)		15.9	23.0	31.2	39.4	34.9	39.9	38.1	47.1	4.0	10.0	10.8
SG (Singapore)		-23.7	-21.5	-17.0	-8.2	-5.0	-1.8	2.6	6.7	0.4	5.2	5.2
SIQ (Ljubljana)		-1113.6	-1137.5	-1112.5	-1154.8	-1191.4	-1226.7	-1237.4	-1285.5	4.0	20.0	20.4
SMD (Bruxelles)		-12.6	-18.0	-18.8	-19.9	-22.4	-23.5	-23.1	-22.0	0.7	20.1	20.1
SMU (Bratislava)		-	-	-	85.8	87.6	84.1	92.9	105.5	2.5	20.1	20.2
SP (Boras)		-8.7	-4.6	-2.4	0.6	-0.1	-1.6	-2.8	-4.4	0.3	1.8	1.8
SU (Moskva)		-0.7	-1.0	-0.5	-1.1	0.1	-1.3	-0.9	-2.5	1.0	5.2	5.3
TCC (Concepcion)		2418.1	2433.1	2446.0	2456.5	-	-	-	-	0.3	5.2	5.2
TL (Chung-Li)		-8.2	-8.3	-11.1	-10.2	-6.7	-4.4	-4.2	-4.0	0.3	5.0	5.0
TP (Praha)		-8.5	-3.8	-7.8	-12.4	-10.9	-13.2	-14.6	-19.2	0.3	5.2	5.2
UA (Kharkov)		23.1	26.0	28.8	27.4	28.9	25.0	19.8	15.1	1.5	7.1	7.3
UME (Gebze-Kocaeli)		908.0	922.2	935.5	947.6	964.0	977.0	992.2	1005.6	1.0	7.0	7.1
USNO (Washington DC)		-0.5	-0.8	-1.1	-1.6	-1.3	-0.3	-0.3	0.0	0.2	3.8	3.8
VMI (Ha Noi)		-26.7	-30.5	-35.5	-30.5	-21.9	-15.8	-9.3	-10.5	2.0	20.1	20.2
VSL (Delft)		-4.2	0.8	-3.2	-5.9	-0.1	2.0	1.1	2.0	0.3	1.8	1.9
ZA (Pretoria)		-1558.3	-1580.6	-1625.5	-1657.3	-1701.4	-1740.8	-1774.7	-1815.0	1.5	19.9	20.0

- Note on section 1:

(1) KZ : Time step of UTC(KZ) of -950 ns on MJD 56490.0.

2 - International Atomic Time TAI and Local atomic time scales TA(k). Computed values of  $[TAI-TA(k)]$ .

Date 2013	0h UTC	JUN 26	JUL 1	JUL 6	JUL 11	JUL 16	JUL 21	JUL 26	JUL 31
MJD		56469	56474	56479	56484	56489	56494	56499	56504
Laboratory k		$[TAI-TA(k)]/ns$							
CH (Bern-Wabern)		31013.2	30935.9	30858.9	30779.5	30701.7	30624.9	30548.3	30470.9
F (Paris)		167607.6	167611.8	167611.4	167611.3	167611.2	167612.9	167613.3	167612.5
JATC (Lintong)		-53765.3	-53794.3	-53822.7	-53847.1	-53873.9	-53897.8	-53928.1	-53951.0
KRIS (Daejeon)		43801.6	-	-	-	-	-	-	-
NICT (Tokyo)		880.5	885.1	890.2	896.4	902.7	907.6	911.6	916.1
NIST (Boulder)		-45392010.5	-45392199.7	-45392389.3	-45392578.7	-45392767.2	-45392955.7	-45393144.8	-45393333.6
NRC (Ottawa)		23621.0	23600.9	23582.3	23559.9	23545.8	23527.8	23514.4	23506.1
NTSC (Lintong)		16615.3	16646.4	16677.0	16707.9	16737.9	16770.1	16798.5	16830.6
ONRJ (Rio de Janeiro)		-13754.4	-13825.5	-13892.8	-13963.9	-14030.7	-14099.3	-14171.8	-14241.5
PL (Warszawa)		-11664.3	-11675.2	-11688.8	-11702.9	-11715.4	-11732.1	-11742.4	-11755.1
PTB (Braunschweig)		2016.2	2016.2	2014.0	2014.3	2014.4	2014.1	2014.5	2013.2
SG (Singapore)		13026.3	13058.5	13103.0	13141.8	13185.0	13218.2	13262.6	13296.7
SU (Moskva)		27291031.8	27291031.5	27291032.0	27291031.4	27291032.6	27291031.2	27291031.6	27291030.0 (1)
TL (Chung-Li)		-159.4	-154.3	-144.1	-137.1	-132.1	-129.9	-122.5	-112.8
USNO (Washington DC)		-35131144.4	-35131432.8	-35131721.3	-35132009.0	-35132296.4	-35132583.4	-35132871.5	-35133159.5

- Note on section 2:

(1) SU : Listed values are  $TAI-TA(SU)$  - 2.80 seconds.

3 - Difference between the normalized frequencies of EAL (free atomic time scale) and TAI.

	Interval of validity	$f(EAL)-f(TAI)$	
Steering correction	56469 - 56504	$6.483 \times 10^{-13}$	(2013 JUN 26 - 2013 JUL 31)
New correction	56504 - 56534	$6.483 \times 10^{-13}$	(2013 JUL 31 - 2013 AUG 30)
New correction foreseen	56534 - 56564	$6.483 \times 10^{-13}$	(2013 AUG 30 - 2013 SEP 29)

#### 4 - Duration of the TAI scale interval.

TAI is a realization of coordinate time TT. The following tables give the fractional deviation  $d$  of the scale interval of TAI from that of TT (the SI second on the geoid), i.e. the fractional frequency deviation of TAI with the opposite sign:  $d = -y_{TAI}$ . In this section, a frequency over a time interval is defined as the ratio of the end-point phase difference to the duration of the interval. Whenever needed, the instability of EAL should be expressed as the quadratic sum of three components with  $\tau$  in days: (1) a white frequency noise of  $2.0 \times 10^{-15} / \sqrt{\tau}$ , (2) a flicker frequency noise of  $0.4 \times 10^{-15}$  and (3) a random walk frequency noise of  $1.0 \times 10^{-16} \times \sqrt{\tau}$ . The relation between EAL and TAI is given in *Circular T* and the *BIPM Annual Report on Time Activities*.

In the first table,  $d$  is obtained, on the given periods of estimation by comparison of the TAI frequency with that of the given individual Primary Frequency Standards (PFS). In this table:  $u_A$  is the uncertainty originating in the instability of the PFS,  $u_B$  is the combined uncertainty from systematic effects,  $u_{1/Lab}$  is the uncertainty in the link between the PFS and the clock participating to TAI, including the uncertainty due to the dead-time,  $u_{1/TAI}$  is the uncertainty in the link to TAI,  $u$  is the quadratic sum of all four uncertainty values. Ref( $u_B$ ) is a reference giving information on the values of  $u_B$  or is the *Circular T* where the reference was first given.  $u_B(Ref)$  is the  $u_B$  value stated in this references. Note that all uncertainties may vary over time and that the current  $u_B$  values are generally not the same as the peer reviewed values given in Ref( $u_B$ ). See "<http://www.bipm.org/jsp/en/TimeFtp.jsp>" for previous issues of *Circular T* and individual Reports of Evaluation of Primary Frequency Standards that explain changes in uncertainties. All values are expressed in  $10^{-15}$  and are valid only for the stated period of estimation.

Standard	Period of Estimation	$d$	$u_A$	$u_B$	$u_{1/Lab}$	$u_{1/TAI}$	$u$	Ref( $u_B$ )	$u_B(Ref)$	Note
PTB-CS1	56469 56504	-17.14	6.00	8.00	0.00	0.06	10.00	T148	8.	(1)
PTB-CS2	56469 56504	5.68	3.00	12.00	0.00	0.06	12.37	T148	12.	(1)
NPL-CsF2	56469 56494	0.02	0.23	0.23	0.06	0.23	0.40	T284	0.23	(2)
SYRTE-F02	56469 56504	-0.51	0.25	0.25	0.10	0.17	0.41	T301	0.23	(3)

#### Notes:

- (1) Continuously operating as a clock participating to TAI
- (2) Report 02 AUG. 2013 by NPL
- (3) Report 02 AUG. 2013 by LNE-SYRTE

In the second table,  $d$  is obtained on the given periods of estimation by comparison of the TAI frequency with that of the given individual Secondary Frequency Standards (SFS). This table is organized similarly to the first table, with the addition of  $u_{Srep}$  which represents the recommended uncertainty of the secondary representation of the second and of Ref( $u_S$ ) which provides the reference for the frequency of the transition and its uncertainty  $u_{Srep}$ . All values are expressed in  $10^{-15}$  and are valid only for the stated period of estimation. Starting with *Circular T* 307, SFS are used for the estimation of  $d$  provided in the third table below, and for determining the steering correction reported in section 3.

Standard	Period of Estimation	$d$	$u_A$	$u_B$	$u_{1/Lab}$	$u_{1/Tai}$	$u$	$u_{Srep}$	Ref( $u_s$ )	Ref( $u_B$ )	$u_B(Ref)$	Note
SYRTE-FORb	56469 56504	-0.59	0.40	0.30	0.11	0.17	0.54	1.3	[1]	T301	0.35	(1)

[1] CIPM Recommendation 1 (CI-2013) : Updates to the list of standard frequencies.

-Note :

(1) Report 02 AUG. 2013 by LNE-SYRTE

The third table gives the BIPM estimate of  $d$ , based on all available PFS and SFS measurements over the period MJD 56109-56504, taking into account their individual uncertainties and characterizing the instability of EAL as noted above.  $u$  is the computed standard uncertainty of  $d$

Period of estimation	$d$	$u$	
56469-56504	$-0.3 \times 10^{-15}$	$0.3 \times 10^{-15}$	(2013 JUN 26 - 2013 JUL 31)

5 - Relations of UTC and TAI with predictions of UTC(k) disseminated by GNSS and their System Times.

$[UTC-GPS \text{ time}] = -16 \text{ s} + C_0$  ,  $[TAI-GPS \text{ time}] = 19 \text{ s} + C_0$  , global uncertainty is of the order of 10 ns.  
 $[UTC-UTC(USNO)_GPS] = C_0'$  ,  $[TAI-UTC(USNO)_GPS] = 35 \text{ s} + C_0'$  , global uncertainty is of the order of 10 ns.  
 $[UTC-GLONASS \text{ time}] = C_1$  ,  $[TAI-GLONASS \text{ time}] = 35 \text{ s} + C_1$  , global uncertainty is of the order of hundreds ns.  
 $[UTC-UTC(SU)_GLONASS] = C_1'$  ,  $[TAI-UTC(SU)_GLONASS] = 35 \text{ s} + C_1'$  , global uncertainty is of the order of hundreds ns.

$[UTC(USNO)_GPS]$  and  $[UTC(SU)_GLONASS]$  are, respectively, UTC(USNO) and UTC(SU) as predicted by USNO and SU and disseminated by GPS and GLONASS. The  $C_0$  and  $C_0'$  values provide realizations of GPS time and of the prediction of UTC(USNO) broadcast by GPS, as obtained using the values  $[UTC-UTC(OP)]$  and the GPS data taken at the Paris Observatory, corrected for IGS precise orbits, clocks and ionosphere maps. The  $C_1$  and  $C_1'$  values provide realizations of GLONASS time and of the prediction of UTC(SU) broadcast by GLONASS, as obtained using the values  $[UTC-UTC(AOS)]$  and the GLONASS data taken at the Astrogeodynamical Observatory Borowiec (AOS).  $N_0$ ,  $N_0'$ ,  $N_1$  and  $N_1'$  are the numbers of measurements; when  $N_0$ ,  $N_0'$ ,  $N_1$  or  $N_1'$  is 0, the corresponding values in the table are interpolated. The standard deviations  $\sigma$ ,  $\sigma'$ ,  $\sigma_1$  and  $\sigma_1'$  characterize the dispersion of individual measurements. The actual uncertainty of users' access to GPS and GLONASS times may differ from these values. For this edition of circular,  $\sigma = 1.1 \text{ ns}$ ,  $\sigma' = 1.2 \text{ ns}$ ,  $\sigma_1 = 6.3 \text{ ns}$ ,  $\sigma_1' = 6.3 \text{ ns}$

2013	Oh UTC	MJD	$C_0/ns$	$N_0$	$C_0'/ns$	$N_0'$	$C_1/ns$	$N_1$	$C_1'/ns$	$N_1'$
	JUN 26	56469	-2.4	90	-2.2	90	-186.0	90	-407.3	90
	JUN 27	56470	-2.4	89	-3.2	89	-182.2	85	-405.1	85
	JUN 28	56471	-2.5	89	-3.9	89	-179.8	89	-403.8	89
	JUN 29	56472	-1.5	89	-2.5	89	-180.5	89	-404.7	89
	JUN 30	56473	-1.8	90	-3.0	90	-180.5	89	-404.4	89
	JUL 1	56474	-2.7	86	-2.9	86	-179.8	89	-402.3	89
	JUL 2	56475	-3.6	89	-3.7	89	-176.3	88	-396.8	89
	JUL 3	56476	-4.4	89	-4.1	89	-173.7	84	-392.9	86
	JUL 4	56477	-4.7	90	-3.6	90	-173.4	90	-390.6	90
	JUL 5	56478	-4.4	88	-3.7	88	-172.4	84	-384.2	86
	JUL 6	56479	-3.4	89	-2.6	89	-171.3	87	-377.6	87
	JUL 7	56480	-1.4	89	-1.1	89	-175.3	86	-379.3	86
	JUL 8	56481	-1.8	90	-2.7	90	-175.4	88	-378.1	88
	JUL 9	56482	-1.7	88	-1.8	88	-170.9	89	-371.1	89
	JUL 10	56483	-2.1	88	-3.5	88	-169.7	89	-366.8	88
	JUL 11	56484	-2.9	89	-4.7	88	-169.9	87	-363.8	87
	JUL 12	56485	-3.5	90	-4.5	90	-171.7	90	-362.5	90
	JUL 13	56486	-4.9	89	-4.2	89	-174.5	89	-362.6	89
	JUL 14	56487	-4.7	89	-3.3	89	-175.7	89	-361.8	89
	JUL 15	56488	-4.2	88	-3.7	88	-177.1	88	-360.5	88
	JUL 16	56489	-3.9	90	-3.4	90	-177.0	90	-357.0	90
	JUL 17	56490	-3.4	89	-2.9	89	-177.5	88	-355.1	88
	JUL 18	56491	-3.4	89	-4.5	89	-178.6	88	-354.6	88
	JUL 19	56492	-2.5	85	-2.5	81	-180.1	88	-355.9	88
	JUL 20	56493	-2.6	90	-1.3	90	-180.5	90	-356.8	90
	JUL 21	56494	-2.3	89	-1.9	89	-178.3	88	-355.5	89
	JUL 22	56495	-2.0	89	-1.6	89	-176.7	88	-354.9	88
	JUL 23	56496	-1.2	89	-1.2	89	-176.5	89	-356.4	89
	JUL 24	56497	-0.6	90	-0.9	90	-175.8	90	-357.2	90
	JUL 25	56498	-0.4	89	-0.5	89	-171.4	85	-353.8	85
	JUL 26	56499	0.3	89	0.9	89	-168.8	85	-352.1	86
	JUL 27	56500	-1.8	87	-1.1	88	-170.1	89	-354.7	89
	JUL 28	56501	-1.4	90	-2.2	89	-172.0	90	-358.5	90
	JUL 29	56502	-1.5	88	-1.4	88	-171.5	86	-359.6	86
	JUL 30	56503	-0.6	89	-0.8	89	-170.5	88	-359.2	88
	JUL 31	56504	0.3	88	1.4	88	-172.6	89	-361.6	89

6 - Time links used for the computation of TAI and their uncertainties.

The time links used in the elaboration of this *Circular T* are listed in this section. The technique for the link is indicated as follows:

GPS SC for GPS all-in-view single-channel C/A data; GPS MC for GPS all-in-view multi-channel C/A data;  
GPS P3 for GPS all-in-view multi-channel dual-frequency P code data; GPS PPP for GPS Precise Point Positioning technique;  
GPS GT for 'GPS time' observations; GLN MC for GLONASS common-view multi-channel C/A data; GPSGLN for the combination of  
GPS MC and GLN MC links; TWGPPP/TWGPP3 for the combined smoothing of TWSTFT and GPS PPP/GPS P3; INT LK for internal cable  
link and TWSTFT for two-way satellite time and frequency transfer data.

For each link, the following uncertainties are provided:  $u_A$  is the standard uncertainty accounting for measurement noise and random effects with typical duration between 1 day and 30 days.  $u_B$  is the estimated uncertainty of the calibration.

The calibration type of the link is indicated as: GPS EC for GPS equipment calibration; TW EC for two-way equipment calibration; LC (technique) for a link calibrated using 'technique'; BC (technique) for a link calibrated using 'technique' to transfer a past equipment calibration through a discontinuity of link operation. DIC is used for direct internal calibration.

The calibration dates indicate: the most recent calibration results for the two laboratories in the case of EC and the most recent calibration of the link in the case of LC and BC.  
NA stands for not available, in this case estimated values are provided.

Link	Type	$u_A$ /ns	$u_B$ /ns	Calibration Type	Calibration Dates
AOS /PTB	TWGPPP	0.3	5.0	BC(GPS MC)	2008 May
APL /PTB	GPSPPP	0.3	5.0	LC(GPS MC)	2012 Sep
AUS /PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2010 Oct/2004 Aug
BEV /PTB	GPSPPP	0.3	3.0	BC(GPS MC)	2012 Mar
BIM /PTB	GPS MC	1.5	7.0	GPS EC/GPS EC	2007 Nov
BIRM/PTB	GPS MC	1.5	20.0	NA /GPS EC	NA /2006 Sep
BY /PTB	NA				
CAO /PTB	NA				
CH /PTB	TWGPPP	0.3	1.0	LC(TWSTFT)/BC(GPS PPP)	2008 Sep/2009 Aug
CNM /PTB	GPSGLN	2.0	5.0	LC(GPS MC)	2012 Mar
CNMP/PTB	GPS MC	3.5	5.0	GPS EC/GPS EC	2004 May/2006 Sep
DLR /PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2007 Feb/2004 Aug
DMDM/PTB	GPSPPP	0.3	7.0	LC(GPS MC)	2012 Jul
DTAG/PTB	GPSPPP	0.3	10.0	LC(GPS MC)	2009 Jul
EIM /PTB	GPS MC	7.5	5.0	GPS EC/GPS EC	2007 May/2003 Aug
ESTC/PTB	GPSPPP	0.3	20.0	NA /GPS EC	NA /2004 Aug
HKO /PTB	GPS MC	4.0	5.0	GPS EC/GPS EC	2004 Sep/2006 Sep
IFAG/PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2003 Jun/2004 Aug
IGNA/PTB	GPS MC	2.0	5.0	GPS EC/GPS EC	2004 Aug/2006 Sep
INPL/PTB	GPS P3	0.7	20.0	NA /GPS EC	NA /2004 Aug
INTI/PTB	GPS MC	2.5	20.0	NA /GPS EC	NA /2006 Sep
INXE/PTB	GPSPPP	0.3	20.0	NA /GPS EC	NA /2006 Sep
IPQ /PTB	NA				
IT /PTB	TWGPPP	0.3	1.2	LC(TWSTFT)/BC(GPS PPP)	2008 Sep/2009 Aug
JATC/NTSC	INT LK	0.2	1.0	DIC	/2006 Sep
JV /PTB	GPS GT	5.0	20.0	NA /GPS EC	NA /2003 Aug
KEBS/PTB	NA				
KIM /PTB	GPS MC	2.0	20.0	NA /GPS EC	NA /2006 Sep
KRIS/PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2005 Aug/2004 Aug
KZ /PTB	GPSGLN	2.5	20.0	NA /GPS EC	NA /2006 Sep

Link	Type	$u_A$ /ns	$u_B$ /ns	Calibration Type	Calibration Dates
LT /PTB	GPS MC	2.0	5.0	GPS EC/GPS EC	2006 Oct/2006 Sep
MIKE/PTB	GPSPPP	0.3	7.0	NA /GPS EC	NA /2004 Aug
MKEH/PTB	GPS MC	1.5	20.0	NA /GPS EC	NA /2006 Sep
MSL /PTB	GPS P3	1.5	20.0	NA /GPS EC	NA /2004 Aug
MTC /PTB	GPS MC	10.0	20.0	NA /GPS EC	NA /2004 Aug
NAO /PTB	GPS MC	2.0	20.0	NA /GPS EC	NA /2006 Sep
NICT/PTB	TWGPPP	0.3	5.0	LC(GPS P3)	2009 Jun
NIM /PTB	TWGPP3	0.7	5.0	LC(GPS P3)	2012 Oct
NIMB/PTB	GPS MC	2.0	20.0	NA /GPS EC	NA /2006 Sep
NIMT/PTB	GPS P3	1.0	20.0	NA /GPS EC	NA /2004 Aug
NIS /PTB	GPSGLN	1.5	7.0	GPS EC/GPS EC	2005 May/2006 Sep
NIST/PTB	TWGPPP	0.3	5.0	LC(TWSTFT)/BC(GPS PPP)	2005 May/2009 Aug
NMIJ/PTB	GPSPPP	0.4	5.0	GPS EC/GPS EC	2002 Apr/2004 Aug
NMLS/PTB	GPS MC	1.5	20.0	NA /GPS EC	NA /2006 Sep
NPL /PTB	TWGPPP	0.3	5.0	LC(GPS P3)	2008 Sep/2009 Nov
NPLI/PTB	TWGPPP	0.3	7.0	LC(GPS P3)	2012 Jun
NRC /PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2003 Nov/2004 Aug
NRL /PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2002 May/2004 Aug
NTSC/PTB	TWSTFT	0.5	5.0	BC(GPS MC)	2009 May
ONBA/PTB	GPS MC	2.5	5.0	GPS EC/GPS EC	2004 Jul/2006 Sep
ONRJ/PTB	GPS P3	1.0	7.0	GPS EC/GPS EC	2011 Dec/2006 Sep
OP /PTB	TWGPPP	0.3	1.1	LC(TWSTFT)/BC(GPS PPP)	2008 Sep/2009 Aug
ORB /PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2012 Oct/2004 Aug
PL /PTB	GPSPPP	0.3	5.0	LC(GPS MC)	2012 Mar
ROA /PTB	TWGPPP	0.3	5.0	LC(TWSTFT)/BC(GPS PPP)	2005 May/2009 Aug
SCL /PTB	GPS MC	4.0	10.0	LC(GPS SC)	1993 May
SG /PTB	GPSPPP	0.4	5.0	GPS EC/GPS EC	2010 Mar/2004 Aug
SIQ /PTB	GPS SC	4.0	20.0	NA /GPS EC	NA /2003 Aug
SMD /PTB	GPS P3	0.7	20.0	NA /GPS EC	NA /2006 Sep
SMU /PTB	GPSGLN	2.5	20.0	NA /GPS EC	NA /2006 Sep
SP /PTB	TWGPPP	0.3	1.0	LC(TWSTFT)/BC(GPS PPP)	2006 Mar/2009 Aug
SU /PTB	GPSGLN	1.0	5.0	LC(GPS MC)	2009 May
TCC /PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2011 Feb/2004 Aug
TL /PTB	TWGPPP	0.3	5.0	LC(GPS PPP)	2011 Dec
TP /PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2009 Feb/2004 Aug
UA /PTB	GPS MC	1.5	7.0	GPS EC/GPS EC	2011 Mar/2006 Sep
UME /PTB	GPSGLN	1.0	7.0	GPS EC/GPS EC	2005 Dec/2006 Sep
USNO/PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2001 /2004 Aug
VMI /PTB	GPS P3	2.0	20.0	NA /GPS EC	NA /2004 Aug
VSL /PTB	TWGPPP	0.3	1.0	LC(TWSTFT)/BC(GPS PPP)	2006 Mar/2009 Aug
ZA /PTB	GPS P3	1.5	20.0	NA /GPS EC	NA /2004 Aug