Laboratory **EMC and Durability Lab, HCL Technologies Ltd., #73-74, South Phase, Ambattur Industrial Estate, Chennai**

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

Discipline **Electronics Testing** **Issue Date** **06.07.2013**

Certificate Number **T-1284** **Valid Until** **05.07.2015**

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S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
I. EMI / EMC TESTS				
1.	**IT Products / Household / Industrial / Medical / Network Tele-communications Equipment**	Radiated Emission Test (RE)	CISPR11:2010 BSEN 55011:2010 CISPR22:2008 BSEN 55022 :2007, FCC Part 15 IEC 60601-1-2:2007 IEC 61000-6-3:2010 IEC 61000-6-4:2010 IEC 61326-1:2012 IEC 61260-2001 IEC 60255-25:2000 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012 ICES 003, VCCI V-3 GR1089 Issue:04	9 kHz to 18 GHz Electric Field (In 10 m Semi-Anechoic chamber)
		Conducted Emission Test (CE)	CISPR11:2010 BSEN 55011:2010 CISPR22:2008 BSEN 55022 :2010, FCC Part 15 IEC 60601-1-2:2007 IEC 61000-6-3:2010 IEC 61000-6-4:2010 IEC 61326-1:2012 IEC 61260-2001 IEC 60255-25:2000 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012 ICES 003, VCCI V-3	150 kHz to 30 MHz Power line: Single phase, Three Phase : 25A Signal port ISN 8 Wire-Cat 6-Gigabit Ethernet 8 Wire- Ethernet, 4 Wire- Ethernet, SDN 2 Wire- RJ 45 and RJ 11

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Electrostatic Discharge Immunity Test (ESD)	IEC 61000-4-2:2008 EN 61000-4-2:2009 BSEN 55024:2010 IEC 60601-1-2:2007 IEC 61000-6-1:2005 IEC 61000-6-2:2005 IEC 61326-1:2012 IEC 61260-2001 CISPR 24:2010 IEC 60255-22-2:2008 IEC 61496-1:2012 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012	Level: ±1kV to ± 30kV
		RF Radiated Susceptibility Test	IEC 61000-4-3:2010 EN 61000-4-3:2010 BSEN 55024:2010 IEC 60601-1-2:2007 IEC 61000-6-1:2005 IEC 61000-6-2:2005 IEC 61326-1:2012 CISPR 24:2010 IEC 60255-22-3 :2007 IEC 61496-1:2012 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012	From 80 MHz to 3 GHz , Electric Field; Level: 20 V/m 80MHz to 1GHz @3m 1GHz to 3GHz @1 m

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Electrical fast transient Immunity Test (EFT)	IEC 61000-4-4:2012 EN 61000-4-4:2012 BSEN 55024:2010 IEC 60601-1-2:2007 IEC 61000-6-1:2005 IEC 61000-6-2:2005 IEC 61326-1:2012 CISPR 24:2010 IEC 61260-2001 IEC 60255-26:2008 IEC 60255-22-4:2008 IEC 61496-1:2012 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012	Level: +/-0.5 to +/-4.4kV Single phase:16A Three Phase: 32A
2.	**IT Products/ Household/ Industrial/ Medical**	Surge Immunity Test (1.2/50µS Lightning Surge)	IEC 61000-4-5:2005 EN 61000-4-5:2006 BSEN 55024:2010 IEC 60601-1-2:2007 IEC 61000-6-1:2005 IEC 61000-6-2:2005 IEC 61326-1:2012 CISPR 24:2010 IEC 61260-2001 IEC 60255-26:2008 IEC 60255-22-5:2008 IEC 61496-1:2012 ETSI EN301 489-1:2011	Level: +/- 0.5 to+/- 6 kV Single phase:16A Three Phase: 32A

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Conducted RF Susceptibility Test	IEC 61000-4-6:2008 EN 61000-4-6:2009 BSEN 55024:2010 IEC 60601-1-2:2007 IEC 61000-6-1:2005 IEC 61000-6-2:2005 IEC 61326-1:2012 CISPR 24:2010 IEC 61260-2001 IEC 60255-26:2008 IEC 60255-22-6:2001 IEC 61496-1:2012 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012	From : 150 kHz to 80 MHz, Level : 10 V (rms)
		Magnetic field Immunity test	IEC 61000-4-8: 2009 EN 61000-4-8:2010 BSEN 55024:2010 IEC 60601-1-2:2007 IEC 61000-6-1:2005 IEC 61260-2001 IEC 61000-6-2:2005 CISPR 24:2010 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012	1 to100A/m Continuous 300 A/m to1000 A/m, 1secs to 3 secs

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		Voltage dips & interrupts Immunity Test	IEC 61000-4-11: 2004 EN 61000-4-11: 2004 BSEN 55024:2010 IEC 60601-1-2:2007 IEC 61000-6-1:2005 IEC 61000-6-2:2005 IEC 61326-1:2012 IEC 61260-2001 CISPR 24:2010 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012	Single phase: 16A Three Phase : 32A
		Harmonic Current emission	IEC 61496-1:2012 IEC 61000-3-2: 2009 EN 61000-3-2: 2009 IEC 60601-1-2:2007 IEC 61326-1:2012 IEC 61260-2001 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012	Upto 40th Harmonic
		Flicker	IEC 61000-3-3: 2008 EN 61000-3-3: 2008 IEC 60601-1-2:2007 IEC 61260-2001 IEC 61326-1:2012 ETSI EN301 489-1:2011 ETSI EN 300 386 :2012	Single phase :16A Three Phase : 32A Frequency : 50 Hz

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II. ENVIRONMENTAL TESTS				
3.	**Electrical & Electronic items**	Cold (Low Temperature)	IS 9000 part II -1977 MIL STD 810G-2008 QM333-1990 RTCA DO-160G-2010 SAE J1455-2012 JSS 55555 -2000 JSS 50101 - 1996 GR-63 :2006 ETSI-300 019 - 2 -1 :2000 ETSI-300 019 - 2 -2 :1994 ETSI-300 019 - 2 - 3 : 2003 ETSI-300 019 - 2 - 4 : 2003 IEC 60068-2-1:2007 ISO 16750-4 :2010	Ambient to -65°C to ambient Average rate of change of Temperature: 0.1 to 5°C/Minute
		Dry Heat (High Temperature)	IS 9000 Part III -1977 IEC 60068-2-2:2007 including Amend 1&2 MIL Std 810G-2008 QM333-1990 RTCA DO-160G-2010 SAE J1455-2012 JSS 55555 -2000, JSS 50101 -1996 GR-63 :2006 ETSI-300 019 - 2 - 1 : 2000 ETSI-300 019 - 2 - 2 : 1994 ETSI-300 019 - 2 - 3 : 2003 ETSI-300 019 - 2 - 4 : 2003 ISO 16750-4 :2010	Ambient to 300°C Average rate of change of Temperature: 0.1 to 5°C/Minute

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Change of Temperature	IS 9000 Part XIV -1988 IEC 60068-2-14:2009 MIL Std 810G-2008 QM333-1990 RTCA DO-160G-2010 SAE J1455-2012, GR-63 :2006 ETSI-300 019 - 2 - 1 : 2000 ETSI-300 019 - 2 - 2 :1994 ETSI-300 019 - 2 - 3 : 2003 ETSI-300 019 - 2 - 4 : 2003 ISO 16750-4 :2010	-65°C to 180°C; Average rate of change of Temperature: 0.1 to 5°C / Minute
		Temperature Shock / Rapid change of Temperature with Prescribed time of transfer	IS 9000 Part XIV- 1988 IEC 60068-2-14: 2009 MIL Std 810G-2008 RTCA DO-160G-2010 SAE J1455-2012 ISO 16750-4 :2010 JSS 55555:2000	Minimum Temperature : - 65°C, Maximum Temperature: +150°C
		Damp Heat (Steady State)	IS 9000 Part IV 2008 QM333-1990 RTCA DO-160G-2010 SAE J1455-2012 MIL STD 810G-2008 JSS 55555 -2000 JSS 50101 -1996, GR-63 :2006 ETSI-300 019 - 2 - 1 :2000 ETSI-300 019 - 2 - 2 :1994 ETSI-300 019 - 2 - 3 : 2003	Temperature range: 25°C to 85°C, Humidity range: 10% to 97% RH.

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			ETSI-300 019 - 2 - 4 : 2003 IEC 60068-2-67-1995 IEC 60068-2-78 -2012 ISO 16750-4 :2010	
		Damp Heat (Cyclic)	IS 9000 Part V, 1981 IEC 60068-2-30:2005 MIL Std 810G-2008 ASTM D2247-2011 QM333-1990 RTCA DO-160G-2010 SAE J1455-2012 JSS 55555 -2000 JSS 50101 -1996 ETSI-300 019 - 2 - 1 : 2000 ETSI-300 019 - 2 - 2 : 1994 ETSI-300 019 - 2 - 3 : 2003 ETSI-300 019 - 2 - 4 : 2003 ISO 16750-4 :2010	Temperature range: 25°C to 85°C, Humidity range: 10% to 97% RH.
		Salt Spray (Corrosion)	IEC 60068-2-11:1981 IEC 60068-2-52:1996 IS 9000 Part XI: 1983 MIL Std 810G-2008 ASTM B117-2003 SAE J1455-2012 QM333-1990 RTCA DO-160G-2010 NEMA -250 : 2008 ISO 16750-4 :2010	Temperature: Ambient to 50°C Max, Sodium Chloride Concentration: 5%

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		Composite Temperature & Humidity	IS 9000 Part VI,1978 RTCA DO-160G-2010 SAE J1455-2012 MIL Std 810G-2008 ISO 16750-4 :2010 IEC60068-38:1974	Temperature range: 25°C to 85°C, Humidity range: 10% to 97 % RH.
		Vibration	IEC 60068-2-6:2007 IS 9000 Part VIII 1981 MIL Std 810G-2008 QM333-1990 SAE J1455-2012 IEC 60255-21-1:1988 RTCA DO-160G-2010 JSS 55555 -2000 JSS 50101 -1996 GR-63 :2006 IEC 60068-2-64:2008 ETSI-300 019 - 2 -1 :2000 ETSI-300 019 - 2 -2 :1994 ETSI-300 019 - 2 - 3 : 2003 ETSI-300 019 - 2 - 4 : 2003 ISO 16750-4 :2010	Freq: 5Hz to 2 kHz Maximum Acceleration: 80 g (2000kgf) Single axes and Three axes test

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		Shock	IEC 60068-2-27:2008 IS 9000 Part VII:1988 MIL Std 810G-2008 RTCA DO-160G-2010 SAE J1455-2012 IEC60255-21-2:1988 JSS 55555 -2000 JSS 50101 -1996 ETSI-300 019 - 2 -1 :2000 ETSI-300 019 - 2 -2 :1994 ETSI-300 019 - 2 - 3 : 2003 ETSI-300 019 - 2 - 4 : 2003 IEC 60068-2-29:1987 ISO 16750-4 :2010	Acceleration – Pulse width 10g-16ms 20g-6-11 ms 30g-6ms 40g-6ms (2000 kgf max)
		Water - IP X1 to IP X6 Degree of Protection provided by enclosures	IEC 60529-2001 IEC 60068-2-18:2000	Qualitative Test
		Dust - IP 1X to IP 6X Degree of Protection provided by enclosures	IEC 60529 -2001 IEC 60068-2-68:1994	Qualitative Test
		Low Air Pressure Altitude	IS 9000 Part Xiii :1988 JSS 55555 -2000 JSS 50101 - 1996 GR-63 :2006 RTCA DO-160G-2010	Atmosphere to 100 mbar

-X-X-X-X-X-X-X-X-X-X-X-X-X-X-