

Table 6. Measurements of the 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 (in practice the SI second on the geoid), i.e. the fractional frequency deviation of TAI with the opposite sign: $d = -y_{\text{TAI}}$.

In this table, d is obtained on the given periods of estimation by comparison of the TAI frequency with that of the individual primary frequency standards (PFS) IT-CSF1, NICT-CSF1, NIST-F1, NMIJ-F1, NPL-CSF1, PTB-CS1, PTB-CS2, PTB-CSF1, SYRTE-FO1, SYRTE-FO2, SYRTE-FOM and SYRTE-JPO for the year 2007. Previous calibrations are available in the successive annual reports of the BIPM Time section volumes 1 to 18 and in the BIPM Annual Report on Time Activities, volume 1.

Each comparison is provided with the following information:

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 ,

$u_{\text{link/lab}}$ is the uncertainty in the link between the PFS and the clock participating to TAI, including the uncertainty due to dead-time,

$u_{\text{link/TAI}}$ is the uncertainty in the link to TAI (For evaluations published since September 2006, this value is computed using the standard uncertainty of $[UTC-UTC(k)]$, following a recommendation of the CCTF Working Group on PFS),

u is the quadratic sum of all four uncertainty values.

In this table, a frequency over a time interval is defined as the ratio of the end-point phase difference to the duration of the interval.

The typical characteristics of the calibrations of the TAI frequency provided by the different primary standards over 2007 are indicated below.

Primary Standard	Type /selection	Type B std. Uncertainty	Operation	Comparison with	Number/typical duration of comp.
IT-CSF1	Fountain	0.5×10^{-15}	Discontinuous	H maser	1 / 20 d
NICT-CSF1	Fountain	$(1.6 \text{ to } 2.8) \times 10^{-15}$	Discontinuous	UTC(NICT)	5 / 10 to 15 d
NIST-F1	Fountain	0.3×10^{-15}	Discontinuous	H maser	6 / 10 to 25 d
NMIJ-F1	Fountain	3.9×10^{-15}	Discontinuous	H maser	1 / 15 d
NPL-CSF1	Fountain	1.8×10^{-15}	Discontinuous	H maser	4 / 25 to 35 d
PTB-CS1	Beam /Mag.	8×10^{-15}	Continuous	TAI	12 / 30 d
PTB-CS2	Beam /Mag.	12×10^{-15}	Continuous	TAI	12 / 30 d
PTB-CSF1	Fountain	1.0×10^{-15}	Discontinuous	H maser	1 / 15 d
SYRTE-F01	Fountain	0.4×10^{-15}	Discontinuous	H maser	1 / 30 d
SYRTE-F02	Fountain	$0.4\text{-}0.5 \times 10^{-15}$	Discontinuous	H maser	6 / 15 to 30 d
SYRTE-FOM	Fountain	$(0.9 \text{ to } 1.2) \times 10^{-15}$	Discontinuous	H maser	8 / 10 to 30 d
SYRTE-JPO	Beam /Opt.	6.3×10^{-15}	Discontinuous	H maser	12 / 15 to 35 d

More detailed information on the characteristics and operation of individual PFS may be found in the annexes supplied by the individual laboratories.

Table 6. (Cont.)

Standard	Period of estimation		d (10^{-15})	u_A (10^{-15})	u_B (10^{-15})	Ref(u_B)	$u_{\text{link/lab}}$ (10^{-15})	$u_{\text{link/TAI}}$ (10^{-15})	u (10^{-15})	Notes
IT-CSF1	54204	54224	4.6	0.8	0.5	[1]	0.3	0.5	1.1	
NICT-CSF1	54014	54029	1.7	1.0	2.5	[2]	0.3	0.9	2.9	
NICT-CSF1	54029	54039	3.1	1.0	2.8		0.3	1.2	3.2	
NICT-CSF1	54039	54049	0.3	1.0	1.6		0.3	1.2	2.3	
NICT-CSF1	54079	54094	4.2	1.0	1.9		0.3	0.9	2.3	
NICT-CSF1	54369	54384	4.5	1.0	1.8		0.3	0.6	2.2	
NIST-F1	54134	54154	0.6	0.4	0.3	[3]	0.2	0.5	0.7	
NIST-F1	54204	54219	2.8	0.5	0.3		0.3	0.6	0.9	
NIST-F1	54219	54234	3.1	0.4	0.3		0.2	0.6	0.8	
NIST-F1	54314	54339	3.4	0.3	0.3		0.1	0.4	0.6	
NIST-F1	54384	54399	4.1	0.3	0.3		0.3	0.6	0.8	
NIST-F1	54409	54419	3.7	0.4	0.3		0.6	0.9	1.2	
NMIJ-F1	54339	54354	1.4	0.9	3.9	[4]	0.4	0.9	4.1	
NPL-CSF1	54284	54319	2.0	0.5	1.8	[5]	0.2	0.4	1.9	
NPL-CSF1	54319	54344	4.3	0.6	1.8		0.1	0.5	2.0	
NPL-CSF1	54344	54369	5.6	0.7	1.8		0.2	0.5	2.0	
NPL-CSF1	54369	54399	8.2	0.7	1.8		0.2	0.5	2.0	
PTB-CS1	54099	54129	-3.1	5.0	8.0	[6]	0.0	0.2	9.4	(1)
PTB-CS1	54129	54159	-3.1	5.0	8.0		0.0	0.2	9.4	
PTB-CS1	54159	54189	-10.2	5.0	8.0		0.0	0.2	9.4	
PTB-CS1	54189	54219	0.4	5.0	8.0		0.0	0.1	9.4	
PTB-CS1	54219	54249	3.3	5.0	8.0		0.0	0.2	9.4	
PTB-CS1	54249	54279	7.6	5.0	8.0		0.0	0.2	9.4	
PTB-CS1	54279	54309	2.1	5.0	8.0		0.0	0.1	9.4	
PTB-CS1	54309	54339	-5.9	5.0	8.0		0.0	0.1	9.4	
PTB-CS1	54339	54369	-6.9	5.0	8.0		0.0	0.1	9.4	
PTB-CS1	54369	54404	-15.0	5.0	8.0		0.0	0.1	9.4	
PTB-CS1	54404	54434	-10.8	5.0	8.0		0.0	0.1	9.4	
PTB-CS1	54434	54464	-8.8	5.0	8.0		0.0	0.1	9.4	
PTB-CS2	54099	54129	0.6	3.0	12.0	[7]	0.0	0.2	12.4	(1)
PTB-CS2	54129	54159	-4.9	3.0	12.0		0.0	0.2	12.4	
PTB-CS2	54159	54189	-4.3	3.0	12.0		0.0	0.2	12.4	
PTB-CS2	54189	54219	2.4	3.0	12.0		0.0	0.1	12.4	
PTB-CS2	54219	54249	0.7	3.0	12.0		0.0	0.2	12.4	
PTB-CS2	54249	54279	2.8	3.0	12.0		0.0	0.2	12.4	
PTB-CS2	54279	54309	3.0	3.0	12.0		0.0	0.1	12.4	
PTB-CS2	54309	54339	5.6	3.0	12.0		0.0	0.1	12.4	
PTB-CS2	54339	54369	4.8	3.0	12.0		0.0	0.1	12.4	
PTB-CS2	54369	54404	0.2	3.0	12.0		0.0	0.1	12.4	
PTB-CS2	54404	54434	-0.7	3.0	12.0		0.0	0.1	12.4	
PTB-CS2	54434	54464	0.8	3.0	12.0		0.0	0.1	12.4	
PTB-CSF1	54369	54384	1.2	1.0	1.0	[8]	0.1	0.2	1.4	

Table 6. (Cont.)

Standard	Period of estimation	d (10^{-15})	u_A (10^{-15})	u_B (10^{-15})	Ref(u_B)	$u_{\text{link/lab}}$ (10^{-15})	$u_{\text{link/TAI}}$ (10^{-15})	u (10^{-15})	Notes
SYRTE-F01	54189 54219	2.5	0.3	0.4	[9]	0.1	0.3	0.6	
SYRTE-F02	54194 54219	2.8	0.2	0.4	[9]	0.1	0.4	0.6	
SYRTE-F02	54224 54249	4.2	0.3	0.5		0.5	0.4	0.8	
SYRTE-F02	54249 54279	2.2	0.3	0.5		0.1	0.3	0.6	
SYRTE-F02	54279 54309	2.4	0.4	0.5		0.1	0.3	0.7	
SYRTE-F02	54309 54329	3.7	0.3	0.5		0.3	0.5	0.8	
SYRTE-F02	54334 54349	7.1	0.3	0.5		0.1	0.6	0.8	
SYRTE-F0M	54189 54219	2.6	0.2	1.2	[10]	0.1	0.3	1.3	
SYRTE-F0M	54224 54234	3.1	0.4	0.9		0.1	0.9	1.3	
SYRTE-F0M	54249 54269	2.1	0.4	0.9		0.1	0.5	1.1	
SYRTE-F0M	54344 54374	2.1	0.1	0.9		0.1	0.3	1.0	
SYRTE-F0M	54374 54384	3.8	0.2	0.9		0.1	0.9	1.3	
SYRTE-F0M	54389 54404	1.0	0.2	0.9		0.1	0.6	1.1	
SYRTE-F0M	54404 54434	2.8	0.2	0.9		0.1	0.3	1.0	
SYRTE-F0M	54434 54464	5.4	0.2	0.9		0.2	0.4	1.0	
SYRTE-JP0	54099 54129	15.0	0.7	6.3	[11]	0.3	0.3	6.4	
SYRTE-JP0	54129 54159	12.1	0.6	6.3		0.3	0.3	6.3	
SYRTE-JP0	54159 54189	11.9	0.7	6.3		0.3	0.3	6.4	
SYRTE-JP0	54189 54219	10.4	0.7	6.3		0.3	0.3	6.4	
SYRTE-JP0	54219 54239	10.3	0.8	6.3		0.3	0.5	6.4	
SYRTE-JP0	54249 54279	9.9	0.7	6.3		0.3	0.3	6.4	
SYRTE-JP0	54284 54309	1.4	0.9	6.3		0.3	0.4	6.4	
SYRTE-JP0	54309 54339	1.8	0.7	6.3		0.3	0.3	6.4	
SYRTE-JP0	54339 54369	3.1	0.7	6.3		0.3	0.3	6.4	
SYRTE-JP0	54369 54404	3.8	0.8	6.3		0.3	0.3	6.4	
SYRTE-JP0	54404 54429	0.8	0.9	6.3		0.3	0.4	6.4	
SYRTE-JP0	54449 54464	4.1	1.0	6.3		0.3	0.9	6.4	

Notes:

(1) Continuously operating as a clock participating to TAI.

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