



NABL

National Accreditation Board for Testing and Calibration Laboratories

(An Autonomous Body under Department of Science & Technology, Govt. of India)

CERTIFICATE OF ACCREDITATION

ELECTRONICS REGIONAL TEST LABORATORY (WEST)

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra

in the discipline of

ELECTRO-TECHNICAL CALIBRATION

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Certificate Number C-0028

Issue Date 02/01/2015



Valid Until 01/01/2017

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the additional requirements of NABL.

Signed for and on behalf of NABL

Avijit Das
Program Manager

Anil Relia
Director

Prof. Ashutosh Sharma
Chairman



रा.प्र.प्र.बो.

राष्ट्रीय परीक्षण और अंशशोधन प्रयोगशाला प्रत्यायन बोर्ड

(विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार के अधीन स्वायत्तशासी निकाय)

प्रत्यायन प्रमाण-पत्र

इलेक्ट्रॉनिकी क्षेत्रीय परीक्षण प्रयोगशाला (पश्चिम)

का मूल्यांकन और प्रत्यायन निम्न मानक के अनुसार

आई.एस.ओ./आई.ई.सी. 17025:2005

“परीक्षण एवं अंशशोधन प्रयोगशालाओं की सक्षमता की सामान्य अपेक्षाएँ”

मुम्बई, महाराष्ट्र

में स्थित इसकी सुविधाओं के लिए

विद्युत तकनीकी अंशशोधन

के विषय क्षेत्र में किया गया।

(इस प्रयोगशाला के प्रत्यायन के विषय क्षेत्र की जानकारी एन ए बी एल वेबसाइट www.nabl-india.org से भी प्राप्त कर सकते हैं)

प्रमाण-पत्र संख्या अ-0028
जारी करने की तिथि 02/01/2015



वैधता की तिथि 01/01/2017

यह प्रमाण-पत्र उपर्युक्त मानक तथा राष्ट्रीय परीक्षण और अंशशोधन प्रयोगशाला प्रत्यायन बोर्ड की अतिरिक्त अपेक्षाओं का निरंतर संतोषप्रद अनुपालन किए जाने पर अनुबंध में निर्दिष्टानुसार प्रत्यायन के क्षेत्र के लिए वैध रहेगा।

रा.प्र.प्र.बो. की ओर से हस्ताक्षरित

अ. दास

अविजित दास
कार्यालय प्रबन्धक

अनिल रैलिया

अनिल रैलिया
निदेशक

आशुतोष शर्मा

प्रो. आशुतोष शर्मा
अध्यक्ष



NABL

SCOPE OF ACCREDITATION

Laboratory Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025:2005

Discipline Electro-Technical Calibration **Issue Date** 02.01.2015

Certificate Number C-0028 **Valid Until** 01.01.2017

Last Amended on 23.02.2015 **Page** 1 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
<u>MEASURE</u>			
1. AC RESISTANCE ^S	100 Hz/1 kHz 0.1 m Ω to 100 m Ω 100 m Ω to 1 Ω 1 Ω to 10 k Ω 10 k Ω to 5 M Ω	0.02 % to 0.01 % 0.01 % to 0.004 % 0.004 % 0.004 % to 0.1 %	Using AC/DC Std. Resistor Tinsley 3111/1682/5576/5685series Ref multimeter Fluke 8508A/ MTS4950/Wavetck 4808/ Precision Component Analyser waynkerr 6430 by Direct/Comparison Method
AC RESISTANCE*	100 Hz to 10 kHz 1 Ω to 5 M Ω	0.02 % to 0.1 %	Using Precision Component Analyser 6430B
2. FREQUENCY ^S	1 mHz to 18 GHz	1E-10 % to (1x10 ⁻¹⁰)	Using Rubidium Frequency counter cnt 81/Frequency counterhp/aplab/anritsu MF 1602 by Direct Method
3. PT RATIO ^S	220 V/110 V to 33 kV/110 V @ 50 Hz	0.2 %	Using Amber IXR-2000 & Potential Transformers by Comparison Method
PT Phase Angle	0 to 360 min @ 50 Hz	3.0 min	Using Amber IXR-2000 & Potential Transformers by Comparison Method

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	2 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
4. CT RATIO ^S	1 A to 3200 A / 1 A or 5 A @ 50Hz	0.2 %	Using Amber IXR-2000 & Current I Transformers by Comparison Method
PT Phase Angle	0 to 360 min @ 50 Hz	3.0 min	Using Amber IXR-2000 & Current I Transformers by Comparison Method
5. DC VOLTAGE ^S	10 μ V to 1 mV 1 mV to 100 mV 100 mV to 1000 V	0.05 % to 0.007 % 0.007 % to 0.0005 % 0.0005 % to 0.0003 %	Using Nanovoltmeter Agilent 34420A /MTS 4950 Using fluke 752/fluke 7000/Null Detector
DC VOLTAGE [*]	1 mV to 10 mV 10 mV to 100 mV 100 mV to 1000 V	0.08 % to 0.0015 % 0.0015 % to 0.001 % 0.001 % to 0.0015 %	Using DMM Wavetek 1281/HP 3458/ NanoVoltmeter Agilent 33420A
6. DC HIGH VOLTAGE ^S	>1 kV to 10 kV 10 kV to 50 kV	0.4 % to 0.25 % 0.25 % to 1.5 %	Using HV divider fluke 80E/ EVM by Comparison Method Using HV divider process 100E /DMM Agilent by Comparison Method
DC HIGH VOLTAGE [*]	1 kV to 5 kV 5 kV to 40 kV	0.25 % 0.25 % to 1.5 %	Using DMM Agilent U1253/ Fluke 80k-6/40 by Comparison Method

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	3 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
7. DC CURRENT ^s	100 pA to 1 nA	0.05 % to 0.003 %	Using Std R Fluke/L&N 4030 Series/DMM8508/HP3458/ AC/DC STD R Tinsley 3111/660/5576 by V/R Method
	1 nA to 100 μ A	0.003 % to 0.002 %	
	100 μ A to 100 mA	0.002 % to 0.001 %	
	100 mA to 1 A	0.001 % to 0.002 %	
	1 A to 20 A	0.002 % to 0.006 %	
	20 A to 100 A	0.01 %	
100 A to 500 A	0.01 % to 0.03 %	Using with current source by V/R Method	
DC CURRENT*	100 μ A to 10 mA	0.003 %	Using DMM Wavetek 1281/HP 3458/ Std R Tinsley 3111 by V/I Method
	10 mA to 100 mA	0.003 % to 0.004 %	
	100 mA to 1 A	0.004 % to 0.012 %	
	1 A to 100 A	0.01 %	
8. DC RESISTANCE ^s	0.1 m Ω to 100 m Ω	0.001 %	Using Guideline 6622A DCC Bridge by Direct Method
	100 m Ω to 1 Ω	0.0001 % to 0.0003 %	
	1 Ω to 1 M Ω	0.0003 %	Using Std R I.&N 4030 series by Direct Method
	1 M Ω to 1 G Ω	0.0003 % to 0.001 %	Using DMM8508A/keithley high R meter by Direct Method
	1 G Ω to 1 T Ω	0.001 % to 0.05 %	Using MFC 4808/5520/ Null detector by Direct Method

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	4 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
DC RESISTANCE*	100 m Ω to 1 Ω	0.01 % to 0.008 %	Using Micro ohm meter Agilent 33420A /DMM Wavetek 1281/HP 3458/ High Resistance Meter Keithley 6617
	1 Ω to 10 Ω	0.008 % to 0.001 %	
	10 Ω to 100 M Ω	0.001 % to 0.003 %	
	100 mG Ω to 1 G Ω	0.003 % to 0.02 %	
	100 G Ω to 1 T Ω	0.02 % to 3.0 %	
9. AC VOLTAGE ⁵	10 Hz to 10 kHz		
	1 mV to 100 mV	0.3 % to 0.015 %	Using DMM fluke 8508/MFT Wavetek 4950/ HP3548 by Comparison Method
	100 mV to 10 V	0.015 % to 0.005 %	
	10 V to 1000 V	0.005 % to 0.009 %	
	10 kHz to 20 kHz		
	1 mV to 100 mV	0.28 % to 0.01 %	Using DMM fluke 8508/MFT Wavetek 4950/ HP3548 by Comparison Method
	100 mV to 10 V	0.01 % to 0.005 %	
	10 V to 1000 V	0.005 % to 0.009 %	
	20 kHz to 100 kHz		
	1 mV to 100 mV	0.5 % to 0.01 %	Using DMM fluke 8508/MFT Wavetek 4950/HP3548 by Comparison Method
	100 mV to 10 V	0.01 %	
	10 V to 200 V	0.01 %	
100 kHz to 1 MHz			
1mV to 10 V	1.3 % to 0.15 %	Using DMM fluke 8508/MFT Wavetek 4950/ HP3548 by Comparison Method	
AC VOLTAGE*	50 Hz to 10 kHz		
	10 mV to 100 mV	0.03 % to 0.012 %	Using DMM Wavetek 1281/HP3458
	100 mV to 1000 V	0.012 % to 0.01 %	

Vishal Shukla
Convenor

Avjit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025:2005

Discipline Electro-Technical Calibration

Issue Date 02.01.2015

Certificate Number C-0028

Valid Until 01.01.2017

Last Amended on 23.02.2015

Page 5 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
	10 kHz to 20 kHz 10 mV to 100 mV 100 mV to 1000 V	0.07 % to 0.035 % 0.035 % to 0.03 %	Using DMM Wavetek 1281/IIP3458
	20 kHz to 100 kHz 10 mV to 100 mV 100 mV to 100 V	0.2 % to 0.08 % 0.08 % to 0.06 %	Using DMM Wavetek 1281/IIP3458
10. AC HIGH VOLTAGE ^s	50Hz >1 kV to 25 kV 25 kV to 50 kV	0.1 % to 0.5 % 0.5 % to 1.0 %	Using EVM/IIV Divider/DMM by Comparison Method
AC HIGH VOLTAGE*	1 kV to 5 kV 5 kV to 28 kV	0.7 % to 0.5 % 0.5 % to 2.0 %	Using IIV Probe Fluke 80k-6/40/DMM Agilent U1235 by Comparison Method
11. AC CURRENT ^s	10 Hz to 1 kHz 10 μ A to 100 mA 100mA to 10A 10 A to 100 A	0.015 % to 0.01 % 0.01 % to 0.02 % 0.02 % to 0.05 %	Using Wavetek 4808/fluke 8508/Wavetek 4950/HP3548/Std R Tinsley 5685 Fluke 5220/5520/Std R tinsley 3111/ Rotek 8100/8140/Std R Tinsley 3111/DMM 1281/8508 by Direct Method
	1 kHz to 5 kHz 10 μ A to 100 μ A 100 μ A to 100 mA 100 mA to 10 A	0.2 % to 0.05 % 0.05 % to 0.03 % 0.03 % to 0.1 %	

Vishal Shukla
Convenor

Avijit Das
Program Manager



Laboratory

Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025:2005

Discipline Electro-Technical Calibration

Issue Date 02.01.2015
Valid Until 01.01.2017

Certificate Number C-0028

Last Amended on 23.02.2015

Page 6 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (±)	Remarks
--------------------------------	------------------	--	---------

AC CURRENT*	50 Hz to 5 kHz 100 µA to 100 mA 1 A to 20 A	0.04 % 0.04 % to 0.08 % 0.08 % to 0.05 %	Using DMM Wavetek 1281/Std R Tinsley 3111 by V/R Method
-------------	---	--	--

INDUCTANCE *	100 Hz to 10 kHz 10 µH to 100 H	0.05 % to 0.2 %	Using Precision Component Analyser 6430B
--------------	------------------------------------	-----------------	--

INDUCTANCE #	1 kHz 100 µH to 100 H	0.05 %	Using Video Bridge ESI 2160/ Component Analyser waynkerr 6430B
--------------	--------------------------	--------	---

CAPACITANCE*	100 Hz to 10 kHz 10 pF to 1 mF	0.05 % to 0.2 %	Using Precision Component Analyser 6430B
--------------	-----------------------------------	-----------------	--

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025:2005

Discipline Electro-Technical Calibration

Issue Date 02.01.2015

Certificate Number C-0028

Valid Until 01.01.2017

Last Amended on 23.02.2015

Page 7 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
CAPACITANCE [#]	1 kHz		
	1 pF to 10 pF	0.02 % to 0.005 %	Using Capacitance Measuring Assembly Gr 1620A/ Std Capacitors GR 1404/ Std Capacitors GR 1409/ 4 Terminal Capacitor GR 1417/ MFC Wavetek 4808/MFT Wavetek 4950/IVD by Direct Method
	10 pF to 1000 pF	0.005 %	
	100 pF to 1 μ F	0.005 % to 0.01 %	
	100 Hz		
	1 μ F to 10 mF	0.01 % to 0.05 %	
10 mF to 1000 mF	0.05 %		
14. TIME [#] (Interval)	1 ms to 10000 s	0.001 % to 0.00025 %	Using Frequency counter PM 6672 by Direct Method
	1 min to 24 hrs	0.5 s	Using Digital Clock R&S/Rubidium Frequency Std R & S by Direct Method
15. RF LEVEL/POWER [#]	100 kHz to 3 GHz (-)50 dBm to 13 dBm	0.23 dB to 0.2 dB	Using RF Level Meter URV-35/RF Power Meter Gigatronics 8541 by Direct Method
	10 MHz to 18 GHz (-)60 dBm to 13 dBm	0.20 dB to 0.25 dB	

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025:2005

Discipline Electro-Technical Calibration

Issue Date 02.01.2015

Certificate Number C-0028

Valid Until 01.01.2017

Last Amended on 23.02.2015

Page 8 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
16. POWER/ENERGY 1 ϕ &3 ϕ ACTIVE/ REACTIVE [#]	30 V to 500 V/ 10 mA to 100 A 40 Hz to 70 Hz PF --UPF to 0.5 pf 0.5 pf to 0.1 pf	0.02 % to 0.03 % 0.03 %	Using Rotekl 8100 Power/ Energy calibration system Rotek MSB 100/ 3030 ZERA TPZ 303/MT 3000 by Direct Method
17. PHASE ANGLE [#]	180° to (-)180° (V-V/V-I)	0.006°	Using Power energy calibration system Rotek 8100/ ZERA TPZ 303/MT 3000 by Direct Method
18. POWER FACTOR [#]	0.1 pf to 1 pf lag/lead	0.006°	Using Power energy calibration system Rotek 8100/ZERA TPZ 303/MT 3000 by Direct Method
19. TEMPERATURE MEASURE (SIMULATION METHOD)			Using for Calibration of Temperature Indicator/Controller/ Indicator/Process Calibrator) by Direct Method
THERMOCOUPLE TYPE - K [#]	-200 °C to 1350 °C	0.2 °C to 0.03 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method

Vishal Shukla
Convenor

Avijit Das
Program Manager

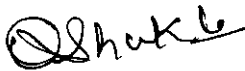


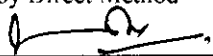
NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	9 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
THERMOCOUPLE TYPE - J [#]	-200 °C to 1200 °C	0.03 °C to 0.05 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
THERMOCOUPLE TYPE - E [#]	-250 °C to 1000 °C	0.012 °C to 0.07 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
THERMOCOUPLE TYPE - T [#]	-250 °C to 400 °C	0.04 °C to 0.08 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
THERMOCOUPLE TYPE - N [#]	-200 °C to 1300 °C	0.02 °C to 0.03 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
THERMOCOUPLE TYPE - R [#]	0 to 1750 °C	0.02 °C to 0.4 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
THERMOCOUPLE TYPE - S [#]	0 °C to 1750 °C	0.02 °C to 0.4 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
THERMOCOUPLE TYPE - B [#]	600 °C to 1800 °C	0.04 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method


Vishal Shukla
Convenor


Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	10 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
THERMOCOUPLE TYPE - C [#]	0 °C to 2300 °C	0.3 °C to 0.9 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
THERMOCOUPLE TYPE - L [#]	(-)200 °C to 900 °C	0.2 °C to 0.4 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
THERMOCOUPLE TYPE - U [#]	(-)200 °C to 600 °C	0.3 °C to 0.4 °C	Using DMM Datron 1281/ nonovoltmeter agilent 34420A by Direct Method
RTD - PT 385, 100 ,1000 OHM [#]	(-)199 °C to 800 °C	0.03 °C to 0.4 °C	Using Nonovolt/microhm meter agilent 34420A by Direct Method
SOURCE			
1. DC VOLTAGE ⁵	10 μ V to 1mV 1 mV to 100 mV 100 mV to 1000 V	0.036 % to 0.002 % 0.002 % to 0.0005 % 0.0005 % to 0.0003 %	Using DC Ref. STD. Fluke 7000/ Ref. div. Fluke 752/ Null Detector ESI/ Wavetek4808/fluke8508A
DC VOLTAGE*	1 mV to 100 mV 100 mV to 1000 V	0.1 % to 0.003 % 0.003 % to 0.002 %	Using MFC Fluke 5520/Wavetek 9100/ Navovoltmeter Agilent 34420A

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	11 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
2. DC HIGH VOLTAGE ^S	>1 kV to 10 kV 10 kV to 50 kV	0.25 % 0.25 % to 1.5 %	Using IIV divider fluke /fluke 5520/IIV Power supply / EVM/ IIV divider -100
3. DC CURRENT ^S	100 pA to 1 nA 1 nA to 100 μ A 100 μ A to 1 A 1 A to 20 A 20 A to 100 A 100 A to 500 A 20 A to 1000 A	0.05 % to 0.003 % 0.003 % to 0.002 % 0.002 % 0.002 % to 0.006 % 0.006 % to 0.01 % 0.01 % to 0.02 % 0.2 %	Using Std R IET/MFC Wavetek 4808/ L&N 4030 /DMM8508A/ Std R Tinsley3111/ 1682/MFC5220/DMM1281/ 8508/3458 Std R 3111/1682/ Guildline current Source /DMM1281/8508/3458 DC Current source/Std R tinsley 3111/660/DMM1281 MFC Wavetek 9100/Fluke5520/Current coil by V/R Method
DC CURRENT*	100 μ A to 1000 μ A 1 mA to 100 mA 100 mA to 1 A 1 A to 20 A 20 A to 1000 A	0.025 % to 0.02 % 0.02 % 0.02 % to 0.03 % 0.03 % to 0.31 % 0.3 %	Using MFC Fluke 5520/ Wavetek 9100 With Current coil

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory **Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra**

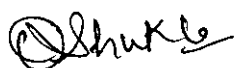
Accreditation Standard **ISO/IEC 17025:2005**

Discipline **Electro-Technical Calibration** **Issue Date** **02.01.2015**

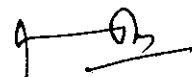
Certificate Number **C-0028** **Valid Until** **01.01.2017**

Last Amended on **23.02.2015** **Page** **12 of 19**

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
4. DC RESISTANCE ^s	0.1 m Ω to 100 m Ω	0.001 %	Using Std R Tinsley 660/5576/3111/1682/ Std R L&N 4030/Tinsley 5685/ Std R HET, Fluke Std R Box Tinsley 4720 (discrete Values in step of 10) by Direct Method
	1 Ω to 1 M Ω 1 M Ω to 1 G Ω 1 G Ω to 1 T Ω	0.0002 % to 0.0005 % 0.0005 % to 0.001 % 0.001 % to 3.0 %	
DC RESISTANCE [*]	0.333 m Ω to 10 k Ω 10 k Ω to 1 M Ω 1 M Ω to 10 M Ω 10 M Ω to 1 G Ω 1 G Ω to 1 T Ω	0.01% to 0.001 % 0.001 % 0.001 % to 0.005 % 0.005 % to 0.050 % 0.05 % to 3.0 %	Using Guideline Shunt9921A/ Std R L&N 4030 series / Decade R Box ESI/ Decade R Box Biddle
5. AC VOLTAGE ^s	10 Hz to 10 kHz		Using MFCWavetek 4808 / MTSWavetek 4950 by Comparison Method
	1 mV to 100 mV	0.28 % to 0.02 %	
	100 mV to 10 V	0.02 % to 0.004 %	
	10 V to 1000V	0.004 % to 0.009 %	
	10 kHz to 20 kHz		Using MFCWavetek 4808 / MTSWavetek 4950 by Comparison Method
	1 mV to 100 mV	0.33 % to 0.01 %	
100 mV to 10 V	0.01 % to 0.005 %		
20 kHz to 100 kHz		Using MFCWavetek 4808 / MTSWavetek 4950 by Comparison Method	
1 mV to 100 mV	0.46 % to 0.010 %		
100 mV to 10 V	0.010 % to 0.005 %		
10 V to 200 V	0.005 % to 0.09 %		



Vishal Shukla
Convenor



Avijit Das
Program Manager

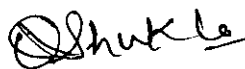


NABL

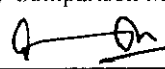
SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	13 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
	100 kHz to 1 MHz 1 mV to 10 V	1.3 % to 0.14 %	Using MFC Wavetek 4808 / MTS Wavetek 4950 by Comparison Method
AC VOLTAGE*	50 Hz to 10 kHz 1 mV to 10 mV	0.62 % to 0.075 %	Using MFC Fluke 5520/ Wavetek 9100/DMM Wavetek 1281/HP 3458
	10 mV to 100 mV	0.075 % to 0.025 %	
	100 mV to 10 V	0.025 % to 0.021 %	
	10 V to 1000 V	0.021 % to 0.031 %	
	10 kHz to 30 kHz 1 mV to 10 mV	0.7 % to 0.11 %	Using MFC Fluke 5520/ Wavetek 9100/DMM Wavetek 1281/HP 3458
	10 mV to 100 mV	0.11 % to 0.04 %	
	100 mV to 10 V	0.04 % to 0.030 %	
	10 V to 100 V	0.03% to 0.04 %	
	30 kHz to 100 kHz 1 mV to 10 mV	1.5 % to 0.5 %	Using MFC Fluke 5520/ Wavetek 9100/DMM Wavetek 1281/HP 3458
	10 mV to 100 mV	0.5 % to 0.083 %	
	100 mV to 10 V	0.083 % to 0.041 %	
	10 V to 100 V	0.041 % to 0.25 %	
	100 kHz to 500 kHz 1 mV to 10 V	1.3 % to 3.4 %	
6. AC HIGH VOLTAGE^s	50 Hz/ >1 kV to 33 kV	0.6 % to 0.4 %	Using HV source /Standard PT/DMM Agilent by Comparison Method



Vishal Shukla
 Convenor



Avijit Das
 Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	14 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks	
7. AC CURRENT ⁵	10 Hz to 1 kHz			
	10 μ A to 100 mA	0.014 % to 0.01 %	Using Wavetek 4808/fluke8508/ Wavetek 4950/ Std R Tinsley 5685/ HP3548/Std R Tinsley 5685 Fluke 5220/5520/ Std R tinsley 3111/ Rotek 8100/8140/Std R Tinsley 3111/DMM 1281/8508 for clamp type meter; using X 10 & X50 turn coil with MFC Fluke by Direct Method	
	100 mA to 10 A	0.01 % to 0.03 %		
	10 A to 100 A	0.03 % to 0.1 %		
	1 kHz to 5 kHz			
	10 μ A to 100 μ A	0.2 % to 0.05 %		
	100 μ A to 100 mA	0.05 % to 0.03 %		
	100 mA to 10 A	0.03 % to 0.1 %		
	50/60 Hz			
	20 A to 1000 A	0.2 %		
AC CURRENT*	50 Hz to 1 kHz			
	100 μ A to 1 mA	0.23 % to 0.12 %	Using MFC Fluke 5520/ Wavetek 9100	
	1 mA to 10 mA	0.12 % to 0.06 %		
	10 mA to 1 A	0.06 %		
	1 A to 10 A	0.06 % to 0.08 %		
	10 A to 20 A	0.08 % to 0.22 %		
	1 kHz to 5 kHz			
	100 μ A to 1 mA	0.45 % to 0.22 %		Using MFC Fluke 5520/ Wavetek 9100
	1 mA to 10 mA	0.22 % to 0.1 %		
	10 mA to 100 mA	0.1 % to 0.15 %		
100 mA to 1000 mA	0.15 % to 0.7 %			
1 A to 20 A	0.7 % to 3.2 %			
50/60 Hz				
20 A to 1000 A (C.Coil)	0.22 % to 1.0 %		Using MFC Fluke 5520/ Wavetek 9100	

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	15 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
8. AC RESISTANCE ^S	1 kHz		
	1 m Ω	0.03 %	Using Standard Resistor Tinsley 5576/660/1682/3111/5685 Series (Discrete values) by Direct Method
	10 m Ω	0.022 %	
	100 m Ω	0.003 %	
	1 Ω , 10 Ω , 100 Ω , 1 k Ω , 10 k Ω	0.005 % to 0.003 %	
9. FREQUENCY ^S	1 MHz to 18 GHz	1E-10 % to (1x10 ⁻¹⁰)	Using Rubidium Frequency counter CNT 81/Frequency counter HP/synthesized signal generator R&S SMT06/Gigatronics 9000S by Direct Method
10. INDUCTANCE [#]	1 kHz		
	100 μ H to 10 H	0.05 %	Using Standard Inductor GR 1482 series by Direct Method
11. CAPACITANCE [#]	1 kHz		
	1 pF	0.04 %	Using Standard Capacitors IET/Std Capacitors GR 1404/ Std Capacitors GR 1409/(Discrete Values) 4 Terminal Capacitor GR 1417/Fluke 5520/ Wavetek 91004 Terminal Capacitor GR 1417 by Direct Method
	10 pF to 1000 pF	0.0015 %	
	1000 pF to 1 μ F	0.0015 % to 0.01 %	
	1 μ F to 10 mF	0.01 % to 0.1 %	
100 Hz			
10 mF to 1000 mF	0.1 to 0.13		

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	16 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
12. TIME [#] (Interval)	1 ms to 10000 s	0.00025 %	Using Frequency counter PM6672+ Function Gen.Hp by Direct Method
13. RF LEVEL/POWER [#]	100 kHz to 3 GHz (-) 50 dBm to 13 dBm	0.23 dB to 0.2 dB	Using synthesized Signal generator R & S SMT 06/Gigatronics 9000s RF Level Meter URV-35 RF Power Meter Gigatronics 8541 by Direct Method
	10 MHz to 18 GHz (-) 60 dBm to 13 dBm	0.2 dB to 0.25 dB	
14. POWER/ENERGY 1 ϕ &3 ϕ ACTIVE/REACTIVE [#]	30V to 500 V/ 10mA to 100A	0.03 %	Using Power Energy calibration system Rotek 8100/MSB 100/Zera t pz303/Zera Mt 3000 by Direct Method
	40 Hz to 70 Hz Power factor- UPF to 0.5 0.5 to 0.1pf	0.02 % to 0.03 % 0.03 %	Using Power Energy calibration system Rotek 8100/MSB 100/Zera t pz303/Zera Mt 3000 by Direct Method

Vishal Shukla
Convenor

Avijit Das
Program Manager

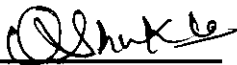


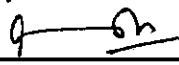
NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	17 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
15. PHASE ANGLE [#]	180° to (-)180° (V-V/V-I)	0.006 deg	Power energy calibration system Rotek 8100100/ Zera tpz303/Zera Mt 3000 by Direct Method
16. POWER FACTOR [#]	0.1 PF to 1 PF	0.006 deg	Power energy calibration system Rotek 8100100/ Zera tpz303/Zera Mt 3000 by Direct Method
17. TEMPERATURE SIMULATION			Using for Calibration of Temperature/Indicator/ Controller/Indicator/ Process Calibrator)
THERMOCOUPLE [#] TYPE - K	(-)200 °C to 1350 °C	0.2 °C to 0.11 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - J	(-)200 °C to 1200 °	0.03 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - E	(-)250 °C to 1000 °C	0.11 °C to 0.06 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - T	(-)250 °C to 400 °C	0.13 °C to 0.06 °C	Using MFC Datron 4808 by Direct Method


Vishal Shukla
Convenor


Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory	Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra		
Accreditation Standard	ISO/IEC 17025:2005		
Discipline	Electro-Technical Calibration	Issue Date	02.01.2015
Certificate Number	C-0028	Valid Until	01.01.2017
Last Amended on	23.02.2015	Page	18 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
THERMOCOUPLE [#] TYPE - N	(-)200 °C to 1300 °C	0.1 °C to 0.07 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - R	0 to 1750 °C	0.15 °C to 0.1 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - S	0 °C to 1750 °C	0.11 °C to 0.15 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - B	600 °C to 1800 °C	0.1 °C to 0.15 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - C	0 °C to 2300 °C	0.3 °C to 0.9 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - L	(-)200 °C to 900 °C	0.2 °C to 0.4 °C	Using MFC Datron 4808 by Direct Method
THERMOCOUPLE [#] TYPE - U	(-)200 °C to 600 °C	0.3 °C to 0.6 °C	Using MFC Fluke 5520A by Direct Method
RTD - PT 385, 100, 1000 OHM [#]	(-)199 °C to 800 °C	0.03 °C	Using MFC Fluke 5520A by Direct Method

Vishal Shukla
Convenor

Avijit Das
Program Manager



NABL

SCOPE OF ACCREDITATION

Laboratory Electronics Regional Test Laboratory (W), STQC Directorate, Department of Information Technology, Plot No. F 7 & 8, MIDC Area, Andheri East, Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025:2005

Discipline Electro-Technical Calibration **Issue Date** 02.01.2015

Certificate Number C-0028 **Valid Until** 01.01.2017

Last Amended on 23.02.2015 **Page** 19 of 19

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
18. DC POWER [#]	33 mV to 1000 V 1 mA to 20 A	0.03 % to 0.07 %	Using MFC Fluke 5520A by Direct Method
19. OSCILLOSCOPE PARAMETERS AMPLITUDE [#] (Vertical Deflection Factor)	1 mV to 130 V (1 M Ω) 1 mV to 6.6 V (50 Ω)	0.75 %	Using MFC Fluke 5520/9100
Time Base	2 ns to 20 ms 20 ms to 5 s	0.3 %	Using MFC Fluke 5520/ Wavetek 9100
Bandwidth	Upto 3 GHz	2 % to 5 %	Using Signal Generator SMT 06/aplab1016

* Measurement Capability is expressed as an uncertainty (\pm) at a confidence probability of 95%

[#]Only for Site Calibration

[§]Only in Permanent Laboratory

[#]The laboratory is also capable for site calibration however, the uncertainty at site depends on the prevailing actual environmental conditions and master equipment used.

Vishal Shukla
Convenor

Avijit Das
Program Manager