



ELECTRONICS TEST & DEVELOPMENT CENTRE

(STQC Directorate, Ministry of Electronics & Information Technology, Government of India)
100 Feet Road, Peenya Industrial Estate, Bengaluru – 560 058.

Tel.: (080) 2839 4252, 2839 4647, 2839 9088, Fax: (080) 2839 8905

Email: etdcbg@stqc.gov.in



CC-2811

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Report No: CR/PCAL/52809/2

CALIBRATION REPORT

Service Request No.:52809		Date: 23-04-2024		Job No: 2	
Calibrated for :		M/s Micron Technology Operations India LLP ,The Sky View 20, 4,5,6,7 th Floor, Divija Commercial Properties Pvt. Ltd. SEZ Developer ,Sy # 83/1 Plot No S 22, Serilingampally Mandal, Hyderabad-500081			
1.0 Description /Unambiguous Identification of Item:					
Nomenclature	Reference Multimeter				
Make/Model	Fluke / 8588 A				
Serial No.	530077758	Dates of Calibration		02-05-2024 to 10-05-2024	
Equipment Received on	23-04-2024	Recommended Calibration		10-05-2025	
Condition of Item on receipt	Functional	Calibrated at		In-house / Onsite	
Calibration Procedure Ref.: Mfr. recommended Procedure			Applicable Spec.: Standard/Manufacturer/User		
Laboratory Environmental Conditions:			Temperature: 25 +/- 2 Deg. C R.H.: 30% to 75 %		
Date of Issue of Calibration Report			17-05-2024		
2.0 Standards used :					
Nomenclature	Make & Model	Cal. At	Calibration Validity		
DC Voltage REF. Std.	Datron / 4910	ETDC (Bg)	Apr-2025		
Reference Divider	Fluke 752 A	ETDC (Bg)	Self cal		
Multifunction Calibration	Fluke / 5720 A / 5725A	ETDC (Bg)	Aug-2024		
AC Measurement Standard	Fluke / 5790A	ETDC (Bg)	Sep-2024		
Standard Resistor	Fluke / 742 A	ETDC (Bg)	Sep-2024		
Oscilloscope Calibrator	Fluke/9500	ETDC (Bg)	Nov-2024		
Standard Resistor	Tinsley /5685/1682 /1659/3111	ETDC (Bg)	Sep-2024		
Reference Meter	Fluke / 8508 A	ETDC (Bg)	Feb 2025		
Function Generator	HP/3325B	ETDC(Bg)	Mar-2024		
Standard Resistor Calibrator	Guildline/9330	ETDC(Bg)	June-2024		
Standard Resistor	Fluke8508A-7000K	ETDC(Bg)	Sep-2024		
Standard Resistor	Guildline/9334A-10G	ETDC(Bg)	Oct-2024		
Trans Conductance Amplifier	Fluke /52120 A	ETDC(Bg)	Nov-2024		

Measurements are traceable to SI units through National Standards.

This Certificate refers only to the item calibrated and shall not be extended or used for any other purpose without the written approval from Director, ETDC, Bengaluru.
Refer to information contained on the cover.

Verification Result ☒ Pass ☐ Fail

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Electro Technical Calibration**3.0 Results :****3.1 DC VOLTAGE :**

Sl. No.	RANGE	STANDARD INPUT	DUC READING	DUC ACCURACY (+/-)	MEASUREMENT UNCERTAINTY (+/-)	k Factor
1	100 mV	0 mV	0.00002 mV	0.0002 mV	---	--
2		1	0.99998	0.0002051	0.060 uV	2.00
3		10	9.99994	0.000251	0.093	2.00
4		50	49.99987	0.000455	0.17	2.00
5		100	99.99981	0.00071	0.34	2.00
6		-100	-99.99964	0.00071	0.34	2.00
7	1 V	0 V	0.0000000 V	0.0000003 V	---	---
8		0.5	0.4999995	0.0000017	1.4 uV	2.00
9		1	0.9999986	0.0000031	2.8	2.00
10		-1	-0.9999980	0.0000031	2.8	2.00
11	10 V	0 V	0.000000 V	0.0000005 V	---	---
12		1	0.999998	0.0000033	0.0028 mV	2.00
13		10	9.999992	0.0000285	0.028	2.00
14		19	18.999987	0.0000537	0.053	2.00
15		-1	-0.999998	0.0000033	0.0029	2.00
16		-10	-9.999984	0.0000285	0.028	2.00
17		-19	-18.999970	0.0000537	0.053	2.00
18	100 V	0 V	0.00000 V	0.00003 V	---	---
19		50	49.99991	0.000235	0.21 mV	2.00
20		100	99.99986	0.00044	0.42	2.00
21		-100	-99.99989	0.00044	0.42	2.00
22	1050 V	0 V	0.0000 V	0.0005 V	---	---
23		500	499.9997	0.00265	2.2 mV	2.00
24		1000	999.9990	0.0048	4.2	2.00
25		-1000	-999.9986	0.0048	4.2	2.00



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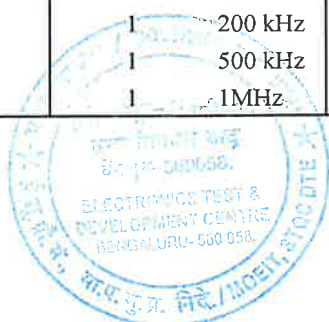


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3.2 AC Voltage :

Sl. No.	RANGE	STANDARD INPUT LEVEL FREQUENCY	DUC READING	DUC ACCURACY (+/-)	MEASUREMENT UNCERTAINTY (+/-)	k Factor
26	10 mV	1 mV 10 Hz	0.99954 mV	0.00135 mV	0.67uV	2.00
27		1 50 Hz	0.99927	0.00135	0.67	2.00
28		1 100 Hz	0.99961	0.00135	0.66	2.00
29		1 1 kHz	0.99961	0.00135	0.65	2.00
30		1 10 kHz	0.99972	0.00143	0.65	2.00
31		1 100 kHz	0.99946	0.0041	1.08	2.00
32		1 200 kHz	0.99668	0.014	1.29	2.00
33		1 500 kHz	0.99926	0.024	3.77	2.00
34		1 1MHz	1.00179	0.024	3.78	2.00
35		10 mV 10 Hz	9.99686 mV	0.0036 mV	1.24uV	2.00
36		10 50 Hz	9.99662	0.0036	1.17	2.00
37		10 100 Hz	9.99655	0.0036	1.24	2.00
38		10 1 kHz	9.99668	0.0036	1.24	2.00
39		10 10 kHz	9.99800	0.0045	1.24	2.00
40		10 100 kHz	9.99808	0.104	1.73	2.00
41		10 200 kHz	9.99128	0.104	6.17	2.00
42		10 500 kHz	9.98693	0.204	7.02	2.00
43		10 1MHz	9.99341	0.204	7.02	2.00
44	100 mV	100 mV 10 Hz	99.9972 mV	0.0073 mV	12.4uV	2.00
45		100 50 Hz	99.9937	0.0073	11.7	2.00
46		100 100 Hz	99.9940	0.0073	11.7	2.00
47		100 1 kHz	99.9957	0.0073	11.7	2.00
48		100 10 kHz	99.9979	0.022	19.3	2.00
49		100 100 kHz	100.0001	0.23	19.3	2.00
50		100 200 kHz	99.9979	0.23	59	2.00
51		100 500 kHz	100.0020	1.1	59	2.00
52		100 1MHz	99.8820	2	58.9	2.00
53	1 V	1 V, 10 Hz	1.000044 V	0.000069 V	0.091 mV	2.00
54		1 50 Hz	1.000018	0.000069	0.084	2.00
55		1 100 Hz	1.000017	0.000069	0.068	2.00
56		1 1 kHz	1.000015	0.000069	0.068	2.00
57		1 10 kHz	1.000027	0.00022	0.068	2.00
58		1 100 kHz	1.000036	0.0023	0.074	2.00
59		1 200 kHz	1.000115	0.0023	0.266	2.00
60		1 500 kHz	1.000698	0.011	0.266	2.00
61		1 1MHz	1.000591	0.020	0.36	2.00



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3.2 AC Voltage : Contd.,

Sl. No.	RANGE	STANDARD INPUT LEVEL FREQUENCY	DUC READING	DUC ACCURACY (+/-)	MEASUREMENT UNCERTAINTY (+/-)	k Factor
62	10 V	1 V, 1 kHz	1.000020 V	0.000114 V	0.050 mV	2.00
63		10 V 10 Hz	1.00002 V	0.00069 V	0.05 mV	2.00
64		10 50 Hz	10.00015	0.00069	0.51	2.00
65		10 100 Hz	10.00017	0.00069	0.46	2.00
66		10 1 kHz	10.00016	0.00069	0.46	2.00
67		10 10 kHz	10.00018	0.0022	0.46	2.00
68		10 100 kHz	9.99807 V	0.023 V	0.59 mV	2.00
69		10 200 kHz	9.99681	0.023	2.29	2.00
70		10 500 kHz	9.99420	0.11	2.29	2.00
71		10 1MHz	9.98615	0.20	2.3	2.00
72	100 V	100 V, 10 Hz	100.0044 V	0.0075 V	10.1 mV	2.00
73		100 50 Hz	100.0019	0.0075	5.9	2.00
74		100 100 Hz	100.0019	0.0075	5.9	2.00
75		100 1 kHz	100.0016	0.0075	5.9	2.00
76		100 10 kHz	99.9972	0.022	5.9	2.00
77		100 30 kHz	100.0081	0.056	5.3	2.00
78		100 60 kHz	100.0057	0.056	6.4	2.00
79		100 100 kHz	100.0009	0.40	9.5	2.00
80	1000 V	500 V, 50 Hz	499.992 V	0.07V	65.5 mV	2.00
81		500 1 kHz	500.003	0.07	65.5	2.00
82		500 10 kHz	499.981	0.13	65.5	2.00
83		500 50 kHz	499.968	0.355	65.5	2.00
84		500 100 kHz	499.937	0.355	66.1	2.00
85		1000 50 Hz	1000.025	0.115	132.3	2.00
86		1000 1 kHz	1000.008	0.115	132.3	2.00
87		1000 20 kHz	1000.002	0.235	132.3	2.00





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3.3 DC Current :

Sl. No.	RANGE	STANDARD INPUT	DUC READING	DUC ACCURACY (+/-)	MEASUREMENT UNCERTAINTY (+/-)	k Factor
88	10 uA	0 uA	-0.000023 uA	0.0004 uA	---	---
89		1	1.000017	0.000424	0.000052uA	2.00
90		5	4.999946	0.00052	0.00015	2.00
91		10	9.999958	0.00064	0.00027	2.00
92		-10	-9.999941	0.00064	0.00027	2.00
93	100 uA	0 uA	-0.00002 uA	0.00040 uA	---	---
94		50	49.99999	0.0081	0.00056uA	2.00
95		100	99.99985	0.00122	0.0012	2.00
96		-100	-99.99998	0.00122	0.0012	2.00
97	1 mA	0 mA	0.0000004 mA	0.000004 mA	---	---
98		0.5	0.4999985	0.0000078	0.0000054mA	2.00
99		1	0.9999969	0.0000116	0.000011	2.00
100		-1	-0.9999981	0.0000116	0.000011	2.00
101	10 mA	0 mA	-0.000004 mA	0.00004 mA	---	---
102		5	4.999980	0.0000845	0.000054mA	2.00
103		10	9.999965	0.000129	0.00011	2.00
104		-10	-9.999975	0.000129	0.00011	2.00
105	100 mA	0 mA	0.00007 mA	0.0010 mA	---	---
106		50	49.99988	0.00265	0.00054 mA	2.00
107		100	99.99996	0.0043	0.0011	2.00
108		-100	-99.99970	0.0043	0.0012	2.00
109	1 A	0 A	0.0000007 A	0.0001 A	---	---
110		0.5	0.5000053	0.00015	0.000018 A	2.00
111		1	1.0000148	0.0002	0.000037	2.00
112		-1	-1.0000154	0.0002	0.000037	2.00
113	10 A	0 A	0.000269 A	0.00040 A	---	---
114		5	4.999981	0.00127	0.00019 A	2.00
115		10	10.000276	0.00214	0.00065	2.00
116		-10	-10.000804	0.00214	0.00068	2.00
117		15	14.999990	0.00301	0.0028	2.00
118	30A	30	29.994865 A	0.01911 A	0.0056 A	2.00
119		-30	-30.006840	0.01911	0.0056	2.00



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3.4 AC Current :

Sl. No.	RANGE	STANDARD INPUT	DUC READING	DUC ACCURACY (+/-)	MEASUREMENT UNCERTAINTY (+/-)	k Factor
120	10 uA	10 uA, 10 Hz	10.00396 uA	0.0226 uA	0.00258 uA	2.00
121		10 50 Hz	10.00796	0.0226	0.00258	2.00
122		10 1 kHz	10.00405	0.0226	0.00272	2.00
123	100 uA	100 uA, 10 Hz	100.0054 uA	0.031 uA	0.031 uA	2.00
124		100 50 Hz	100.0067	0.031	0.017	2.00
125		100 1 kHz	100.0045	0.031	0.016	2.00
126	1 mA	1 mA, 10 Hz	1.000041 mA	0.00031 mA	0.00011 mA	2.00
127		1 50 Hz	1.000016	0.00031	0.000084	2.00
128		1 100 Hz	1.000016	0.00031	0.000084	2.00
129		1 1 kHz	1.000008	0.00031	0.000084	2.00
130	10 mA	10 mA, 10 Hz	10.00041 mA	0.0031 mA	0.00077mA	2.00
131		10 50 Hz	10.00016	0.0031	0.00071	2.00
132		10 100 Hz	10.00015	0.0031	0.00071	2.00
133		10 1 kHz	10.00006	0.0031	0.00071	2.00
134		10 5 kHz	10.00072	0.0056	0.00071	2.00
135		10 10 kHz	10.00159	0.0077	0.00083	2.00
136	100 mA	100 mA, 10 Hz	100.0047 mA	0.031 mA	0.011 mA	2.00
137		100 50 Hz	100.0022	0.031	0.0096	2.00
138		100 100 Hz	100.0024	0.031	0.0092	2.00
139		100 1 kHz	100.0027	0.031	0.0098	2.00
140		100 5 kHz	100.0112	0.055	0.0098	2.00
141		100 10 kHz	100.0254	0.075	0.010	2.00
142	1 A	1 A, 10 Hz	1.000068 A	0.00036 A	0.00016 A	2.00
143		1 50 Hz	1.000059	0.00036	0.00016	2.00
144		1 100 Hz	1.000057	0.00036	0.00016	2.00
145		1 1 kHz	1.000035	0.00036	0.00017	2.00
146		1 5 kHz	0.999763	0.00061	0.00016	2.00
147		1 10 kHz	0.999769	0.00081	0.00017	2.00
148	10 A	10 A, 10 Hz	9.99744 A	0.0085 A	0.0020 A	2.00
149		10 50 Hz	10.00304	0.0085	0.0020	2.00
150		10 100 Hz	10.00310	0.0085	0.0020	2.00
151		10 1 kHz	10.00396	0.0085	0.0020	2.00
152		10 5 kHz	10.00332	0.0085	0.0020	2.00
153		10 10 kHz	9.99958	0.0085	0.0022	2.00



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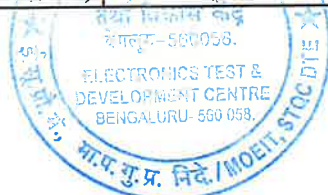
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3.4 AC Current :

Sl. No.	RANGE	STANDARD INPUT	DUC READING	DUC ACCURACY (+/-)	MEASUREMENT UNCERTAINTY (+/-)	k Factor
154	10 A	20A, 10 Hz	19.99968 A	0.0165 A	0.0062 A	2.00
155		20 50 Hz	19.99958	0.0165	0.0062	2.00
156		20 100 Hz	19.99949	0.0165	0.0062	2.00
157		20 1 kHz	19.99364	0.0165	0.0062	2.00
158		20 5 kHz	20.00335	0.0165	0.0062	2.00
159	30 A	30 50 Hz	29.99716 A	0.036 A	0.0093 A	2.00

3.5 Resistance :

Sl. No.	RANGE	STANDARD INPUT	DUC READING	DUC ACCURACY (+/-)	MEASUREMENT UNCERTAINTY (+/-)	k Factor
160	1 ohm	0 ohm	0.0000003 ohm	0.000004 ohm	---	2.00
161	(1 ohm)	1.00003259	1.0000345	0.000015	0.0036 mohm	
162	10 ohm	0 ohm	0.000000 ohm	0.000014 ohm	---	2.00
163	(10 ohm)	10.0003757	10.000337	0.000091	0.033 mohm	
164	100 ohm	0 ohm	0.00000 ohm	0.000050 ohm	---	2.00
165	(100 ohm)	100.002595	100.00242	0.00077	0.35 mohm	
166	1 kohm	0 kohm	0.0000000 kohm	0.0000005 kohm	---	2.00
167	(1 kohm)	1.000015477	1.0000154	0.0000076	0.0037 ohm	
168	10 kohm	0 kohm	0.000000 kohm	0.000005 kohm	---	2.00
169	(10 kohm)	10.0004849	10.000469	0.000077	0.043 ohm	
170	100 kohm	0 kohm	0.00000 kohm	0.00005 kohm	---	2.00
171	(100 kohm)	100.0033497	100.00302	0.00078	0.56 ohm	
172	1 Mohm	0 Mohm	0.0000000 Mohm	0.0000010 Mohm	---	2.00
173	(1 Mohm)	1.000002111	1.0000041	0.0000092	0.0056 kohm	
174	10 Mohm	0 Mohm	0.000000 Mohm	0.00010 Mohm	---	2.00
175	(10 Mohm)	10.0004255	10.000490	0.00021	0.078 kohm	
176	100 Mohm	0 Mohm	0.00000 Mohm	0.0100 Mohm	---	2.00
177	(100 Mohm)	100.0092598	100.00686	0.0139	3.3 kohm	
178	1 Gohm	0 Gohm	0.0000000 Gohm	0.0010 Gohm	---	2.00
179	(1 Gohm)	1.0000935	1.0000395	0.0015	0.25 Mohm	
180	10 Mohm	Hi Vohms 0 Mohm	0.000001 Mohm	0.000010 Mohm	---	2.00
181	(10 Mohm)	10.0004255	10.000454	0.00016	0.11 kohm	
182	100 Mohm	0 Mohm	0.00001 Mohm	0.0010 Mohm	---	2.00
183	(100 Mohm)	100.009259	100.01575	0.0070	3.1 kohm	
184	1 Gohm	0 Gohm	0.0000001 Gohm	0.00010 Gohm	---	2.00
185	(1 Gohm)	1.0000935	1.0008762	0.00025	0.25 Mohm	
186	10 Gohm	0 Gohm	0.000001 Gohm	0.001	---	2.00
187	(1 Gohm)	1.0000935	0.999894	0.01053	0.72 Mohm	
188	(10 Gohm)	10.00646	10.014629	0.0153	7.18 Mohm	2.00



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3.6 Frequency :

Sl. No.	RANGE	STANDARD INPUT	DUC READING	DUC ACCURACY (+/-)	MEASUREMENT UNCERTAINTY (+/-)	k Factor
189		1 Hz @3 V	1.00000029 Hz	0.0000022 Hz	0.00000012 Hz	2.00
190		10 Hz	10.0000029	0.000022	0.0000012	2.00
191		100 Hz	100.000029	0.00022	0.000012	2.00
192		1 kHz	1.00000029 kHz	0.0000022 kHz	0.00000012 kHz	2.00
193	100 MHz	10 kHz	10.0000029	0.000022	0.0000012	2.00
194		100 kHz	100.000029	0.00022	0.000012	2.00
195		1 MHz	1.00000029 MHz	0.0000022 MHz	0.00000012 MHz	2.00
196		10 MHz	10.0000029	0.000022	0.0000012	2.00
197		100 MHz	100.000030	0.00022	0.000012	2.00

4.0 Conclusion / Remarks :

4.1 Measurement uncertainty is reported at approx. 95% confidence level.

4.2 Reported readings are with Adjustments .

Calibrated by:

*** End of Report ***

Approved By:

बृजनंदन प्रसाद / BRIJNANDAN PRASAD
 वैज्ञानिक "एफ" / निदेशक / Scientist 'F' / Director
 भारत सरकार / Govt. of India
 इले तथा सू. प्रौ. मंत्रालय / Min. of Elec. & IT
 इ.टी.डी.सी. / E.T.D.C.,
 बेंगलूरु / Bengaluru - 560058.

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 वैज्ञानिक अधिकारी "एस.बी." / Scientific Officer 'SB'
 भारत सरकार / Govt. of India
 इलेक्ट्रॉनिक्स और सूचना प्रौद्योगिकी मंत्रालय / Ministry of Electronics & IT
 मा.प.गु.प्र. निदेशालय / STQC Directorate
 इ.टी.डी.सी. / E.T.D.C.
 बेंगलूरु / Bengaluru - 560 058.



CO-ORDINATOR
CALIBRATION SERVICE
E.T.D.C., BENGALURU.