CIRCULAR T 328 ISSN 1143-1393
2015 MAY 07, 09h UTC

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. From 2015 July 1, 0h UTC, TAI-UTC = 36 s.

Date 2015 0h UTC	MAR 28	APR 2	APR 7	APR 12	APR 17	APR 22	APR 27	Uncertainty/ns			Notes
MJD	57109	57114	57119	57124	57129	57134	57139	u_A	u_B	u	
Laboratory *k*	[*UTC-UTC*(*k*)]/ns										
AOS (Borowiec)	-4.6	-3.3	-1.9	-2.0	-1.8	-2.6	-3.0	0.3	5.1	5.1	
APL (Laurel)	1.9	1.4	1.8	1.9	3.1	1.5	-4.2	0.3	4.9	4.9	
AUS (Sydney)	-576.0	-590.3	-608.0	-609.8	-617.7	-626.4	-634.8	0.3	5.0	5.1	
BEV (Wien)	-26.6	-22.0	-21.4	-14.0	-19.2	-24.4	-26.4	0.3	3.1	3.1	
BIM (Sofiya)	2163.0	2191.2	2225.1	2219.5	2236.7	2271.3	2286.5	1.5	7.0	7.2	
BIRM (Beijing)	-28.8	-30.5	-31.8	-33.2	-31.9	-40.0	-46.8	1.5	20.0	20.1	
BY (Minsk)	-0.7	0.7	6.2	5.4	1.4	1.7	3.7	1.5	7.0	7.2	
CAO (Cagliari)	-4362.6	-4477.0	-4591.8	-4713.3	-4823.2	-4913.9	-5026.1	8.0	7.0	10.7	
CH (Bern-Wabern)	-3.6	-5.1	-6.1	-7.0	-7.4	-7.4	-6.5	0.3	1.3	1.3	
CNM (Queretaro)	-16.4	-17.5	-13.5	-12.4	-6.1	-0.7	4.4	3.0	5.1	5.9	
CNMP (Panama)	-4.7	5.4	-1.4	-6.7	-2.1	6.6	15.1	3.5	5.1	6.2	
DFNT (Tunis)	7003.2	7189.8	7386.0	7581.2	7770.4	7963.9	8160.1	1.5	20.0	20.1	
DMDM (Belgrade)	4.0	-10.5	-20.0	-16.7	-12.6	-11.5	-13.6	0.3	7.0	7.1	
DTAG (Frankfurt/M)	50.5	51.0	44.8	35.9	31.1	31.5	28.7	0.3	9.9	9.9	
EIM (Thessaloniki)	15.4	7.1	14.0	16.1	11.4	10.2	13.8	7.5	5.1	9.1	
ESTC (Noordwijk)	-0.4	-0.5	-1.5	0.0	3.6	2.7	-1.2	0.3	5.1	5.1	
HKO (Hong Kong)	1765.2	1785.9	1806.7	1826.7	1857.9	1891.5	1915.2	1.0	5.0	5.1	
IFAG (Wettzell)	-981.7	-973.1	-972.2	-965.9	-962.1	-948.4	-947.3	0.3	5.0	5.0	
IGNA (Buenos Aires)	-	-	-	-	-	-	-				
INPL (Jerusalem)	242.9	-54.1	-36.2	-24.3	-17.0	-14.5	-7.3	0.5	7.0	7.0	(1)
INTI (Buenos Aires)	26.2	34.5	51.6	63.8	67.9	83.2	93.3	2.5	20.0	20.2	
INXE (Rio de Janeiro)	-13.2	-17.5	-9.4	9.8	6.6	-0.8	-12.7	0.3	20.0	20.0	
IPQ (Caparica)	321.1	349.5	376.0	392.2	420.8	-	-	0.4	7.0	7.1	
IT (Torino)	-0.9	-2.4	-2.3	-2.7	-2.9	-3.5	-3.3	0.5	1.4	1.5	(2)
JATC (Lintong)	0.8	1.4	2.6	3.4	4.0	4.4	2.9	0.4	4.8	4.8	
JV (Kjeller)	-7.4	-23.1	-14.7	-18.6	-22.5	-39.5	-42.6	5.0	20.0	20.6	
KEBS (Nairobi)	-	-	-	-	-	-	-				
KIM (Serpong-Tangerang)	302.9	316.2	336.5	353.9	364.6	389.7	384.2	2.0	20.0	20.1	
KRIS (Daejeon)	-20.6	-22.6	-25.3	-27.9	-29.8	-32.0	-33.4	0.3	5.1	5.1	
KZ (Astana)	-995.3	-978.7	-969.8	-960.8	-955.5	-948.1	-927.3	1.5	7.0	7.2	

Date 2015 0h UTC	MAR 28	APR 2	APR 7	APR 12	APR 17	APR 22	APR 27	Uncertainty/ns			Notes
MJD	57109	57114	57119	57124	57129	57134	57139	u_A	u_B	u	
Laboratory *k*				[*UTC*-*UTC*(*k*)]/ns							
LT (Vilnius)	927.2	933.0	932.8	919.6	913.4	907.9	905.2	2.0	5.1	5.4	
MASM (Bayanzurkh)	-302.7	-325.8	-355.1	-385.7	-408.8	-445.9	-471.9	0.4	20.0	20.0	
MIKE (Espoo)	1.5	1.7	1.1	0.3	0.5	-0.6	-0.6	0.3	7.0	7.1	
MKEH (Budapest)	-28764.4	-28970.8	-29175.8	-29376.9	-29578.9	-29784.3	-29981.9	1.5	20.0	20.1	
MSL (Lower Hutt)	-	-	-	-	-	-	-				
MTC (Makkah)	72.6	85.1	93.5	98.1	101.0	103.5	106.8	0.3	7.0	7.1	
NAO (Mizusawa)	-50.6	-53.6	-46.9	-46.0	-52.3	-53.1	-38.1	2.0	20.0	20.1	
NICT (Tokyo)	-12.2	-11.8	-12.2	-12.4	-10.6	-11.8	-12.9	0.3	4.7	4.7	
NIM (Beijing)	1.3	1.4	1.0	-0.5	-1.3	-1.9	-2.0	0.3	4.9	4.9	
NIMB (Bucharest)	774.7	788.3	824.4	856.8	898.0	920.0	944.6	4.5	20.0	20.5	
NIMT (Pathumthani)	-13.0	-23.8	-24.9	-12.6	-11.9	-7.5	-5.9	1.0	20.0	20.0	
NIS (Cairo)	-7943.7	-7923.7	-7910.9	-7897.0	-7892.5	-7874.1	-7865.2	1.6	7.0	7.2	
NIST (Boulder)	4.3	4.6	4.5	4.2	4.4	4.3	4.4	0.3	4.8	4.8	
NMIJ (Tsukuba)	-13.9	-11.4	-8.4	-5.3	-0.5	-4.2	-8.7	0.3	5.0	5.0	
NMLS (Sepang)	-400.0	-364.0	-332.5	-333.3	-321.3	-314.4	-303.0	1.0	20.0	20.0	
NPL (Teddington)	32.8	30.7	28.4	26.1	25.6	24.8	24.5	0.3	7.0	7.0	
NPLI (New-Delhi)	15.1	18.6	21.3	17.3	9.6	4.5	2.5	0.3	7.0	7.1	
NRC (Ottawa)	-31.1	-29.0	-24.1	-16.5	-15.1	-19.6	-27.3	0.3	5.1	5.1	
NRL (Washington DC)	4.4	2.3	-0.8	0.0	-0.2	2.6	3.4	0.3	5.1	5.1	
NTSC (Lintong)	0.8	0.0	-0.1	2.6	3.2	3.6	2.1	0.3	4.7	4.7	
ONBA (Buenos Aires)	-2373.4	-2413.8	-2430.9	-2433.7	-2428.5	-2446.4	-2461.2	2.5	5.1	5.6	
ONRJ (Rio de Janeiro)	-1.9	-2.4	0.5	0.7	-2.3	-0.8	-6.2	1.3	7.0	7.1	
OP (Paris)	0.3	0.8	0.7	0.2	0.4	0.3	0.5	0.3	1.3	1.4	
ORB (Bruxelles)	2.0	3.6	-2.6	-3.4	-0.4	8.2	3.3	0.3	5.0	5.1	
PL (Warszawa)	-2.5	-14.4	-11.5	-19.8	-13.9	-10.4	-3.4	0.3	5.0	5.0	
PTB (Braunschweig)	0.9	1.0	0.7	0.0	0.0	-0.1	0.2	0.1	0.8	0.8	
ROA (San Fernando)	16.1	10.9	12.6	11.2	8.3	5.9	3.2	0.5	5.0	5.1	(3)
SASO (Riyadh)	-69.6	-70.0	-78.9	-82.8	-85.3	-85.0	-86.1	0.7	7.0	7.1	
SCL (Hong Kong)	28.4	23.8	6.4	30.2	30.8	31.4	37.5	6.0	10.0	11.7	
SG (Singapore)	-6.9	-7.8	-8.9	-6.0	-2.3	0.5	4.5	0.7	5.0	5.1	
SIQ (Ljubljana)	-1455.9	-1459.1	-1461.0	-1475.8	-1497.1	-1484.2	-1498.8	0.3	7.0	7.1	
SMD (Bruxelles)	4.7	5.6	6.0	-1.5	-9.4	-4.9	-0.3	0.3	7.0	7.0	
SMU (Bratislava)	-143.1	-148.3	-153.2	-151.9	-155.8	-156.6	-158.0	1.0	20.0	20.0	
SP (Boras)	3.5	-1.8	0.1	0.8	1.5	-0.1	-0.3	0.5	1.2	1.3	(4)
SU (Moskva)	1.5	-0.3	-0.3	0.0	-0.2	0.2	-0.1	0.9	4.7	4.8	
TL (Chung-Li)	-17.3	-14.1	-16.0	-12.5	-8.6	-10.4	-8.0	0.3	5.0	5.0	
TP (Praha)	-33.0	-37.9	-33.6	-27.8	-27.5	-28.1	-33.6	0.3	5.0	5.0	
UA (Kharkov)	-20.1	-42.2	-45.2	-41.6	-41.2	-29.3	-14.7	1.5	7.0	7.2	
UME (Gebze-Kocaeli)	-515.8	-532.6	-546.9	-552.8	-564.9	-570.7	-585.9	0.3	7.0	7.1	
USNO (Washington DC)	2.3	1.9	1.6	1.3	1.1	1.0	1.3	0.2	1.0	1.0	
VMI (Ha Noi)	-36.0	-46.2	-41.7	-39.3	-50.8	-68.8	-	0.3	20.0	20.0	
VSL (Delft)	17.5	21.4	10.5	2.5	-2.3	-4.5	2.2	0.3	1.3	1.3	
ZA (Pretoria)	4043.0	4004.5	3979.9	3946.2	3909.4	3862.9	3826.8	1.5	20.0	20.1	

- Notes on section 1:

(1) INPL: Time step of UTC(INPL) of +307.7 ns on MJD 57110.31.
(2) IT : Time step of UTC(IT) of +2.1 ns on MJD 57112 due to TWSTFT calibration.
(3) ROA : Time step of UTC(ROA) of +4.7 ns on MJD 57112 due to TWSTFT calibration.
(4) SP : Time step of UTC(SP) of +5.1 ns on MJD 57112 due to TWSTFT calibration.

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

Date 2015 0h UTC	MAR 28	APR 2	APR 7	APR 12	APR 17	APR 22	APR 27	
MJD	57109	57114	57119	57124	57129	57134	57139	
Laboratory *k*				[*TAI-TA*(*k*)]/ns				
CH (Bern-Wabern)	21368.9	21296.0	21223.7	21151.3	21079.2	21008.1	20937.6	
CNM (Queretaro)	-1081.8	-1085.8	-1084.3	-1087.8	-1082.9	-1083.8	-1087.9	
F (Paris)	167623.9	167624.3	167623.1	167623.2	167624.5	167623.8	167623.7	
JATC (Lintong)	-57413.0	-57437.5	-57462.4	-57486.9	-57509.8	-57534.2	-57557.6	
KRIS (Daejeon)	46006.9	46018.4	46029.2	46040.1	46051.7	46063.0	46075.1	
NICT (Tokyo)	1329.0	1332.4	1333.8	1336.9	1338.1	1338.7	1339.2	
NIST (Boulder)	-45416007.8	-45416193.0	-45416378.6	-45416564.4	-45416749.7	-45416935.3	-45417120.7	
NRC (Ottawa)	21481.1	21466.4	21454.4	21445.7	21430.5	21409.3	21384.7	
NTSC (Lintong)	20664.2	20699.6	20734.9	20771.1	20808.5	20844.1	20879.5	
ONRJ (Rio de Janeiro)	-21892.0	-21934.6	-21974.4	-22013.5	-22055.3	-22095.6	-22139.8	
PL (Warszawa)	-6939.4	-6954.8	-6965.8	-6974.1	-6980.2	-6982.7	-6984.6	
PTB (Braunschweig)	2003.3	2005.5	2004.3	2003.8	2004.6	2004.9	2005.1	
SG (Singapore)	19043.1	19102.2	19161.1	19224.0	19287.7	19350.5	19404.5	
SU (Moskva)	27291058.7	27291056.9	27291056.9	27291057.2	27291057.0	27291057.4	27291057.1	(1)
TL (Chung-Li)	-135.9	-132.5	-128.1	-125.9	-124.1	-122.5	-118.4	
USNO (Washington DC)	-35167985.6	-35168274.3	-35168562.8	-35168850.2	-35169137.6	-35169425.4	-35169712.8	

- 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	57109 - 57139	6.483×10^{-13}	(2015 MAR 28 - 2015 APR 27)
New correction	57139 - 57169	6.483×10^{-13}	(2015 APR 27 - 2015 MAY 27)
New correction foreseen	57169 - 57199	6.483×10^{-13}	(2015 MAY 27 - 2015 JUN 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 τ in days: (1) a white frequency noise of $1.7\times10^{-15} / \sqrt{\tau}$, (2) a flicker frequency noise of 0.35×10^{-15} and (3) a random walk frequency noise of $0.2\times10^{-16} \times \sqrt{\tau}$. 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, $u_{l/lab}$ is the uncertainty in the link between the standard and the clock participating to TAI, including the uncertainty due to the dead-time, $u_{l/TAI}$ 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, $u_S$rep 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 $u_S$rep, 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	$u_{l/Lab}$	$u_{l/Tai}$	u	$u_S$rep	Ref(u_S)	Ref(u_B)	u_B(Ref)	Note
PTB-CS1	57109	57139	-9.78	6.00	8.00	0.00	0.07	10.00	PFS/NA		T148	8.	(1)
PTB-CS2	57109	57139	-4.57	3.00	12.00	0.00	0.07	12.37	PFS/NA		T148	12.	(1)
IT-CsF2	57124	57139	-1.49	0.47	0.17	0.32	0.61	0.85	PFS/NA		T318	0.18	(2)
NIM5	57119	57139	-1.32	0.60	1.40	0.20	0.28	1.56	PFS/NA		T319	1.4	(3)
NIST-F2	57069	57089	-2.07	0.43	0.15	0.19	0.57	0.75	PFS/NA		T318	0.11	(4)
PTB-CSF1	57109	57139	0.36	0.10	0.70	0.01	0.07	0.71	PFS/NA		T162	1.40	(5)
PTB-CSF2	57114	57129	-0.21	0.19	0.33	0.02	0.12	0.40	PFS/NA		T287	0.41	(5)
SU-CsFO2	57104	57139	-0.15	0.20	0.25	0.14	0.51	0.62	PFS/NA		T315	0.50	(6)
SYRTE-FO2	57109	57134	-0.03	0.40	0.27	0.11	0.23	0.55	PFS/NA		T301	0.23	(7)
SYRTE-FORb	57109	57139	0.13	0.20	0.30	0.11	0.20	0.42	1.3	[1]	[2]	0.32	(7)

Notes:
(1) Continuously operating as a clock participating to TAI
(2) Report 04 MAY 2015 by INRIM
(3) Report 04 MAY 2015 by NIM
(4) Report 27 MAR. 2015 by NIST
Erratum: Corrected value of ul/Tai published in Circular T 327 due to an issue of TWSTFT link.
(5) Report 28 APR. 2015 by PTB
(6) Report 30 APR. 2015 by SU
(7) Report 04 MAY 2015 by OP
[1] 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.
[2] Contributing to TAI with a secondary representation of the SI second. Guéna J. , Abgrall, M. Clairon A. and Bize S. *Metrologia* 51, 108, 2014.

The second table gives the BIPM estimate of *d*, based on all available PFS and SFS measurements over the period MJD 56749-57139, 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*	
57109-57139	-0.23×10^{-15}	0.26×10^{-15}	(2015 MAR 28 - 2015 APR 27)

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

[*UTC-GPS time*] = -16 s + C_0 , [*TAI-GPS time*] = 19 s + C_0 , global uncertainty is of the order of 10 ns.
[*UTC-UTC(USNO)_GPS*] = C_0', [*TAI-UTC(USNO)_GPS*] = 35 s + C_0', global uncertainty is of the order of 10 ns.
[*UTC-GLONASS time*] = C_1 , [*TAI-GLONASS time*] = 35 s + C_1 , global uncertainty is of the order of hundreds ns.
[*UTC-UTC(SU)_GLONASS*]= C_1', [*TAI-UTC(SU)_GLONASS*]= 35 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 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, σ_0= 1.3 ns, σ_0'= 1.4 ns, σ_1= 6.5 ns, σ_1'= 6.5 ns

2015 0h UTC	MJD	C_0/ns	N_0	C_0'/ns	N_0'	C_1/ns	N_1	C_1'/ns	N_1'
MAR 28	57109	0.8	89	1.1	89	217.5	88	214.6	86
MAR 29	57110	0.9	89	2.4	89	213.8	86	207.9	86
MAR 30	57111	1.8	90	2.7	90	211.8	87	203.7	86
MAR 31	57112	2.6	61	4.2	61	214.6	89	204.2	88
APR 1	57113	1.9	89	2.2	89	217.1	86	204.7	84
APR 2	57114	2.9	89	2.4	89	218.6	87	204.5	86
APR 3	57115	4.0	89	3.5	89	216.1	88	200.0	89
APR 4	57116	4.1	89	1.7	89	211.2	88	193.5	88
APR 5	57117	4.7	89	1.4	89	209.3	87	191.3	86
APR 6	57118	4.0	89	2.3	89	209.1	85	192.0	86
APR 7	57119	2.6	90	2.2	90	208.9	77	192.3	76
APR 8	57120	2.7	89	1.9	89	209.2	84	193.1	84
APR 9	57121	1.9	89	1.6	89	210.1	84	195.2	84
APR 10	57122	0.7	89	0.8	89	207.7	89	194.2	89
APR 11	57123	0.1	90	1.4	90	200.3	84	188.7	85
APR 12	57124	0.0	89	3.1	89	199.7	86	190.2	86

2015	0h UTC	MJD	C_0/ns	N_0	C_0'/ns	N_0'	C_1/ns	N_1	C_1'/ns	N_1'
	APR 13	57125	0.0	89	5.6	89	204.0	87	196.5	87
	APR 14	57126	0.6	89	4.7	87	205.3	87	199.4	86
	APR 15	57127	1.3	90	2.5	90	205.2	89	200.9	90
	APR 16	57128	1.3	76	2.3	76	201.9	65	199.9	65
	APR 17	57129	2.1	89	3.7	89	200.2	79	200.1	80
	APR 18	57130	2.3	89	3.1	88	202.7	86	203.9	86
	APR 19	57131	3.8	90	-0.3	90	204.6	86	206.8	86
	APR 20	57132	4.4	86	-1.4	85	204.1	89	206.9	89
	APR 21	57133	3.6	89	0.6	89	204.5	85	209.8	85
	APR 22	57134	3.4	89	-0.5	89	207.9	79	216.5	80
	APR 23	57135	2.5	89	0.8	86	209.9	90	215.4	90
	APR 24	57136	1.8	89	2.8	89	208.7	87	208.8	87
	APR 25	57137	2.6	89	3.2	89	207.2	84	205.2	84
	APR 26	57138	2.9	89	2.6	89	208.5	86	205.3	86
	APR 27	57139	2.8	90	2.1	90	208.7	88	204.4	88

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	GPSPPP	0.3	3.0	BC(GPS MC)	2012 Mar
BIM /PTB	GPS MC	1.5	7.0	GPS EC/GPS EC	2007 Nov/2006 Sep
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	GPS MC	3.0	5.0	BC(GPS SC)	2008 May
CNMP/PTB	GPS MC	3.5	5.0	GPS EC/GPS EC	2004 May/2006 Sep
DFNT/PTB	GPS MC	1.5	20.0	NA /GPS EC	NA /2006 Sep
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	GPS P3	1.0	5.0	LC(GPS MC)	2013 Apr
IFAG/PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2003 Jun/2004 Aug
IGNA/PTB	NA				
INPL/PTB	GPSPPP	0.5	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	TWSTFT	0.5	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	1.5	7.0	NA /GPS EC	NA /2006 Sep
LT /PTB	GPS MC	2.0	5.0	GPS EC/GPS EC	2006 Oct/2006 Sep
MASM/PTB	GPSPPP	0.4	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	NA				
MTC /PTB	GPSPPP	0.3	7.0	GPS EC/GPS EC	2013 Aug/2004 Aug
NAO /PTB	GPS MC	2.0	20.0	NA /GPS EC	NA /2006 Sep
NICT/PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2005 Jun/2004 Aug
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	1.6	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	GPSPPP	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	GPSPPP	0.3	5.0	LC(TWSTFT)	2014 Nov
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	TWSTFT	0.5	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	6.0	10.0	LC(GPS SC)	1993 May
SG /PTB	GPS P3	0.7	5.0	GPS EC/GPS EC	2010 Mar/2004 Aug
SIQ /PTB	GPSPPP	0.3	7.0	GPS EC/GPS EC	2014 Aug/2009 Nov
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	TWSTFT	0.5	1.0	LC(TWSTFT)/BC(GPS PPP)	2006 Mar/2009 Aug
SU /PTB	GPSGLN	1.0	5.0	LC(TWSTFT)	2014 Nov
TL /PTB	GPSPPP	0.3	5.0	GPS EC/GPS EC	2005 May/2004 Aug
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	GPSPPP	0.3	7.0	GPS EC/GPS EC	2005 Dec/2006 Sep
USNO/PTB	TWGPPP	0.3	1.0	TW EC	2014 Jun
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