

BUREAU INTERNATIONAL DES POIDS ET MESURES
ORGANISATION INTERGOUVERNEMENTALE DE LA CONVENTION DU METRE
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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 2014	0h UTC	JUN 26	JUL 1	JUL 6	JUL 11	JUL 16	JUL 21	JUL 26	JUL 31	Uncertainty/ns Notes		
MJD		56834	56839	56844	56849	56854	56859	56864	56869	u_A	u_B	u
Laboratory k		$[UTC-UTC(k)]/ns$										
AOS (Borowiec)		0.0	-0.3	-0.4	-1.3	-2.0	-2.8	-3.3	-3.9	0.3	5.3	5.3
APL (Laurel)		-5.0	-4.9	-5.5	-6.4	-2.9	-1.3	-2.1	-2.8	0.3	5.3	5.3
AUS (Sydney)		-15.2	-30.1	-44.4	-54.0	-64.2	-72.3	-85.2	-98.2	0.3	5.3	5.3
BEV (Wien)		-26.0	-31.1	-34.0	-35.8	-34.3	-33.3	-26.5	-21.9	1.5	3.5	3.8
BIM (Sofiya)		1283.8	1311.9	1340.1	1346.5	1368.8	1383.3	1403.0	1427.6	1.5	7.2	7.4
BIRM (Beijing)		281.8	292.5	302.8	318.4	323.1	331.6	336.4	5.2	1.5	20.1	20.1 (1)
BY (Minsk)		2.2	11.0	7.7	0.4	-0.4	1.1	13.8	-2.7	1.5	7.2	7.4
CAO (Cagliari)		-6256.2	-6254.3	-6240.7	-6247.9	-6242.0	-6234.4	-6246.9	-6240.4	8.0	7.2	10.8
CH (Bern-Wabern)		-9.4	-5.9	-11.5	-8.2	-4.1	-2.3	-8.1	-11.4	0.3	2.1	2.1
CNM (Queretaro)		-1.4	-0.5	5.5	3.7	7.8	0.6	-18.7	4.4	2.0	5.3	5.7
CNMP (Panama)		50.2	41.9	35.7	29.2	12.2	2.8	-10.2	-21.8	3.5	5.3	6.4
DLR (Oberpfaffenhofen)		-	-	-	-	-	-	-	-	-	-	-
DMDM (Belgrade)		-5.2	-15.5	13.7	10.5	3.5	-2.9	-11.2	-7.3	0.3	7.2	7.2
DTAG (Frankfurt/M)		13.1	18.3	17.7	14.1	10.0	17.2	24.9	24.4	0.3	10.1	10.1
EIM (Thessaloniki)		8.4	13.1	13.8	14.0	12.5	4.6	8.8	-	7.5	5.3	9.2
ESTC (Noordwijk)		-0.9	0.7	0.8	-0.1	0.9	1.1	1.1	-0.2	0.3	5.3	5.3
HKO (Hong Kong)		798.2	805.0	825.8	833.9	848.0	850.9	862.4	871.8	0.3	5.3	5.3
IFAG (Wetzell)		-1214.7	-1225.8	-1227.8	-1231.3	-1229.1	-1232.3	-1240.8	-1233.7	0.3	5.2	5.3
IGNA (Buenos Aires)		2072.4	2172.4	2262.1	2355.0	2430.1	2512.2	2601.7	-	2.0	5.3	5.7
INPL (Jerusalem)		-65.9	-64.4	-68.3	-71.8	-69.0	-74.0	-78.9	-86.6	0.7	7.2	7.3
INTI (Buenos Aires)		-22.8	-23.1	-32.6	-44.4	-36.1	-25.0	-24.2	-22.0	2.5	20.1	20.2
INXE (Rio de Janeiro)		-7.3	2.0	12.8	22.2	28.4	33.2	34.3	32.1	0.3	20.1	20.1
IPQ (Caparica)		-1.5	-0.5	11.6	6.6	1.0	-4.7	-1.6	-4.2	0.4	7.2	7.2
IT (Torino)		2.1	3.1	3.1	2.4	2.3	2.2	2.0	1.6	0.3	2.2	2.2
JATC (Lintong)		3.6	5.6	8.2	9.4	9.2	8.4	6.3	4.1	0.5	5.2	5.2
JV (Kjeller)		-0.2	17.1	23.6	16.7	20.5	34.7	26.3	30.7	5.0	20.1	20.7
KEBS (Nairobi)		-89069.2	-89360.5	-89636.3	-89915.7	-90206.4	-90503.9	-90784.9	-91083.9	1.5	20.1	20.1
KIM (Serpong-Tangerang)		-	-	-	-	-	-	-	-	-	-	-
KRIS (Daejeon)		2.1	3.6	5.5	7.1	7.7	7.1	5.4	2.1	0.3	5.2	5.2
KZ (Astana)		-1077.7	-1099.3	-1119.6	-1129.2	-1152.2	-1166.0	-1184.9	-1199.0	2.5	20.1	20.2

Date 2014	0h UTC	JUN 26	JUL 1	JUL 6	JUL 11	JUL 16	JUL 21	JUL 26	JUL 31	Uncertainty/ns Notes		
MJD		56834	56839	56844	56849	56854	56859	56864	56869	u_A	u_B	u
Laboratory k		[UTC-UTC(k)]/ns										
LT (Vilnius)		568.1	574.0	575.9	569.5	578.8	604.0	609.6	627.6	2.0	5.3	5.7
MASM (Bayanzurkh)		-709.1	-726.0	-749.0	-	-	-810.2	-828.3	-843.2	1.5	20.1	20.1
MIKE (Espoo)		4.2	6.1	6.3	5.3	6.0	5.3	4.2	3.7	0.3	7.2	7.2
MKEH (Budapest)		-17518.3	-17723.6	-17921.1	-18117.1	-18324.4	-18533.1	-18737.1	-18954.1	1.5	20.1	20.1
MSL (Lower Hutt)		-260.2	-213.2	-197.9	-202.0	-189.2	-167.2	-159.7	-153.7	1.5	20.1	20.1
MTC (Makkah)		9.8	14.4	18.6	19.0	11.7	8.6	6.1	-	10.0	20.1	22.4
NAO (Mizusawa)		-1.8	-6.3	-1.4	1.7	5.4	7.2	-0.8	-9.0	2.0	19.9	20.0
NICT (Tokyo)		-12.8	-14.4	-15.0	-15.4	-15.4	-15.7	-13.8	-10.1	0.3	5.0	5.0
NIM (Beijing)		5.6	6.3	6.5	6.1	6.3	5.8	5.2	3.9	0.3	5.1	5.2
NIMB (Bucharest)		358.1	368.0	365.7	365.8	348.9	335.1	351.4	348.5	4.5	20.1	20.6
NIMT (Pathumthani)		-24.1	-22.2	-20.3	-18.6	-5.7	-7.9	-21.9	-34.5	1.0	20.1	20.1
NIS (Cairo)		-23.3	-26.4	-24.1	75.8	184.3	302.0	817.3	929.6	0.8	7.2	7.3 (2)
NIST (Boulder)		4.7	5.1	5.4	5.0	4.9	4.9	4.8	4.5	0.3	5.1	5.2
NMIJ (Tsukuba)		-5.1	-4.9	-5.0	-5.5	-6.1	-6.2	-6.0	-6.1	0.3	5.2	5.2
NMLS (Sepang)		-1525.1	-1349.7	-1246.6	-1158.0	-1057.3	-958.3	-863.3	-770.4	1.0	20.1	20.1
NPL (Teddington)		22.0	18.2	12.2	5.9	-0.1	-6.2	-11.9	-17.3	0.3	7.2	7.2
NPLI (New-Delhi)		1.3	2.8	3.0	0.0	-2.2	-2.6	-1.7	0.1	0.3	7.2	7.2
NRC (Ottawa)		-6.9	-15.1	-26.4	-33.4	-35.2	-36.8	-42.9	-41.5	0.3	5.3	5.3
NRL (Washington DC)		325.2	341.9	358.3	374.8	391.9	408.3	424.6	-	0.3	5.3	5.3
NTSC (Lintong)		1.1	4.5	5.4	6.8	5.9	4.9	3.2	1.6	0.5	5.1	5.1
ONBA (Buenos Aires)		-1816.5	-1814.6	-1827.3	-1837.1	-1837.0	-1858.0	-1871.4	-1872.9	2.5	5.3	5.9
ONRJ (Rio de Janeiro)		-1.0	0.6	1.6	1.2	-0.6	-2.5	-4.7	-2.1	1.3	7.2	7.3
OP (Paris)		-0.4	0.2	0.7	0.6	0.2	0.1	-0.1	-0.7	0.3	2.1	2.1
ORB (Bruxelles)		-9.2	-8.5	-11.6	-8.8	-8.7	0.2	3.2	5.0	0.3	5.3	5.3
PL (Warszawa)		23.1	20.3	15.2	8.9	11.7	5.8	-3.2	-4.6	0.3	5.3	5.3
PTB (Braunschweig)		-2.2	-1.4	-0.8	-1.1	-1.2	-1.3	-1.6	-2.3	0.1	1.8	1.8
ROA (San Fernando)		-2.5	-3.2	-1.1	-2.1	-5.3	-6.6	-7.8	-9.0	0.3	5.3	5.3
SASO (Riyadh)		163.4	172.1	181.8	187.8	201.1	209.6	212.1	220.7	0.7	7.2	7.3
SCL (Hong Kong)		-24.8	-30.2	-44.2	-49.9	-82.5	-64.7	-	-95.8	4.0	10.2	10.9
SG (Singapore)		-3.2	-2.1	1.4	0.3	-2.2	-4.9	-6.5	-2.4	0.4	5.3	5.3
SIQ (Ljubljana)		-1975.0	-1960.9	-1977.0	-1959.2	-1988.2	-1984.3	-1985.9	-1982.2	4.0	20.1	20.5
SMD (Bruxelles)		-7.5	-3.4	-7.8	-8.3	-8.3	1.9	-1.8	-4.8	0.3	7.2	7.2
SMU (Bratislava)		91.7	81.9	77.8	74.1	79.5	71.8	71.1	58.3	1.0	20.1	20.1
SP (Boras)		-0.3	-1.1	-0.5	-0.1	1.0	1.5	3.5	6.7	0.3	2.0	2.1
SU (Moskva)		1.6	2.7	4.2	4.6	3.3	4.3	4.5	5.4	0.9	5.0	5.1
TCC (Concepcion)		3764.5	3778.4	3793.7	3804.8	3830.2	3845.7	3854.2	3878.1	6.0	5.3	8.0
TL (Chung-Li)		0.5	-0.3	-1.0	-2.9	-5.0	-5.1	-5.3	-6.6	0.3	5.2	5.2
TP (Praha)		27.2	25.1	23.5	22.7	31.0	32.2	27.6	20.7	0.3	5.3	5.3
UA (Kharkov)		-2.5	4.5	-2.7	-4.5	-0.5	4.5	8.2	6.1	1.5	7.2	7.3
UME (Gebze-Kocaeli)		-72.1	-78.8	-78.3	-87.0	-100.9	-109.4	-113.0	-115.4	1.0	7.2	7.3
USNO (Washington DC)		1.3	1.5	1.1	-0.1	0.0	-0.7	-1.4	-1.9	0.2	3.4	3.4
VMI (Ha Noi)		6.6	13.4	8.3	7.8	11.8	7.9	14.7	7.7	0.3	20.1	20.1
VSL (Delft)		8.5	10.0	12.3	7.3	2.0	2.8	2.1	-0.2	0.3	2.1	2.1
ZA (Pretoria)		-4352.1	-4390.6	-4430.4	-4459.1	-4496.3	-4538.2	-4559.8	-4594.1	1.5	20.0	20.0

- Notes on section 1:

(1) BIRM : Apparent time step of UTC(BIRM) of about +340 ns on MJD 56866.

(2) NIS : Apparent time step of UTC(NIS) of about -400 ns on MJD 56862.

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

Date 2014	0h UTC	JUN 26	JUL 1	JUL 6	JUL 11	JUL 16	JUL 21	JUL 26	JUL 31
MJD		56834	56839	56844	56849	56854	56859	56864	56869
Laboratory k		$[TAI-TA(k)]/ns$							
CH (Bern-Wabern)		25512.4	25435.0	25353.3	25279.9	25208.0	25132.4	25051.1	24971.4
CNM (Queretaro)		-212.1	-241.6	-264.4	-295.6	-327.3	-371.8	-446.2	-494.3
F (Paris)		167634.4	167631.9	167632.5	167632.9	167633.4	167633.0	167632.9	167633.7
JATC (Lintong)		-55894.1	-55924.1	-55951.8	-55980.0	-56007.2	-56035.3	-56065.3	-56093.3
KRIS (Daejeon)		45291.8	45308.8	45326.7	45344.3	45359.9	45373.3	45384.6	45393.6
NICT (Tokyo)		1149.6	1153.2	1157.6	1161.8	1164.5	1168.8	1173.6	1179.5
NIST (Boulder)		-45405750.1	-45405937.5	-45406124.9	-45406313.1	-45406500.9	-45406688.7	-45406876.5	-45407064.6
NRC (Ottawa)		22426.7	22401.7	22373.8	22350.0	22331.5	22313.1	22290.1	22274.8
NTSC (Lintong)		18832.2	18866.4	18898.8	18931.6	18964.8	18997.9	19029.3	19061.7
ONRJ (Rio de Janeiro)		-19281.2	-19338.7	-19395.7	-19454.5	-19509.3	-19562.9	-19618.5	-19669.8
PL (Warszawa)		-12657.1	-8574.8	-8506.8	-8437.2	-8353.3	-8281.8	-8178.3	-8086.5
PTB (Braunschweig)		2010.5	2011.4	2012.4	2012.3	2012.5	2012.9	2013.0	2012.8
SG (Singapore)		16186.8	16237.9	16291.4	16340.3	16377.8	16425.1	16473.5	16527.6
SU (Moskva)		27291051.0	27291052.1	27291053.6	27291054.0	27291052.7	27291053.7	27291053.9	27291054.8 (1)
TL (Chung-Li)		-125.6	-127.9	-127.6	-127.6	-130.0	-129.1	-130.3	-133.7
USNO (Washington DC)		-35152150.9	-35152438.7	-35152726.7	-35153015.5	-35153303.3	-35153590.8	-35153878.9	-35154166.9

- 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	56834 - 56869	6.483×10^{-13}	(2014 JUN 26 - 2014 JUL 31)
New correction	56869 - 56899	6.483×10^{-13}	(2014 JUL 31 - 2014 AUG 30)
New correction foreseen	56899 - 56929	6.483×10^{-13}	(2014 AUG 30 - 2014 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 τ in days: (1) a white frequency noise of $2.0 \times 10^{-15} / \sqrt{\tau}$, (2) a flicker frequency noise of 0.4×10^{-15} and (3) a random walk frequency noise of $0.3 \times 10^{-16} \times \sqrt{\tau}$. 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 and Secondary Frequency Standards (PFS/SFS). In this table: u_A is the uncertainty originating in the instability of the standard, u_B is the combined uncertainty from systematic effects, $u_{1/Lab}$ is the uncertainty in the link between the standard 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 reference. 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 and Secondary Frequency Standards that explain changes in uncertainties. For the SFS, u_{Srep} represents the recommended uncertainty of the secondary representation of the second and Ref(u_S) provides the reference for the frequency of the transition and its uncertainty u_{Srep} , these two fields are not applicable to PFS. 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	u_{Srep}	Ref(u_S)	Ref(u_B)	$u_B(Ref)$	Note
PTB-CS1	56834 56869	-8.97	6.00	8.00	0.00	0.06	10.00	PFS/NA		T148	8.	(1)
PTB-CS2	56834 56869	-5.27	3.00	12.00	0.00	0.06	12.37	PFS/NA		T148	12.	(1)
IT-CsF2	56839 56864	-1.14	0.28	0.18	0.18	0.23	0.44	PFS/NA		T315	0.19	(2)
NIM5	56669 56684	-1.25	0.60	1.40	0.20	0.85	1.76	PFS/NA		[1]	1.40	(3)
NIM5	56699 56714	-1.66	0.50	1.40	0.20	0.85	1.73	PFS/NA		[1]	1.40	(3)
NIM5	56729 56749	-0.64	0.80	1.40	0.10	0.66	1.74	PFS/NA		[1]	1.40	(3)
NIM5	56759 56779	0.43	0.80	1.40	0.10	0.66	1.74	PFS/NA		[1]	1.40	(3)
SYRTE-F01	56834 56869	-0.45	0.25	0.39	0.10	0.17	0.50	PFS/NA		T301	0.37	(4)
SYRTE-F02	56834 56869	0.23	0.25	0.28	0.10	0.17	0.42	PFS/NA		T301	0.23	(4)
SYRTE-FORb	56854 56869	0.68	0.40	0.29	0.11	0.37	0.62	1.3	[2]	T301	0.35	(4)
PTB-CSF1	56834 56869	-0.27	0.09	0.71	0.02	0.06	0.72	PFS/NA		T162	1.40	(5)

Notes:

(1) Continuously operating as a clock participating to TAI

(2) Report 31 JUL. 2014 by INRIM

(3) Report 11 JUN. 2014 by NIM

(4) Report 01 AUG. 2014 by LNE-SYRTE

(5) Report 04 AUG. 2014 by PTB

[1] NIM5 Cs fountain clock and its evaluations, Fang Fang, Mingshou Li, Pingwei Lin, Weiliang Chen, Nianfeng Liu, Yige Lin, Ping Wang, Kun Liu, Rui Suo and Tianchu Li, *Metrologia*, submitted.

[2] CIPM Recommendation 1 (CI-2013) : Updates to the list of standard frequencies in *Procès-Verbaux des Séances du Comité International des Poids et Mesures*, 102nd meeting (2013), 2014, 188 p.

The second table gives the BIPM estimate of d , based on all available PFS and SFS measurements over the period MJD 56474-56869, 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	
56834-56869	-0.40×10^{-15}	0.24×10^{-15}	(2014 JUN 26 - 2014 JUL 31)

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

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

$[UTC(USNO) \text{ GPS}]$ and $[UTC(SU) \text{ GLONASS}]$ 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 σ_0 , σ_0' , σ_1 and σ_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, $\sigma_0 = 1.1 \text{ ns}$, $\sigma_0' = 1.1 \text{ ns}$, $\sigma_1 = 6.6 \text{ ns}$, $\sigma_1' = 6.6 \text{ ns}$

2014	0h UTC	MJD	C_0/ns	N_0	C_0'/ns	N_0'	C_1/ns	N_1	C_1'/ns	N_1'
	JUN 26	56834	0.2	89	-1.7	89	-188.0	89	-382.6	89
	JUN 27	56835	-1.8	89	-3.3	89	-188.9	88	-382.0	88
	JUN 28	56836	-1.8	90	-0.3	90	-188.3	82	-380.3	82
	JUN 29	56837	-1.5	88	1.0	88	-186.1	72	-377.3	72
	JUN 30	56838	-0.9	88	0.3	88	-187.5	84	-378.0	84
	JUL 1	56839	0.2	85	-0.3	87	-189.1	75	-379.1	75
	JUL 2	56840	0.3	90	-1.5	90	-188.1	87	-377.8	87
	JUL 3	56841	0.0	89	-1.3	89	-184.8	89	-374.3	89
	JUL 4	56842	-0.7	87	-1.4	88	-182.1	82	-371.8	82
	JUL 5	56843	-1.9	89	-2.0	89	-181.1	85	-371.1	85
	JUL 6	56844	-3.0	90	0.0	89	-181.5	90	-371.3	90
	JUL 7	56845	-3.6	89	1.1	86	-181.1	89	-370.6	89
	JUL 8	56846	-3.1	89	-1.1	89	-181.5	89	-370.7	89
	JUL 9	56847	-3.4	87	-2.3	88	-181.2	87	-369.6	87
	JUL 10	56848	-2.1	87	-1.8	88	-180.2	86	-367.7	86

2014	0h UTC	MJD	C_0 /ns	N_0	C_0' /ns	N_0'	C_1 /ns	N_1	C_1' /ns	N_1'
	JUL 11	56849	0.2	87	-0.9	87	-180.2	88	-367.6	88
	JUL 12	56850	-0.1	89	-2.1	89	-180.4	82	-368.5	82
	JUL 13	56851	0.1	89	-1.0	89	-181.0	86	-369.6	86
	JUL 14	56852	-0.8	90	-0.7	90	-180.0	88	-368.7	88
	JUL 15	56853	-0.4	89	-1.9	89	-176.9	84	-365.7	84
	JUL 16	56854	-2.3	88	-2.8	88	-176.1	64	-364.8	63
	JUL 17	56855	-3.5	87	-1.7	87	-179.9	89	-368.0	89
	JUL 18	56856	-4.1	90	-2.9	90	-180.4	88	-367.8	88
	JUL 19	56857	-3.7	87	-1.4	88	-178.5	87	-365.6	86
	JUL 20	56858	-2.5	89	-2.1	89	-176.8	87	-364.0	87
	JUL 21	56859	-3.1	89	-3.8	89	-176.1	89	-362.6	89
	JUL 22	56860	-3.0	90	-2.8	90	-177.7	88	-363.3	88
	JUL 23	56861	-2.3	89	-2.3	89	-178.0	89	-363.4	89
	JUL 24	56862	-3.6	89	-2.8	89	-176.9	88	-362.3	89
	JUL 25	56863	-3.9	86	-3.1	89	-176.8	86	-362.2	87
	JUL 26	56864	-3.4	89	-3.3	89	-176.4	85	-361.5	85
	JUL 27	56865	-2.0	89	-2.1	89	-175.5	87	-360.4	87
	JUL 28	56866	-3.3	89	-4.6	89	-175.7	86	-360.5	86
	JUL 29	56867	-3.9	89	-5.4	89	-178.0	88	-362.6	88
	JUL 30	56868	-4.3	90	-3.9	90	-180.1	88	-364.4	88
	JUL 31	56869	-4.7	88	-4.8	88	-180.5	84	-365.0	84

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	GPSPPP	0.3	5.0	LC(GPS P3)	2011 Jun
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	GPS MC	1.5	3.0	BC(TWSTFT)	2008 Jan
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	GPS MC	1.5	7.0	GPS EC/GPS EC	2008 Jun/2006 Sep
CAO /PTB	GPS MC	8.0	7.0	GPS EC/GPS EC	2004 Nov/2006 Sep
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	NA				
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	5.0	GPS EC/GPS EC	2012 Nov/2004 Aug
HKO /PTB	GPSPPP	0.3	5.0	LC(GPS MC)	2013 Apr
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	7.0	GPS EC/GPS EC	2009 Jun/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	GPSPPP	0.4	7.0	LC(GPS MC)	2010 Aug
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	GPS MC	1.5	20.0	NA /GPS EC	NA /2006 Sep
KIM /PTB	NA				
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
LT /PTB	GPS MC	2.0	5.0	GPS EC/GPS EC	2006 Oct/2006 Sep
MASM/PTB	GPS P3	1.5	20.0	NA /GPS EC	NA /2004 Aug
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	GPSPPP	0.3	5.0	LC(TWSTFT)	2013 May
NIMB/PTB	GPS MC	4.5	20.0	NA /GPS EC	NA /2006 Sep

Link	Type	u_A /ns	u_B /ns	Calibration Type	Calibration Dates
NIMT/PTB	GPS P3	1.0	20.0	NA /GPS EC	NA /2004 Aug
NIS /PTB	GPS P3	0.8	7.0	LC(GPS MC)	2010 Jun
NIST/PTB	TWGPPP	0.3	5.0	LC(TWSTFT)/BC(GPS PPP)	2005 May/2009 Aug
NMIJ/PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2002 Apr/2004 Aug
NMLS/PTB	GPS P3	1.0	20.0	NA /GPS EC	NA /2006 Sep
NPL /PTB	GPSPPP	0.3	7.0	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	TWGPPP	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	1.3	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
SASO/PTB	GPS P3	0.7	7.0	GPS EC/GPS EC	2012 Nov/2006 Sep
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	GPSPPP	0.3	7.0	GPS EC/GPS EC	2011 Sep/2006 Sep
SMU /PTB	GPSGLN	1.0	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	GPS SC	6.0	5.0	GPS EC/GPS EC	2004 May/2006 Sep
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	GPSPPP	0.3	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