

## Time and Frequency

**Calibration and Measurement Capability (CMC)**

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration		Service Identifier
Quantity/Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Standard	Source of traceability	
Frequency	Frequency meter	Tachometer: direct frequency measurement	0.1	1.7E+03	Hz	Measurement time	100 s	6.0E-06	Hz/Hz	2	95%	Yes	Optical pulses disciplined to cesium standard	UTC(INM), CCTF-K001.UTC	INM-L08-02
						Averaging time	10 s								
						Number of measurements	10								
Frequency	General frequency source	Direct frequency measurement	1	3.0E+08	Hz	Measurement time	100 s to 1 day	1.0E-10	Hz/Hz	2	95%	Yes	Rubidium counter CNT-85R, quartz counter HP5345A, with time bases disciplined to cesium standard	UTC(INM), CCTF-K001.UTC	INM-L08-03
						Gate time	1 s to 10 s								
						Averaging time	<= 32768 s								
						Amplitude	100 mVrms to 12 Vrms (50 Ω), 100 mVrms to 30 Vrms (1 MΩ)								
Frequency	General frequency source	Direct frequency measurement	0.3	8.0	GHz	Measurement time	100 s to 1 day	1.0E-10	Hz/Hz	2	95%	Yes	Rubidium counter CNT-85R, with time base disciplined to cesium standard	UTC(INM), CCTF-K001.UTC	INM-L08-04
						Gate time	1 s to 10 s								
						Averaging time	<= 32768 s								
						Amplitude	80 mVrms to 7 Vrms (50 Ω)								
Frequency	Frequency counter	Direct frequency measurement of its time base	1	10	MHz	Measurement time	1 day	1.0E-10	Hz/Hz	2	95%	Yes	Rubidium counter CNT-85R, quartz counter HP5345A, with time bases disciplined to cesium standard	UTC(INM), CCTF-K001.UTC	INM-L08-05
						Gate time	1 s								
						Averaging time	1 s to 32768 s								
						Amplitude	100 mVrms to 12 Vrms (50 Ω), 100 mVrms to 30 Vrms (1 MΩ)								
Frequency	Frequency counter	Direct frequency measurement	1	6.0E+09	Hz	Measurement time	100 s	1.0E-10	Hz/Hz	2	95%	Yes	EXG vector signal generator N5172B, Rohde and Schwarz signal generator SMS2, with time bases disciplined to cesium standard	UTC(INM), CCTF-K001.UTC	INM-L08-06
						Gate time	1 s to 10 s								
						Averaging time	<= 32 s								

*Time and Frequency*
**Calibration and Measurement Capability (CMC)**

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration		Service Identifier
Quantity/Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Standard	Source of traceability	
Frequency	Frequency meter	Direct frequency measurement of its time base	1	10	MHz	Measurement time	1 day	1.0E-10	Hz/Hz	2	95%	Yes	Rubidium counter CNT-85R, quartz counter HP5345A, with time bases disciplined to cesium standard	UTC(INM), CCTF-K001.UTC	INM-L08-07
						Gate time	1 s								
						Averaging time	1 s to 32768 s								
						Amplitude	100 mVrms to 12 Vrms (50 Ω), 100 mVrms to 30 Vrms (1 MΩ)								
Frequency	Frequency meter	Direct frequency measurement	1	6.0E+09	Hz	Measurement time	100 s	1.0E-10	Hz/Hz	2	95%	Yes	EXG vector signal generator N5172B, Rohde and Schwarz signal generator SMS2, with time bases disciplined to cesium standard	UTC(INM), CCTF-K001.UTC	INM-L08-08
						Gate time	1 s to 10 s								
						Averaging time	<= 32 s								
Frequency	Local frequency standard	Measurement of phase difference	100	100	kHz	Measurement time	20 hours, 72 hours, 100 hours	6.0E-13	Hz/Hz	2	95%	Yes	Cesium clock primary standard	UTC(INM), CCTF-K001.UTC	INM-L08-09
						Gate time	1 s								
						Averaging time	1 s to 32768 s, 1 s to 65536 s, 1 s to 131072 s								
Frequency	Local frequency standard	Measurement of phase difference	1	1	MHz	Measurement time	20 hours, 72 hours, 100 hours	6.0E-13	Hz/Hz	2	95%	Yes	Cesium clock primary standard	UTC(INM), CCTF-K001.UTC	INM-L08-10
						Gate time	1 s								
						Averaging time	1 s to 32768 s, 1 s to 65536 s, 1 s to 131072 s								
Frequency	Local frequency standard	Measurement of phase difference	5	5	MHz	Measurement time	20 hours, 72 hours, 100 hours	6.0E-13	Hz/Hz	2	95%	Yes	Cesium clock primary standard	UTC(INM), CCTF-K001.UTC	INM-L08-11
						Gate time	1 s								
						Averaging time	1 s to 32768 s, 1 s to 65536 s, 1 s to 131072 s								

Time and Frequency

Calibration and Measurement Capability (CMC)

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration		Service Identifier
Quantity/Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Standard	Source of traceability	
Frequency	Local frequency standard	Measurement of phase difference	10	10	MHz	Measurement time	20 hours, 72 hours, 100 hours	6.0E-13	Hz/Hz	2	95%	Yes	Cesium clock primary standard	UTC(INM), CCTF-K001.UTC	INM-L08-12
						Gate time	1 s								
						Averaging time	1 s to 32768 s, 1 s to 65536 s, 1 s to 131072 s								
Time interval	Period source	Direct measurement	2.0E-06	5	s	Measurement time	1000 s to 1 day	4.0E-10	s/s	2	95%	Yes	Rubidium counter CNT-85R, quartz counter HP5345A, with time bases disciplined to cesium standard	UTC(INM), CCTF-K001.UTC	INM-L08-13
						Gate time	1 s to 100 s								
						Averaging time	<= 32768 s								
						Amplitude	100 mVrms to 12 Vrms (50 Ω), 100 mVrms to 30 Vrms (1 MΩ)								

[http://kcdb.bipm.org/appendixC/TF/CO/TF\\_CO.pdf](http://kcdb.bipm.org/appendixC/TF/CO/TF_CO.pdf)

Last updated: 2018-06-20