

**Laboratory** EMC Calibration Laboratory, Sameer-Centre For Electromagnetics,  
2<sup>nd</sup> Cross Road, C.I. T Campus, Taramani, Chennai, Tamil Nadu

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

**Certificate Number** CC-2066 **Page** 1 of 14

**Validity** 23.12.2018 to 22.12.2020 **Last Amended on** -

*"In view of the transition for ISO/IEC 17025:2017, the validity of this accreditation certificate will cease on 30.11.2020"*

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b><u>ELECTRO TECHNICAL CALIBRATION</u></b>				
1.	Insertion Loss / RF Attenuation <sup>\$</sup> (Transient Limiter, Line Impedance Stabilization Network, Bulk Current Injection Probe, Directional Coupler, Attenuator, Cable , ESD Target)	9 kHz to 6GHz 0 dB to 60 dB	0.46 dB	Using Agilent E5071C Vector Network Analyzer by Direct Method
		6 GHz to 18 GHz 0 dB to 90 dB	0.78 dB to 0.81 dB	Using Agilent N5183A Signal Generator & R&S FSP 30 Spectrum Analyzer or Equivalent by Direct Method
2.	Transfer Impedance <sup>\$</sup> (RF Current Probe)	9 kHz to 500 MHz	0.56 dB	Using Agilent E5071C Vector Network Analyzer by Direct Method
3.	Return Loss (VSWR) <sup>\$</sup> (Transient Limiter, Attenuator, Cable, Antenna, Pre-amplifier, TEM cell, Terminator, Directional Coupler )	9 kHz to 6 GHz 1dB to 46 dB	0.46 dB	Using Agilent E5071C Vector Network Analyzer by Direct Method
		6 GHz to 18 GHz 1dB to 46 dB	1.13 dB to 1.24 dB	Using Agilent N5183A Signal Generator & R&S FSP 30 Spectrum Analyzer or Equivalent by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
8.	Isolation <sup>§</sup> (Directional Coupler)	9 kHz to 6 GHz 1 dB to 60 dB	0.46 dB	Using Agilent E5071C Vector Network Analyzer by Direct Method
		6 GHz to 18 GHz 1 dB to 90 dB	0.78 dB to 0.81 dB	Using Agilent N5183A Signal Generator & R&S FSP 30 Spectrum Analyzer or Equivalent by Direct Method
9.	Directivity <sup>§</sup> (Directional Coupler, SWR Bridge)	9 kHz to 6 GHz 1 dB to 60 dB	0.46 dB	Using Agilent E5071C Vector Network Analyzer by Direct Method
		6 GHz to 18 GHz 1 dB to 90 dB	0.78 dB to 0.81 dB	Using Agilent N5183A Signal Generator & R&S FSP 30 Spectrum Analyzer or Equivalent by Direct Method
10.	Decoupling of Common Mode Disturbance <sup>§</sup> (Coupling & Decoupling Network, Impedance Stabilization Network)	9 kHz to 230 MHz 1 dB to 60 dB	0.46 dB	Using Agilent E5071C Vector Network Analyzer by Direct Method
11.	Isolation <sup>§</sup> (Line Impedance Stabilization Network)	9 kHz to 108 MHz 2 dB to 60 dB	0.46 dB	Using Agilent E5071C Vector Network Analyzer as per CISPR 16-1-2

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12.	Longitudinal Conversion Loss <sup>§</sup> (Impedance Stabilization Network)	9 kHz to 30 MHz 1 dB to 60 dB	0.46 dB	Using Agilent E5071C Vector Network Analyzer as per CISPR 22 ,CISPR 32
13.	Antenna Factor <sup>§</sup> (Antenna)	9 kHz to 30 MHz 30 MHz to 1 GHz 1 GHz to 18 GHz	0.46 dB 0.89 dB 0.88 dB to 0.89 dB	Using Agilent E5071C Vector Network Analyzer, R&S SMC 100A / Agilent N5183A Signal Generator & R&S FSP 30 Spectrum Analyzer as per ANSI C63.5,SAE ARP 958D
14.	Antenna Symmetry <sup>§</sup> (Antenna)	30 MHz to 1 GHz	0.89 dB	Using Agilent E5071C Vector Network Analyzer, R&S SMC 100A / Agilent N5183A Signal Generator & R&S FSP 30 Spectrum Analyzer as per ANSI C63.5
15.	RF Power Amplifier <sup>§</sup> a) Gain	9 kHz to 18 GHz 10 dB to 90 dB	0.71 dB to 0.81 dB	Using R&S SMC 100A / Agilent N5183A Signal Generator & R&S FSP 30 Spectrum Analyzer by Direct Method
	b) Harmonics Level (upto 3rd Harmonics)	9 kHz to 10 GHz 5 dBc to 90 dBc	0.71 dB to 0.81 dB	
	c) I/P port Return Loss(VSWR)	9 kHz to 6 GHz 1 dB to 46 dB	0.46 dB	Using Agilent E5071C Vector Network Analyzer by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
	b) Display Error of Detectors with Pulses (Peak, Quasi-Peak, RMS, Average, RMS-Average)	BAND A PRF: Isolated, 1Hz to 100Hz	0.70 dB	Using Schwarzbeck IGUU 2918/IGUU 2916 EMI Pulse Generator as per CISPR 16-1-1
		BAND B PRF: Isolated, 1Hz to 1 kHz	0.70 dB	
		BAND C/D PRF: Isolated, 1Hz to 1 kHz	1.01 dB	
	c) Display Error of Detectors with Sinusoidal Signals	9 kHz to 18 GHz	0.61 dB	R&S SMC 100A / Agilent N5183A Signal Generator or Equivalent as per CISPR 16-1-1
18.	Conducted RF Test System <sup>s</sup>	9 kHz to 1 GHz 5 dBc to 90 dBc	0.65 dB	Using R&S FSP 30 Spectrum Analyzer by Direct Method
	a) Harmonics Level (upto 3rd Harmonics)			
	b) Gain	9 kHz to 1 GHz 10 dB to 90 dB	0.69 dB	
	c) AM	9 kHz to 1 GHz 0% to 100%	6.41 %	
	d) Level Accuracy	9 kHz to 1 GHz (-)40 dBm to 30 dBm	0.21 dB to 0.37 dB	Using Agilent E4419B/E4418B Power Meter by Direct Method
	e) Error of Monitor Input	9 kHz to 1 GHz (-)40 dBm to 30 dBm	0.38 dB	Using R&S SMC 100A / Agilent N5183A Signal Generator & Agilent E4419B/E4418B Power Meter by Direct Method
f) Error of Forward Power Meter	9 kHz to 1 GHz (-)40 dBm to 30 dBm	0.38 dB		

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
24.	Telecom Surge Test System#	± 0.5 kV to ±6.0 kV	3.13%	Using Agilent DSO 9404A Digital Oscilloscope, Voltage differential probe, current probe as per IEC 61000-4-5 or Equivalent
	a) Voltage Amplitude			
	b) Voltage Front Time	10 µs	4.05%	
	c) Voltage Pulse Width	700 µs	3.01%	
	d) Current Amplitude	± 12.5 A to ± 150 A	3.12%	
	e) Current Front Time	5 µs	4.02%	
f) Current Pulse Width	320 µs	3.00%		
25.	Damped Oscillatory Wave Generator#	± 0.25 kV to ±4.0kV	3.47%	Using Agilent DSO 9404A Digital Oscilloscope, Voltage differential probe, current probe as per IEC 61000- 4-12 & IEC 61000-4-18: or Equivalent
	a) Voltage Amplitude			
	b) Rise Time	75 ns	4.07%	
	c) Oscillation Frequency (Period)	100 kHz (10 µs) 1 MHz (1 µs)	3.00% 3.00%	
	d) Repetition Rate	40 Hz (25 ms) 400 Hz (2.5 ms)	3.00% 3.00%	
	e) Current Amplitude	± 1.25 A to ± 20 A	6.91%	
26.	Ring Wave Generator#	±0.25 kV to ±6.0 kV	3.14%	Using Agilent DSO 9404A Digital Oscilloscope, Voltage differential probe, current probe as per IEC 61000- 4-12: or Equivalent
	a) Voltage Amplitude			
	b) Voltage Rise Time	0.5 µs	4.01%	
	c) Oscillation Frequency (period)	100 kHz (10 µs)	3.00%	
	d) Current Amplitude	20 A to 135 A	3.41%	
	e) Current Rise Time	≤ 1 µs	4.02%	

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	c) Rise Time	1 µs	4.13%	Using Agilent DSO 9404A Digital Oscilloscope as per ISO 7637 – 2 & SAE J1113 –11 or Equivalent
	d) Pulse Width	12 µs 50 µs	3.22% 3.12%	
	Pulse 2b – 12 V & 24 V System	10 V 20 V	3.86% 3.86%	
	a) Amplitude Without Load & With Load			
	b) Rise Time	1 ms	4.01%	
	c) Pulse Width	2 s	3.00%	
	d) t <sub>12</sub>	1 ms	4.01%	
	Pulse 3a & 3b – 12 V & 24V System	(-)200 V & 200 V	3.89%	
	a) Amplitude Without Load			
	b) Amplitude With Load	(-)100 V & 100 V	4.93%	
	c) Rise Time	5 ns	4.92%	
	d) Pulse Width	150 ns	3.80%	
	Pulse 5 – 12 V & 24 V System	100 V 200 V	3.01% 3.09%	
	a) Amplitude Without Load			
	b) Amplitude With Load	50 V 100 V	3.18% 3.09%	
	c) Rise Time	10 ms	4.13%	

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	d) Pulse Width	200 ms 175 ms	3.00% 3.00%	
		400 ms 350 ms	3.00% 3.01%	

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

§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.

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