

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 2006 January 1, 0h UTC,  $TAI-UTC = 33$  s.

Date 2007	0h UTC	JUL 28	AUG 2	AUG 7	AUG 12	AUG 17	AUG 22	AUG 27	Uncertainty/ns			Notes
MJD		54309	54314	54319	54324	54329	54334	54339	$u_A$	$u_B$	$u$	
Laboratory k		$[UTC-UTC(k)]/ns$										
AOS (Borowiec)		5.1	8.1	10.3	-6.3	-5.0	12.9	2.0	1.5	5.1	5.3	
APL (Laurel)		3.0	9.0	18.7	23.4	10.0	-4.6	-4.2	1.5	5.1	5.3	
AUS (Sydney)		141.1	130.0	118.0	117.0	118.5	114.9	121.0	1.5	5.0	5.3	
BEV (Wien)		-33.3	-31.2	-35.5	-36.5	-35.6	-34.2	-41.2	2.0	5.0	5.4	
BIM (Sofiya)		-5549.9	-5550.9	-5530.6	-5565.3	-5578.4	-5610.4	-5623.8	5.0	20.0	20.6	
BIRM (Beijing)		-3464.6	-3461.5	-3490.4	-3522.9	-3553.7	-3583.8	-3611.2	2.5	20.0	20.2	
BY (Minsk)		244.4	253.2	252.4	249.1	266.8	266.2	262.1	7.0	20.0	21.2	
CAO (Cagliari)		-1013.2	-1040.0	-1062.3	-1076.8	-1086.5	-1106.2	-1124.5	1.5	7.1	7.2	
CH (Bern)		-11.4	-12.2	-12.9	-16.6	-20.0	-24.1	-24.0	0.5	1.3	1.4	
CNM (Queretaro)		20.6	19.3	14.0	19.4	17.8	21.3	19.0	5.0	5.1	7.1	
CNMP (Panama)		129.0	141.9	150.0	164.2	156.1	160.6	164.3	3.0	5.1	5.9	
DLR (Oberpfaffenhofen)		26.5	20.4	20.5	19.4	17.3	6.5	5.0	0.7	5.1	5.1	
DTAG (Darmstadt)		428.4	425.8	435.5	438.6	435.0	434.9	433.7	3.0	10.0	10.4	
EIM (Thessaloniki)		-	12.7	6.7	11.1	7.6	2.7	0.9	2.0	20.0	20.1	(1)
HKO (Hong Kong)		12.6	24.4	33.1	40.4	61.5	81.1	83.1	2.5	5.1	5.7	
IFAG (Wetzell)		-448.1	-455.4	-457.6	-457.8	-453.2	-454.7	-477.2	0.7	5.0	5.1	
IGMA (Buenos Aires)		589.0	581.6	572.9	565.0	559.7	551.0	548.4	2.5	5.1	5.7	
INPL (Jerusalem)		-	-	-	-	-	-	-	-	-	-	
IT (Torino)		-7.9	-1.5	0.5	0.8	2.4	6.6	6.8	0.5	1.3	1.4	
JATC (Lintong)		8.5	2.8	-1.7	-5.8	-4.8	1.8	2.4	1.4	4.8	5.0	
JV (Kjeller)		1919.8	2050.1	2167.0	2237.3	2333.2	2410.9	2542.7	5.0	20.0	20.6	
KRIS (Daejeon)		-3.7	-5.5	-7.2	-7.7	-3.6	-3.6	-4.0	0.7	5.0	5.1	
LDS (Leeds)		2955.6	3007.0	3049.2	3109.8	3135.4	3178.4	3245.5	3.0	20.0	20.2	
LT (Vilnius)		153.1	154.6	154.3	165.4	157.9	159.0	161.3	1.5	5.0	5.2	
LV (Riga)		-	1059.5	1100.4	1153.5	1202.1	1240.6	1298.7	2.0	7.1	7.3	(2)
MIKE (Espoo)		-105.1	-122.3	-134.1	-125.3	-109.1	-105.2	-104.2	5.0	19.8	20.4	
MKEH (Budapest)		12241.3	12258.5	12278.6	12296.8	12348.1	12364.2	12391.0	2.5	20.0	20.2	
MSL (Lower Hutt)		18.4	56.7	249.1	422.9	568.2	724.3	724.0	1.0	20.0	20.0	
NAO (Mizusawa)		-6.1	-0.4	3.3	16.4	-5.3	-9.8	-23.9	3.0	19.9	20.1	
NICT (Tokyo)		9.2	9.7	13.3	12.9	15.1	17.5	15.0	0.5	4.6	4.7	

Date 2007	0h UTC	JUL 28	AUG 2	AUG 7	AUG 12	AUG 17	AUG 22	AUG 27	Uncertainty/ns			Notes
MJD		54309	54314	54319	54324	54329	54334	54339	$u_A$	$u_B$	$u$	
Laboratory	$k$	$[UTC-UTC(k)]/ns$										
NIM	(Beijing)	-28.2	-42.3	-41.5	-44.4	-34.6	-28.2	-40.1	1.5	19.8	19.8	
NIMB	(Bucharest)	-881.0	-883.6	-897.4	-889.1	-912.7	-941.9	-951.1	10.0	20.0	22.4	
NIMT	(Bangkok)	-1446.7	-1455.0	109.5	80.3	60.0	36.4	6.0	1.0	20.0	20.0	(3)
NIS	(Cairo)	11.8	4.2	-4.1	-16.9	-3.4	46.2	88.2	2.5	7.1	7.5	
NIST	(Boulder)	-1.8	-2.6	-2.4	-2.5	-2.3	-2.1	-3.0	0.5	4.9	4.9	
NMIJ	(Tsukuba)	15.5	18.0	20.6	22.6	24.9	25.6	22.9	0.7	5.0	5.1	
NMLS	(Sepang)	-558.4	-547.3	-538.9	-528.0	-520.0	-511.4	-496.6	2.0	20.0	20.1	
NPL	(Teddington)	39.5	45.8	59.3	54.5	48.4	42.5	35.5	0.7	5.0	5.1	
NPLI	(New-Delhi)	-92.9	-85.8	-73.2	-78.8	-82.7	-87.2	-89.8	2.5	7.1	7.5	
NRC	(Ottawa)	-28.6	-29.9	-31.8	-32.5	-34.8	-36.5	-44.7	0.7	5.1	5.1	
NTSC	(Lintong)	4.5	0.8	-2.2	-0.8	2.7	8.5	11.3	1.4	4.7	4.9	
ONBA	(Buenos Aires)	-529.4	-537.7	-546.7	-549.5	-547.1	-561.5	-561.7	5.0	5.1	7.1	
ONRJ	(Rio de Janeiro)	-4.7	-7.8	-6.9	-8.0	-7.5	8.0	5.2	4.0	20.0	20.4	
OP	(Paris)	17.0	14.6	17.9	11.7	17.9	15.4	14.1	0.5	1.3	1.4	
ORB	(Bruxelles)	93.3	92.9	93.1	93.5	94.8	98.5	96.9	0.7	5.0	5.1	
PL	(Warszawa)	5.5	-0.3	-4.0	-3.0	-0.1	10.5	12.9	1.4	4.8	5.0	
PTB	(Braunschweig)	-7.7	-10.7	-12.0	-13.8	-17.2	-17.1	-22.8	0.2	0.9	0.9	
ROA	(San Fernando)	0.9	1.8	3.4	3.0	3.0	0.7	-0.3	0.7	4.9	5.0	
SCL	(Hong Kong)	-19.3	-27.3	-23.8	-32.8	-36.3	-34.1	-43.1	3.0	10.0	10.5	
SIQ	(Ljubljana)	-	-5948.4	-5806.7	-5700.6	-5581.8	-5476.0	-5363.2	10.0	20.0	22.4	(4)
SG	(Singapore)	98.6	86.2	94.1	89.0	90.9	89.4	87.3	2.0	5.0	5.4	
SMU	(Bratislava)	-179.6	-183.5	-181.3	-188.7	-194.4	-193.6	-187.8	5.0	19.9	20.5	
SP	(Boras)	4.1	2.8	4.6	-1.9	-2.7	-1.9	1.7	0.5	1.3	1.4	
SU	(Moskva)	0.0	0.0	2.1	2.5	2.7	3.4	1.7	3.0	5.0	5.8	
TCC	(Concepcion)	-4520.9	-4661.3	-4615.4	-7682.1	-7721.9	-7735.9	-7754.5	1.5	20.0	20.1	(5)
TL	(Chung-Li)	-7.9	-4.4	-1.6	-0.5	0.5	3.5	1.1	0.7	4.9	5.0	
TP	(Praha)	-1.4	6.5	4.0	7.7	2.2	-1.0	2.3	0.9	5.0	5.1	
UME	(Gebze-Kocaeli)	29.0	32.8	37.7	32.3	37.1	40.4	42.6	1.5	7.0	7.2	
USNO	(Washington DC)	2.1	3.1	2.5	1.6	2.3	2.6	2.1	0.4	1.1	1.2	
VSL	(Delft)	25.8	21.4	33.0	32.1	32.2	36.1	34.6	0.5	1.3	1.4	
ZA	(Pretoria)	4607.2	4545.6	4472.7	4407.9	4328.1	4262.1	4175.6	2.5	20.0	20.2	
ZMDM	(Belgrade)	1314.4	1338.7	1374.5	1409.2	1446.6	1463.8	1484.2	2.0	7.0	7.3	

-Notes on section 1:

- (1) EIM : Hellenic Institute of Metrology, Thessaloniki.
- (2) LV : SA Latvian National Metrology Centre, Riga.
- (3) NIMT: Time step of UTC(NIMT) of -1573 ns on MJD 54316.2.
- (4) SIQ : Slovenian Institute of Quality and Metrology, Ljubljana.
- (5) TCC : Time step of UTC(TCC) of +3000 ns on MJD 54321.

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

Date 2007	0h UTC	JUL 28	AUG 2	AUG 7	AUG 12	AUG 17	AUG 22	AUG 27	
MJD		54309	54314	54319	54324	54329	54334	54339	
Laboratory k		$[TAI-TA(k)]/ns$							
CH (Bern)		53819.3	53814.1	53809.0	53800.8	53793.1	53784.6	53778.6	
F (Paris)		168303.9	168300.5	168302.3	168298.4	168296.9	168296.7	168293.1	
IT (Torino)		64788.1	64892.2	65024.6	65154.8	65281.8	65414.5	65544.5	
JATC (Lintong)		-42631.3	-42663.4	-42691.8	-42722.3	-42753.1	-42781.6	-42813.0	
KRIS (Daejeon)		18236.0	18310.7	18385.3	18460.8	18540.5	18616.9	18692.4	
NICT (Tokyo)		44.7	46.2	50.0	49.4	54.4	55.8	54.0	
NIST (Boulder)		-45309437.1	-45309628.4	-45309818.7	-45310009.4	-45310199.6	-45310389.9	-45310581.3	
NRC (Ottawa)		30617.2	30625.0	30629.8	30640.0	30647.4	30658.8	30665.3	
NTSC (Lintong)		4900.9	4926.2	4953.8	4980.4	5006.6	5034.3	5060.3	
ONRJ (Rio de Janeiro)		-1808.2	-1816.9	-1822.0	-1830.0	-1832.5	-1836.4	-1839.6	
PL (Warszawa)		-4396.3	-4405.8	-4414.5	-4421.8	-4432.6	-4434.3	-4441.6	
PTB (Braunschweig)		-357627.7	-357623.2	-357617.2	-357611.5	-357607.5	-357599.9	-357598.2	
SU (Moskva)		27244354.6	27244393.1	27244433.6	27244472.6	27244512.4	27244552.9	27244590.9	(1)
TL (Chung-Li)		621.6	623.6	623.0	624.4	624.7	625.4	622.5	
USNO (Washington DC)		-35003167.4	-35003473.8	-35003777.4	-35004081.6	-35004384.6	-35004689.1	-35004993.5	

- 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	54309 - 54339	$6.793 \times 10^{-13}$	(2007 JUL 28 - 2007 AUG 27)
New correction	54339 - 54369	$6.790 \times 10^{-13}$	(2007 AUG 27 - 2007 SEP 26)
New correction foreseen	54369 - 54399	$6.787 \times 10^{-13}$	(2007 SEP 26 - 2007 OCT 26)

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  $3.0 \times 10^{-15} / \sqrt{\tau}$ , (2) a flicker frequency noise of  $0.5 \times 10^{-15}$  and (3) a random walk frequency noise of  $1.0 \times 10^{-16} \sqrt{\tau}$ . 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,  $Ref(u_B)$  is a reference giving information on the stated value of  $u_B$  or is the *Circular T* where this reference was first given,  $u_{1/1ab1}$  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. All values are expressed in  $10^{-15}$ .

Standard	Period of Estimation	$d$	$u_A$	$u_B$	Ref( $u_B$ )	$u_{1/1ab1}$	$u_{1/TAI}$	$u$	Note
PTB-CS1	54309 54339	-5.9	5.0	8.0	T148	0.0	0.1	9.4	(1)
PTB-CS2	54309 54339	5.6	3.0	12.0	T148	0.0	0.1	12.4	(1)
SYRTE-JPO	54309 54339	1.8	0.7	6.3	T160	0.3	0.3	6.4	(2)
SYRTE-F02	54309 54329	3.7	0.3	0.5	T183	0.3	0.5	0.8	(3)
NIST-F1	54314 54339	3.4	0.3	0.3	T214	0.1	0.4	0.6	(4)
NPL-CsF1	54284 54319	2.0	0.5	1.8	T205	0.2	0.4	1.9	(5)
NICT-CsF1	54014 54029	1.7	1.0	2.5	T236	0.3	0.9	2.9	(6)
NICT-CsF1	54029 54039	3.1	1.0	2.8	[1]	0.3	1.2	3.2	(6)
NICT-CsF1	54039 54049	0.3	1.0	1.6	[1]	0.3	1.2	2.3	(6)
NICT-CsF1	54079 54094	4.2	1.0	1.9	[1]	0.3	0.9	2.3	(6)

Reference:

[1] M. Kumagai, H. Ito, M. Kajita and M. Hosokawa: Evaluation of Cesium Atomic Fountain NICT-CsF1, submitted to *Metrologia*

Notes:

- (1) Continuously operating as a clock participating to TAI.
- (2) Report 7 Sept. by LNE SYRTE.
- (3) Report 3 Sept. by LNE SYRTE.
- (4) Report 31 Aug. by NIST.
- (5) Report 12 Sept. by NPL.
- (6) Report 31 Aug. by NICT.

The second table gives the BIPM estimate of  $d$ , based on all available PFS measurements over the period MJD 53949-54339, 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	$d$	$u$	
54309-54339	$3.3 \times 10^{-15}$	$0.5 \times 10^{-15}$	(2007 JUL 28 - 2007 AUG 27)

5 - Relations of UTC and TAI with GPS time and GLONASS time.

$$\begin{aligned} [\text{UTC-GPS time}] &= -14 \text{ s} + C_0, & [\text{TAI-GPS time}] &= 19 \text{ s} + C_0, & \text{global uncertainty is of order } 10 \text{ ns.} \\ [\text{UTC-GLONASS time}] &= 0 \text{ s} + C_1, & [\text{TAI-GLONASS time}] &= 33 \text{ s} + C_1, & \text{global uncertainty is of order hundreds ns.} \end{aligned}$$

The  $C_0$  values provide a realization of GPS time, as obtained using the values  $[\text{UTC-UTC(OP)}]$  and the GPS data taken at the Paris Observatory, corrected for IGS precise orbits, clocks and ionosphere maps. The  $C_1$  values provide a realization of GLONASS time, as obtained using the values  $[\text{UTC-UTC(AOS)}]$  and the GLONASS data taken at the Astrogeodynamical Observatory Borowiec (AOS).  $N_0$  and  $N_1$  are the numbers of measurements, when  $N_0$  or  $N_1$  is 0, the corresponding values of  $C_0$  or  $C_1$  are interpolated.

The standard deviations  $\sigma_0$  and  $\sigma_1$  characterize the dispersion of individual measurements. The actual uncertainty of user's access to GPS and GLONASS times may differ from these values.

For this circular,  $\sigma_0 = 2.1 \text{ ns}$ ,  $\sigma_1 = 16.1 \text{ ns}$

Date 2007	0h UTC	MJD	$C_0/\text{ns}$	$N_0$	$C_1/\text{ns}$	$N_1$
	JUL 28	54309	2.5	46	-775.7	87
	JUL 29	54310	1.0	46	-779.7	86
	JUL 30	54311	-1.4	47	-779.6	68
	JUL 31	54312	-1.4	46	-776.4	74
	AUG 1	54313	0.5	46	-768.1	77
	AUG 2	54314	1.3	46	-775.2	72
	AUG 3	54315	-2.6	47	-785.0	79
	AUG 4	54316	-2.5	45	-773.7	83
	AUG 5	54317	-3.0	45	-733.0	86
	AUG 6	54318	-3.1	46	-719.9	80
	AUG 7	54319	-1.1	46	-746.1	79
	AUG 8	54320	-3.8	46	-752.7	74
	AUG 9	54321	-2.7	45	-745.4	75
	AUG 10	54322	-2.9	45	-750.0	66
	AUG 11	54323	-1.9	46	-750.6	70
	AUG 12	54324	-1.4	46	-749.4	86
	AUG 13	54325	-1.7	46	-755.2	76
	AUG 14	54326	1.4	46	-770.8	78
	AUG 15	54327	0.8	44	-796.8	75
	AUG 16	54328	0.5	44	-807.4	80
	AUG 17	54329	2.1	46	-805.4	74
	AUG 18	54330	0.3	44	-816.1	81
	AUG 19	54331	-1.5	43	-824.9	90
	AUG 20	54332	-2.1	44	-831.6	80
	AUG 21	54333	-0.5	44	-845.7	87
	AUG 22	54334	0.8	41	-855.7	86
	AUG 23	54335	0.3	44	-854.4	73
	AUG 24	54336	0.8	45	-855.1	72
	AUG 25	54337	3.7	39	-863.8	81
	AUG 26	54338	3.6	45	-868.4	73
	AUG 27	54339	-0.2	43	-880.5	80

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 GT for 'GPS time' observations; 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 statistical uncertainty evaluated by taking into account the level of phase noise in the raw data, the interpolation interval between data points and the effects with typical duration between 5 and 30 days.  $u_b$  is the estimated uncertainty on 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	GPS MC	1.5	5.0	GPS EC/GPS EC	2003 Sep/2004 Jul
APL /PTB	GPS MC	1.5	5.0	GPS EC/GPS EC	2003 Dec/2004 Jul
AUS /PTB	GPS MC	1.5	5.0	GPS EC/GPS EC	2004 Nov/2004 Jul
BEV /PTB	GPS MC	2.0	5.0	GPS EC/GPS EC	2001 Dec/2004 Jul
BIM /PTB	GPS SC	5.0	20.0	NA /GPS EC	NA /2004 Jul
BIRM/PTB	GPS MC	2.5	20.0	NA /GPS EC	NA /2004 Jul
BY /PTB	GPS SC	7.0	20.0	NA /GPS EC	NA /2004 Jul
CAO /PTB	GPS MC	1.5	7.0	GPS EC/GPS EC	2004 Nov/2004 Jul
CH /PTB	TWSTFT	0.5	1.0	LC(TWSTFT)	2006 Jun
CNM /PTB	GPS SC	5.0	5.0	GPS EC/GPS EC	2005 Nov/2004 Jul
CNMP/PTB	GPS MC	3.0	5.0	GPS EC/GPS EC	2004 May/2004 Jul
DLR /PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2007 Feb/2004 Aug
DTAG/PTB	GPS MC	3.0	10.0	GPS EC/GPS EC	1998 May/2004 Jul
EIM /PTB	GPS MC	2.0	20.0	NA /GPS EC	NA /2003 Aug
HKO /PTB	GPS MC	2.5	5.0	GPS EC/GPS EC	2004 Sep/2004 Jul
IFAG/PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2003 Jun/2004 Aug
IGMA/PTB	GPS MC	2.5	5.0	GPS EC/GPS EC	2004 Aug/2004 Jul
INPL/PTB	NA				
IT /PTB	TWSTFT	0.5	1.0	LC(TWSTFT)	2006 Mar
JATC/NTSC	INT LK	0.2	1.0	DIC	/2006 Sep

Link	Type	$u_A$ /ns	$u_B$ /ns	Calibration Type	Calibration Dates
JV /PTB	GPS GT	5.0	20.0	NA /GPS EC	NA /2003 Aug
KRIS/PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2005 Aug/2004 Aug
LDS /PTB	GPS SC	3.0	20.0	NA /GPS EC	NA /2004 Jul
LT /PTB	GPS MC	1.5	5.0	GPS EC/GPS EC	2001 Nov/2004 Jul
LV /PTB	GPS MC	2.0	7.0	GPS EC/GPS EC	2006 Feb/2004 Jul
MIKE/PTB	GPS MC	5.0	20.0	NA /GPS EC	NA /2004 Jul
MKEH/PTB	GPS SC	2.5	20.0	NA /GPS EC	NA /2004 Jul
MSL /PTB	GPS P3	1.0	20.0	NA /GPS EC	NA /2004 Aug
NAO /PTB	GPS SC	3.0	20.0	NA /GPS EC	NA /2004 Jul
NICT/PTB	TWSTFT	0.5	5.0	BC(GPS P3)	2007 Mar
NIM /PTB	GPS MC	1.5	20.0	NA /GPS EC	NA /2004 Jul
NIMB/PTB	GPS MC	10.0	20.0	NA /GPS EC	NA /2004 Jul
NIMT/PTB	GPS P3	1.0	20.0	NA /GPS EC	NA /2004 Aug
NIS /PTB	GPS MC	2.5	7.0	GPS EC/GPS EC	2005 May/2004 Jul
NIST/PTB	TWSTFT	0.5	5.0	BC(GPS P3)	2005 May
NMIJ/PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2002 Apr/2004 Aug
NMLS/PTB	GPS MC	2.0	20.0	NA /GPS EC	NA /2004 Jul
NPL /PTB	GPS P3	0.7	5.0	NA/GPS EC	NA /2004 Aug
NPLI/PTB	GPS MC	2.5	7.0	GPS EC/GPS EC	2005 Jul/2004 Jul
NRC /PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2003 Nov/2004 Aug
NTSC/PTB	GPS MC	1.5	5.0	GPS EC/GPS EC	2004 Sep/2004 Jul
ONBA/PTB	GPS MC	5.0	5.0	GPS EC/GPS EC	2004 Jul/2004 Jul
ONRJ/PTB	GPS MC	4.0	20.0	NA /GPS EC	NA /2004 Jul
OP /PTB	TWSTFT	0.5	1.0	LC(TWSTFT)	2006 Mar
ORB /PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2003 Jul/2004 Aug
PL /PTB	GPS MC	1.5	5.0	GPS EC/GPS EC	2001 Oct/2004 Jul
ROA /PTB	TWSTFT	0.7	5.0	BC(GPS P3)	2005 May
SCL /PTB	GPS MC	3.0	10.0	LC(GPS SC)	1993 May
SIQ /PTB	GPS SC	10.0	20.0	NA /GPS EC	NA /2003 Aug
SG /PTB	GPS MC	2.0	5.0	GPS EC/GPS EC	2004 Nov/2004 Jul
SMU /PTB	GPS SC	5.0	20.0	NA /GPS EC	NA /2004 Jul
SP /PTB	TWSTFT	0.5	1.0	LC(TWSTFT)	2006 Mar
SU /PTB	GPS SC	3.0	5.0	GPS EC/GPS EC	2003 Apr/2004 Jul
TCC /PTB	GPS P3	1.5	20.0	NA /GPS EC	NA /2004 Aug
TL /PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2005 May/2004 Aug
TP /PTB	GPS P3	0.9	5.0	LC(GPS SC)	2004 Jul
UME /PTB	GPS MC	1.5	7.0	GPS EC/GPS EC	2005 Dec/2004 Jul
USNO/PTB	TWSTFT	0.5	1.1	BC(TW X-Band)	2005 May
VSL /PTB	TWSTFT	0.5	1.0	LC(TWSTFT)	2006 Mar
ZA /PTB	GPS MC	2.5	20.0	NA /GPS EC	NA /2004 Jul
ZMDM/PTB	GPS MC	2.0	7.0	GPS EC/GPS EC	2005 Mar/2004 Jul