xDevs.com FX

Reference	xDevs.com	Calibration date	December 09 2020
Ref P/N	Volt	Ambient Temperature	24.12 °C
Serial	FX8	Relative Humidity	18.00 %
ID Number	2nd Transfer, traceable	Pressure	1005.76 hPa
Notes	Battery powered standards	Test type	Front 5440A-7003 cable terminals, nulled DMM

Reference standard	Mfg	Model	Options	Serial / Unc	CEID	Calibration date	Due date
DC STD	xDevs.com	792X	9.9999698 ±0.3 ppm	X102	XVR1	11/26/2020	05/26/2021
DC STD	Datron	4910	REDACTED ±0.1 ppm	REDACTED	NVR1	12/03/2020	12/03/2021
DMM	Keysight	3458A/001/002	03	Process unit	XDM5	11/28/2020	12/28/2020
Thermometer	Fluke	1529	Omega RTD100CAP Class A	Process unit	XTM2	12/04/2020	12/04/2021

xDevs.com certifies that this calibration used measurements standards traceable to the SI, through ISO 17025 Accredited Measurement Laboratory. Actual measurement uncertainty available upon request was calculated using the expanded method and is expressed in values at approximately the 95% confidence level using a coverage factor of K= 2.

Certificate statements are based on test results within specified limits without reduction of the uncertainty of the test and/or measurement. The test and measurement data here relate only to the item tested and/or measured. Unit acceptance of failure includes uncertainty data compilation. Calibration due date that appears on the Certificate of Calibration and labels are determined by the customer and does not imply conformance to a standard.

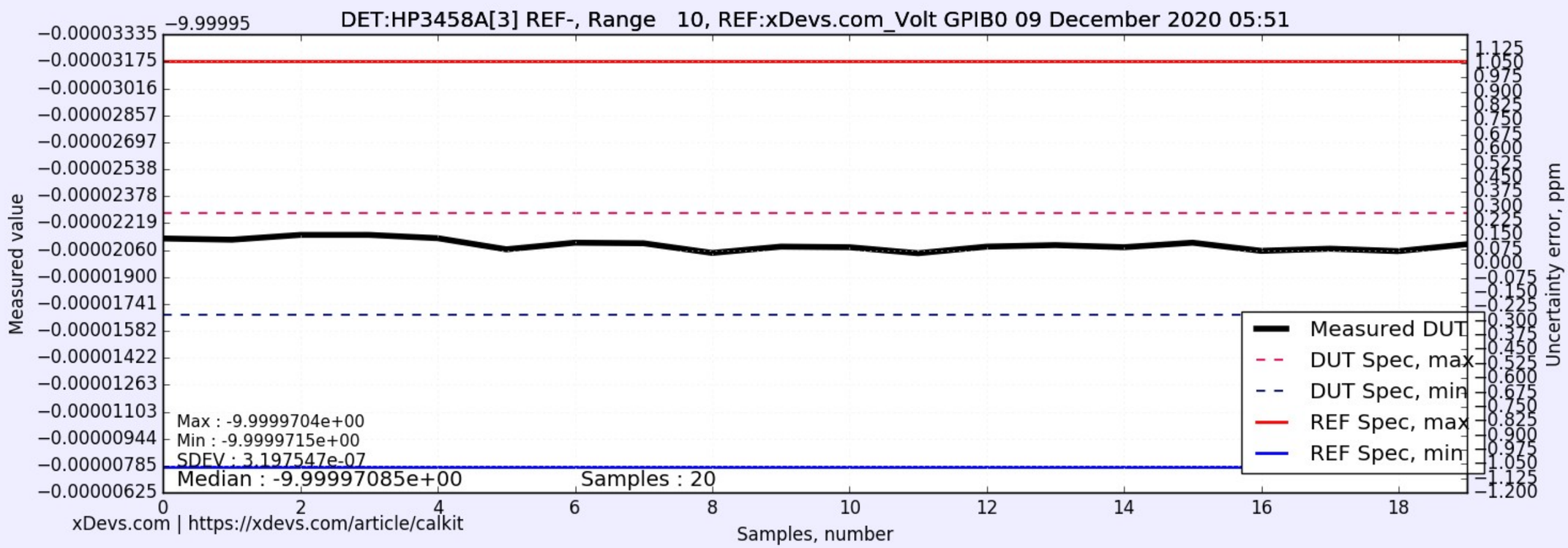
UUT output transferred by manual ratiometric measurement with reference standard.

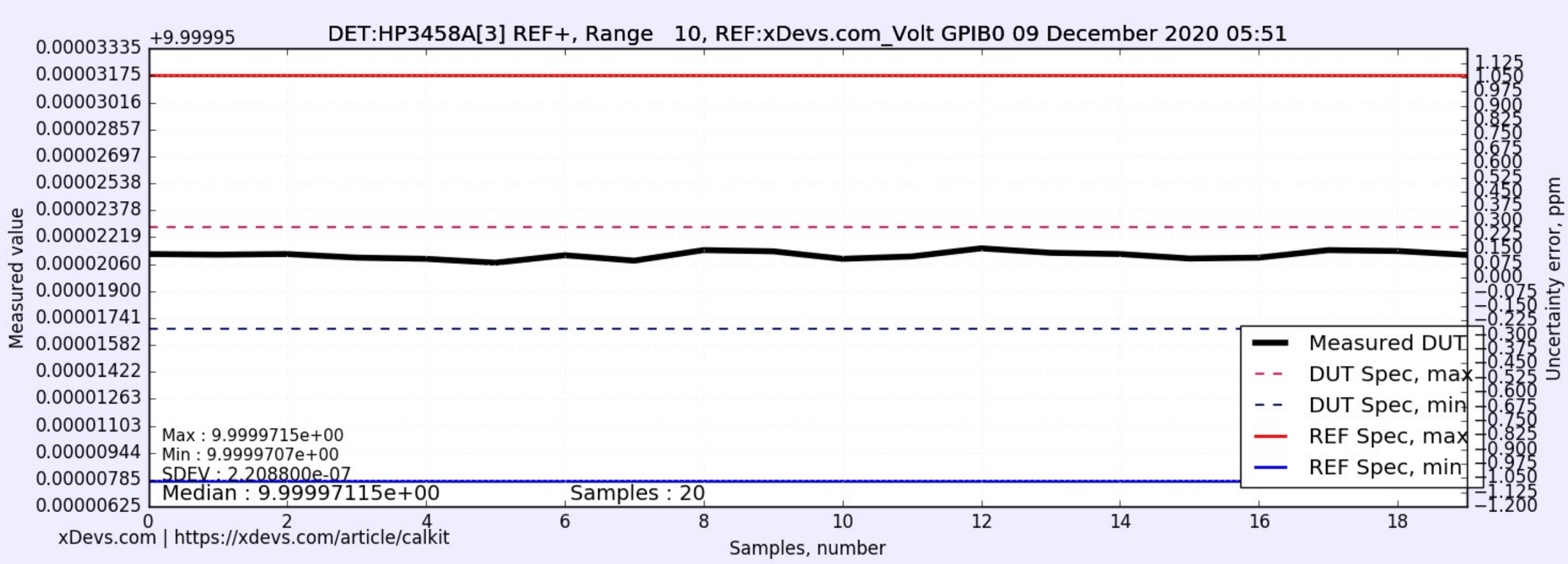
Fixed 1.000e+01 range is used on the Keysight 3458A/X02 detector. The following test use 10 minute transfer specification with xDevs.com Volt output source as reference. Gain verified for stability ±0.10 ppm over the test period. Detector zero offset is DUT is nulled prior to the measurement.

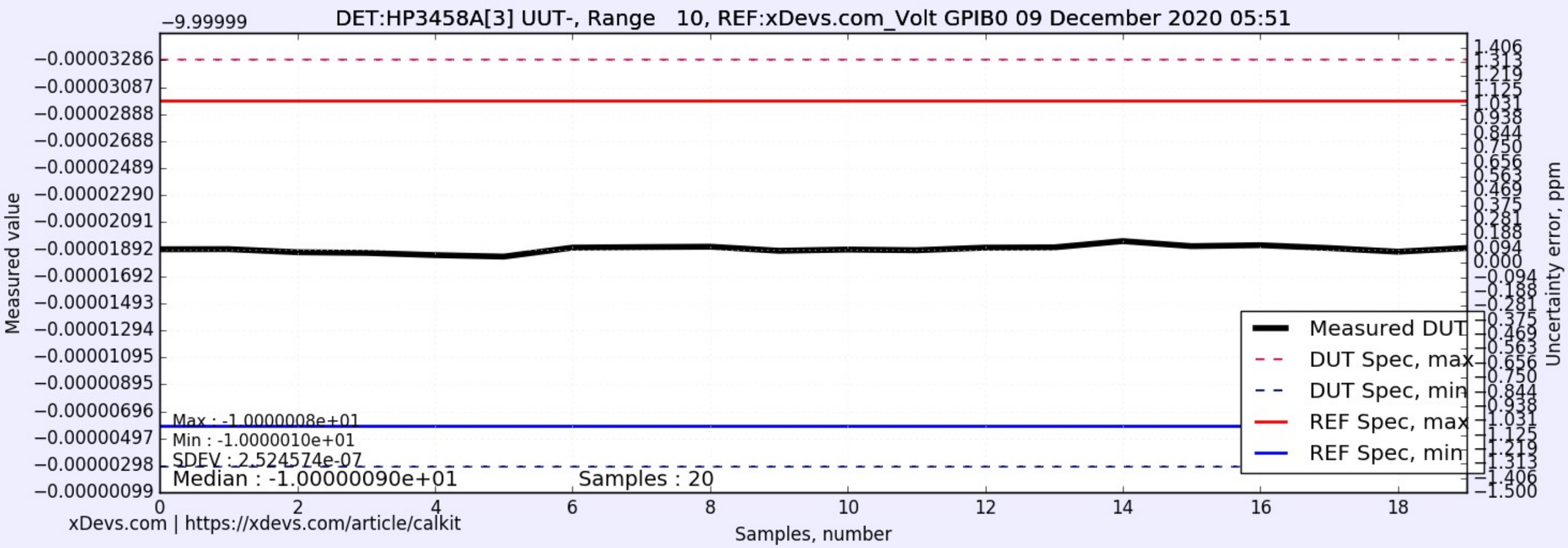
Configuration : Battery power STD, NPLC100, NDIG8, Guard is open. DUT Reference powered by Keysight E36312A +/-12 VDC.

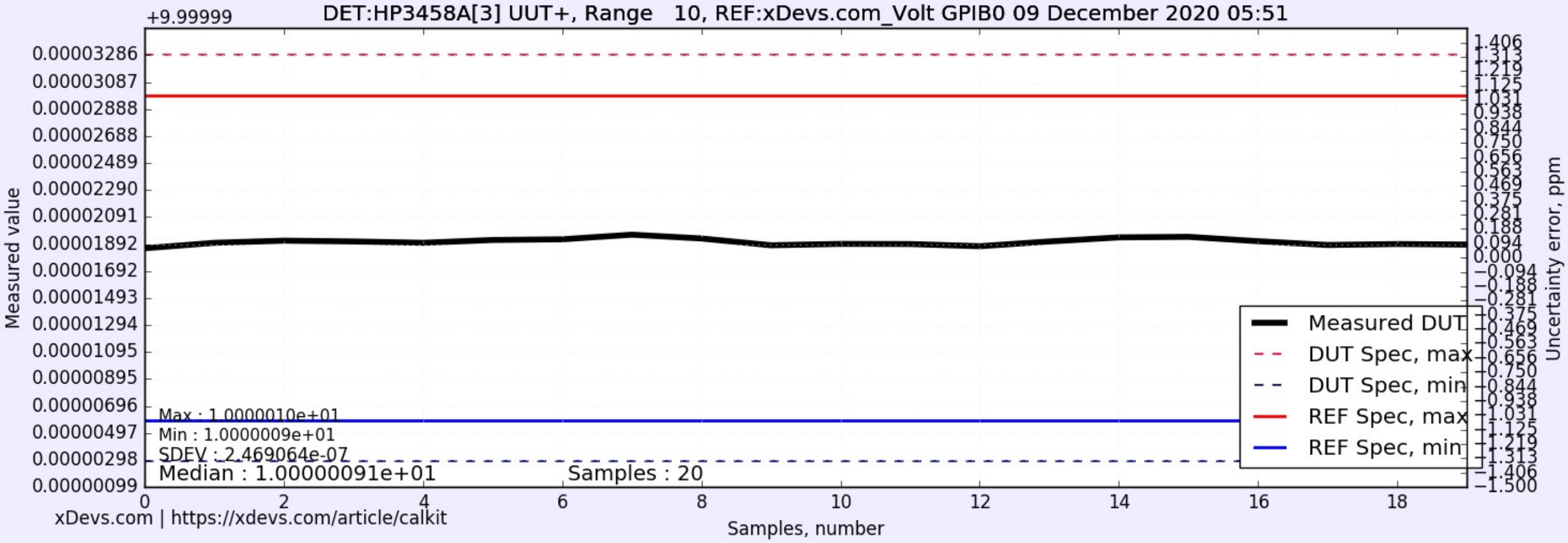
	Measurement	Unit	Uncertainty	Standard Deviation	DUT Spec / Δ	Degree of freedom / Notes
Transfer reference output	**9.9999698**	**VDC**	**±0.300 ppm**			
Reference measured output (+)	9.9999711	VDC	±0.100 ppm	σ = 2.439142e-07 VDC	Δ = 0.134 ppm	20
Reference measured output (-)	-9.9999708	VDC	±0.100 ppm	σ = 2.008229e-07 VDC	Δ = 0.097 ppm	20
Reference calculated +/-	9.9999710	VDC	±0.100 ppm		Δ = 0.116 ppm	
Detector zero offset	0.0000007	VDC		σ = 8.803437e-08 VDC		
UUT measured output (+)	10.0000091	VDC	±0.100 ppm	σ = 2.540394e-07 VDC		20
UUT measured output (-)	-10.0000090	VDC	±0.100 ppm	σ = 2.431698e-07 VDC		20
Ratio positive polarity	1.00000380		±0.200 ppm			Inf
Ratio negative polarity	1.00000383		±0.200 ppm			Inf
UUT calculated output (+)	10.0000078	VDC	±0.500 ppm		Δ = -0.015 ppm	
UUT calculated output (-)	-10.0000081	VDC	±0.500 ppm		Δ = 0.015 ppm	
Temperature Δ	-0.301	°C	±0.60 °C		±1.0 °C	
UUT previous data	10.00000953	VDC	±0.400 ppm			Report
Deviation from previous measurement	**-0.163 ppm**	VDC				
UUT Expanded measurement (Linear) k=2	**10.0000079**	**VDC**	**±0.500 ppm**		0.1%	In spec
UUT Expanded measurement (RSS) k=2	**10.0000079**	**VDC**	**±0.361 ppm**		0.1%	In spec

Statistics image data


DET:HP3458A[3] REF-, Range 10, REF:xDevs.com_Volt GPIB0 09 December 2020 05:51
−9.99995
Measured value
Uncertainty error, ppm
Samples, number
Max : -9.9999704e+00
Min : -9.9999715e+00
SDEV : 3.197547e-07
Median : -9.99997085e+00
Samples : 20
Measured DUT
DUT Spec, max
DUT Spec, min
REF Spec, max
REF Spec, min
xDevs.com | https://xdevs.com/article/calkit


DET:HP3458A[3] REF+, Range 10, REF:xDevs.com_Volt GPIB0 09 December 2020 05:51
+9.99995
Measured value
Uncertainty error, ppm
Samples, number
Max : 9.9999715e+00
Min : 9.9999707e+00
SDEV : 2.208800e-07
Median : 9.99997115e+00
Samples : 20
Measured DUT
DUT Spec, max
DUT Spec, min
REF Spec, max
REF Spec, min
xDevs.com | https://xdevs.com/article/calkit





Test procedure : $Id: xfer_dcv.py | Rev 1989 | 2020/11/04 00:28:02 tin_fpga $

Lab temperature maintained +23°C ±1°C

RAW data	Result
Array Ref P	[9.999971195, 9.99997116, 9.999971195, 9.999970982, 9.999970911, 9.99997068, 9.999971124, 9.999970804, 9.999971427, 9.999971355, 9.999970911, 9.999971053, 9.999971533, 9.999971267, 9.999971195, 9.999970929, 9.999970982, 9.999971427, 9.999971373, 9.999971142]
Array Ref N	[-9.999971284, -9.999971213, -9.999971498, -9.999971498, -9.999971302, -9.999970644, -9.999971035, -9.999971, -9.999970431, -9.999970804, -9.999970769, -9.999970413, -9.999970804, -9.999970893, -9.999970769, -9.999971035, -9.999970555, -9.99997068, -9.999970537, -9.999970946]
Array UUT P	[10.00000861, 10.00000901, 10.00000917, 10.00000911, 10.00000901, 10.00000922, 10.00000927, 10.00000961, 10.00000933, 10.00000883, 10.00000893, 10.00000892, 10.00000876, 10.00000911, 10.00000941, 10.00000945, 10.00000913, 10.00000885, 10.00000892, 10.00000888]
Array UUT N	[-10.00000892, -10.00000893, -10.0000087, -10.00000865, -10.00000849, -10.00000838, -10.00000904, -10.00000908, -10.00000911, -10.00000881, -10.0000089, -10.00000885, -10.00000904, -10.00000906, -10.00000952, -10.00000915, -10.00000922, -10.00000901, -10.00000874, -10.00000901]

Histogramm