ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea

Testing and Certification Laboratory

Test Report for CE

Report Number	**ESTCE1111-001**			
Applicant	Company Name	Suprema Inc.		
	Address	16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea		
Product	Product type	RealScan-G1		
	Model	RS-G1	Manufacturer	Suprema Inc.
	Serial No.	NONE	Country of origin	KOREA
Other	Receipt Date	27-Oct-11	Receipt Number	ESTC-11-01756
	Issued Date	1-Nov-11	Tested Date	2011-10-27~ 2011-10-28
Test Result	Complied			
Standard	EMI Standard		EMS Standard	
	EN 55022:2006+A1:2007 Class A EN 61000-3-2:2006+A1:2009 EN 61000-3-3:2008		EN 55024:1998 +A1:2001 +A2:2003 EN 61000-4-2:2009 EN 61000-4-3:2006+A1:2008 EN 61000-4-4:2004 EN 61000-4-5:2006 EN 61000-4-6:2009 EN 61000-4-11:2004	
Tested by	H.K.Lee / Engineer	(Signature)		
Approved by	J.M. Yang / Engineering Manager	(Signature)		

ESTECH CO., LTD.

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* Note

- This is certified that the above mentioned products have been tested for the sample provided by client.
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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and tested in accordance with the measurement procedures as indicated in this report ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.
ESTECH Lab. assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Head Office : Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, Korea (Safety & Telecom. Test Lab)

EMC Test Lab. : 58-1, Osan-Ri, GaNam-Myon, YeoJoo-Gun, KyungKi-Do, Korea

1.3 Registration Information

Our Test lab has worked test lab system by ISO/IEC 17025:2005 and was registered the follows certification body

KCC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecom.

KOLAS : Granted Accreditation from Ministry of commerce, Industry & Energy for EMC, Safety and Telecom

EK : Granted Accreditation from Ministry of commerce, Industry & Energy for Safety

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference by Information Technology Equipment

2. Description of EUT

2.1 Summary of Equipment Under Test

¨ EUT Name : RealScan-G1
¨ Model Number : RS-G1
¨ Serial Number : NONE
¨ Manufacturer : Suprema Inc.
¨ Country of origin : KOREA
¨ Power Rating : Using PC power

¨ X-tail : 24 MHz

2.2 General descriptions of EUT

Fingerprint Types	Single flats
Resolution	500 dpi
Platen Size (W x L)	1" x 1" (25.4 x 25.4mm)
Ingress Protection	IP54
Operating Temperature	0-50'C
Operating Humidity	From 10 to 90%, non-condensing
Dimension (W x L x H)	55.0 x 106.5 x 43.9 (mm)
Weight	0.18kg
Interface	USB 2.0 (data & power)
Operating Systems	XP, Vista,Windows7 - 32/64 bit
Certificate	CE, FCC, UL, KCC

3. Measurement Condition

3.1 EUT Operation.

- The EUT was in the following operation mode during all testing

1. The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission.
2. Connect the EUT to Notebook Computer usb port.
3. Install scanning program in the Notebook Computer.
4. Execute scanning mode continously and check normal operating.

3.2 Cable Connecting

Start Equipment		End Equipment		Cable		Remark
Name	**I/O port**	**Name**	**I/O port**	**Length**	**Shielded**	
RealScan-G1	USB	Notebook Computer	USB	2.0	Shielded	
Notebook Computer	Power	Adpater	-	2.0	Unshielded	

3.3 EUT Configurations

Equipment Name	Model Name	S/N	Manufacturer	Remark (CE ID)
RealScan-G1	RS-G1	NONE	Suprema Inc.	**E.U.T**
Notebook Computer	GW687AV	CNU0295RBD	HP	
Adapter	PPP009D	WBGSV0ADDZ303R	DELTA ELECTRONICS (JIANG SU). LTD.	

3.4 Performance Criteria for EUT

Criterion	Monitoring method	Remark
A	Normal performance within the specification limits.	
B	Temporary degradation or loss of function or performance which is self-recoverable.	
C	Temporary degradation or loss of function or performance which requires operator intervention or system reset.	

4. Electromagnetic Interference Test

4.1 Measurement of radiated emission

Electric Field strength was measured in accordance with EN 2006+A1:2007 Class A .The test setup was made according to EN 2006+A1:2007 Class A on an open test site, which allows a 10 m distance measurement. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

4.1.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESVS10	Rohde & Schwarz	838562/002	27-Jan-12
Spectrum Analyzer	R3273	ADVANTEST	110600592	27-Jan-12
Logbicon Antenna	VULB 9160	Schwarzbeck	3106	14-Apr-12
Amplifier	8447F	HP	2944A03711	11-Jan-12

4.1.2 Environmental conditions

Section	Temperature (°C)	Humidity (% R.H.)
Radiated emission	8	55
Test Place	Open site : 10 m	

4.1.3 Test data

Test Date 27-Oct-11

Frequency [MHz]	Reading [dBuV]	Position [V/H]	Height [m]	Correction Factor		Result Value [dBuV/m]		Margin [dB]
				Antenna [dB/m]	Cable etc. [dB]	Limit	Result	
48.02	8.87	11.68	1.0	11.68	1.76	40.0	22.31	17.69
72.00	4.46	9.49	1.0	9.49	2.14	40.0	16.09	23.91
120.21	10.81	10.89	1.0	10.89	2.70	40.0	24.40	15.60
145.41	10.21	12.54	1.0	12.54	2.95	40.0	25.70	14.30
168.28	7.33	12.16	1.0	12.16	3.18	40.0	22.67	17.33
216.02	5.52	10.72	1.0	10.72	3.56	40.0	19.79	20.21
240.01	8.63	11.42	1.0	11.42	3.90	47.0	23.95	23.05
250.01	10.35	11.57	1.0	11.57	3.90	47.0	25.82	21.18
360.02	6.64	15.38	3.3	15.38	4.70	47.0	26.72	20.28
375.00	8.73	15.48	3.2	15.48	4.78	47.0	28.98	18.02
457.85	13.86	17.88	2.8	17.88	5.09	47.0	36.83	10.17
480.00	14.52	18.07	2.4	18.07	5.10	47.0	37.69	9.31
840.00	0.77	24.31	1.4	24.31	7.00	47.0	32.08	14.92
Remark	*Result Value=Reading+Correction Factor *Correction Factor=Antenna factor+Cable loss *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120KHz for Quasi-peak detection at frequency below 1GHz.							

◆ Setup for Radiated Test

[Front]

[Rear]

4.2 Conducted emission test

The continuous disturbance voltage of AC Mains was measured in accordance to EN 55022:2006+A1:2007 Class A. The test setup was made according to EN 55022:2006+A1:2007 Class A in a shielded Room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plane. A grounded vertical reference plane was positioned in a distance of 0.8 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m.

4.2.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESHS	Rohde & Schwarz	828765/002	17-Dec-11
LISN	ESH2-Z5	POLARAD	872461/048	11-Jan-12
Pulse Limiter	ESH3-Z2	Rohde & Schwarz	NONE	21-Mar-12

4.2.2 Environmental conditions

Section	Temperature (°C)	Humidity (% R.H.)
Conducted emission	23	49
Test Place	shielded Room	

4.2.3 Test data

Test Date 27-Oct-11

Frequency (MHz)	Correction Factor (dB)		Line (H/N)	Quasi-peak Value (dBuV)			Average Value (dBuV)		
	LISN	Cable etc.		Limit	Reading	Result	Limit	Reading	Result
0.15	0.10	0.35	H	66.0	55.37	55.82	56.0	44.96	45.41
0.23	0.10	0.36	H	62.4	48.79	49.25	52.4		
0.30	0.10	0.36	H	60.2	42.92	43.38	50.2		
0.31	0.17	0.36	N	60.0	41.17	41.70	50.0		
0.39	0.11	0.36	H	58.1	34.63	35.10	48.1		
0.46	0.12	0.37	H	56.7	36.52	37.00	46.7		
0.61	0.12	0.37	H	56.0	38.87	39.36	46.0		
1.32	0.15	0.46	H	56.0	38.80	39.41	46.0		
1.39	0.15	0.46	H	56.0	37.44	38.05	46.0		
1.78	0.16	0.45	H	56.0	39.36	39.97	46.0		
2.09	0.17	0.44	H	56.0	37.82	38.43	46.0		
11.72	0.35	0.53	H	60.0	38.11	38.99	50.0		
Remark	H : Hot Line, N : Neutral Line Correction factor=LISN factor + Cable loss Result = Correction factor + Reading								

4.2.4 Spectral Diagram

◆ Hot Line

ES TECH
HOT LINE

27 Oct 2011 13:57

EUT:	RS-G1
Manuf:	Suprema Inc.
Op Cond:	230 V
Operator:	H.K LEE
Test Spec:	CLASS A
Comment:	

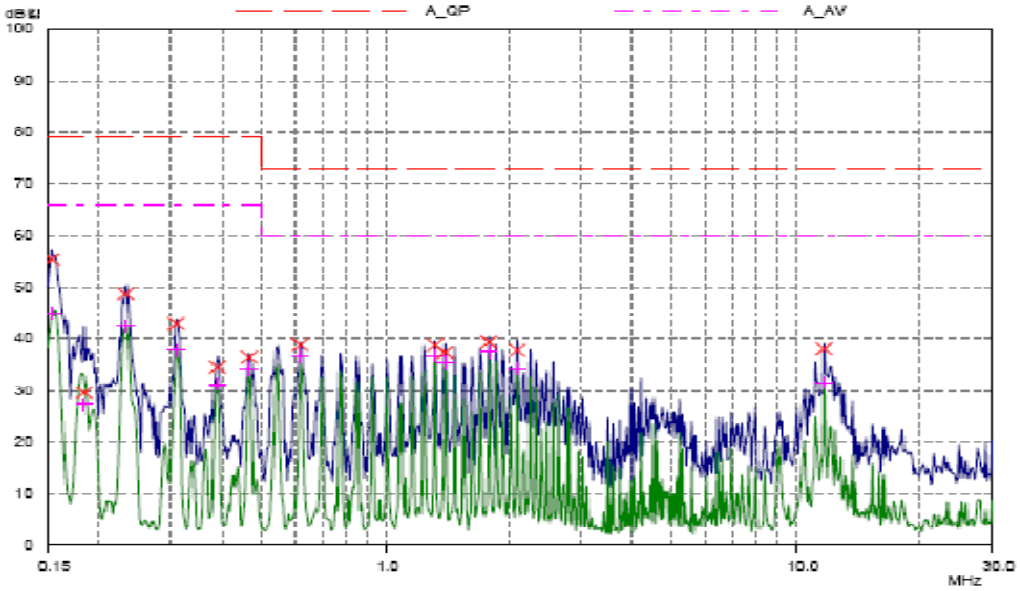
Result File: 111101_h.dat : ESTCE1111-001

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec	Auto	OFF	60dB

Final Measurement:

Detectors:	X QP / + AV
Meas Time:	1sec
Subranges:	25
Acc Margin:	0 dB



◆ - Neutral Line

ES TECH

27 Oct 2011 14:14

NEUTRAL LINE

EUT:	RS-G1
Manuf:	Suprema Inc.
Op Cond:	230 V
Operator:	H.K.LEE
Test Spec:	CLASS A
Comment:	

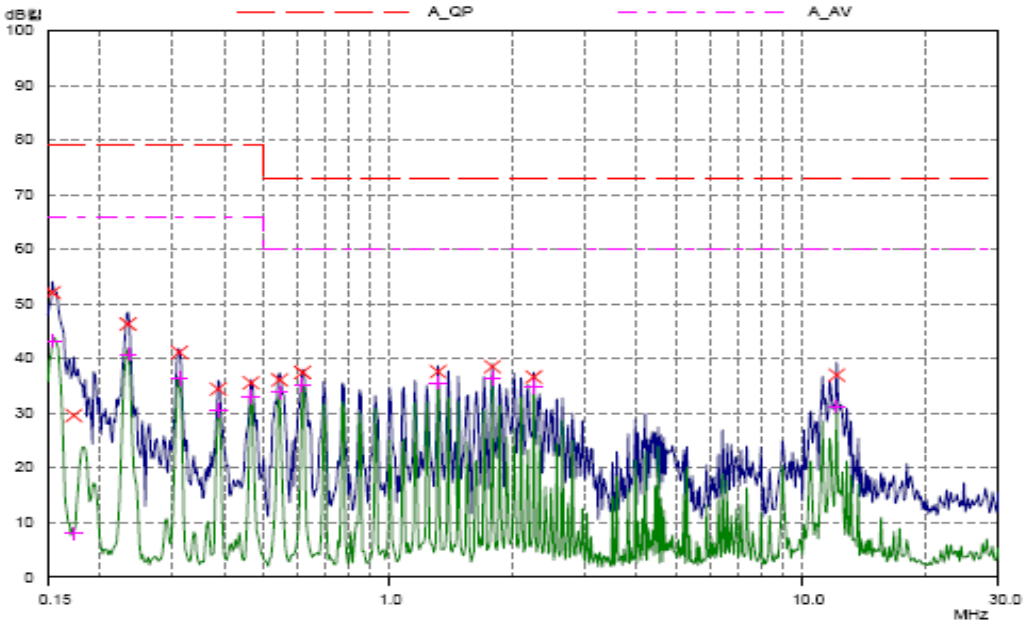
Result File: 111101_n.dat : ESTCE1111-001

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec	Auto	OFF	60dB

Final Measurement:

Detectors:	X QP / + AV
Meas Time:	1sec
Subranges:	25
Acc Margin:	0 dB



◆ Setup for Conducted Test : 0.15 MHz ~ 30 MHz

[Front]

[Rear]

5. Electromagnetic Susceptibility Test

5.1 Electrostatic Discharge test

5.1.1 Test Standard

- Standard : EN 61000-4-2:2009
- Performance appraisal standard : B
- Energy storage capacitance : 150 pF (± 10 %)
- Discharge resistance : 330 ohm (± 10 %)
- Charging resistance : 50 Mohm (50 Mohm ~ 100 Mohm)
- Tolerance of the output voltage indication : ± 5 %
- Polarity of the output voltage : Positive(+) and Negative(-)
- Holding time : at least 5 s
- Discharge, Mode of operation : Single discharge
- Interval discharge time : At least 1s
- Repetition time : At least 200 discharges. 100 each at negative and positive polarity of four test points (a minimum of 50 discharges of each point)

  · At least 50 indirect discharge(contact) to the center of the front edge of the horizontal coupling plane

  · At least 200 indirect discharges shall be applied in the indirect mode use of the vertical conducting plane.

5.1.2 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
ESD Generator	NSG 438	SCHAFFNER	601	16-Jun-12

5.1.3 Environmental Conditions

Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
25	49	99.8

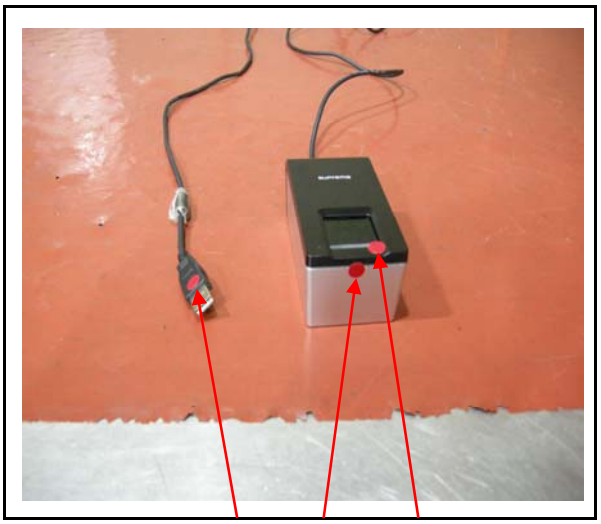
5.1.4 Test data

Test Date 27-Oct-11

Point	Test Method	Test Voltage (+/-)	Criterion	Result	Remark
HCP	Horizontal Coupling	(2,4)kV	B	A	
VCP	Vertical Coupling	(2,4)kV	B	A	
1	Air discharge	(2,4,8)kV	B	A	
2	Air discharge	(2,4,8)kV	B	A	
3	Air discharge	(2,4,8)kV	B	A	
4	Air discharge	(2,4,8)kV	B	A	
5	Air discharge	(2,4,8)kV	B	A	
6	Air discharge	(2,4,8)kV	B	A	
Reference					

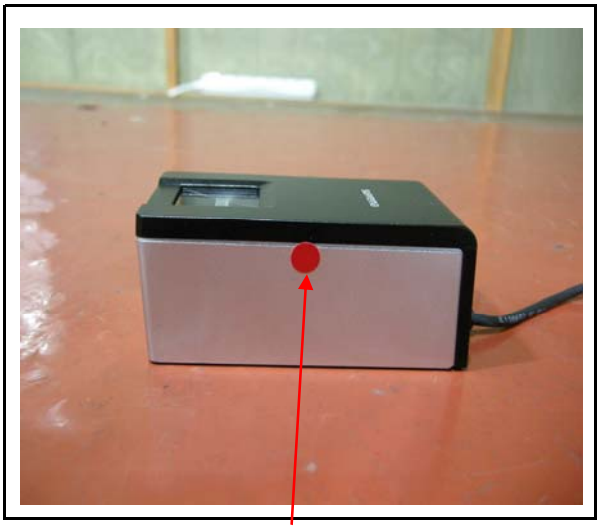
◆ Setup Figure

◆ Test Point



1 2 3

4



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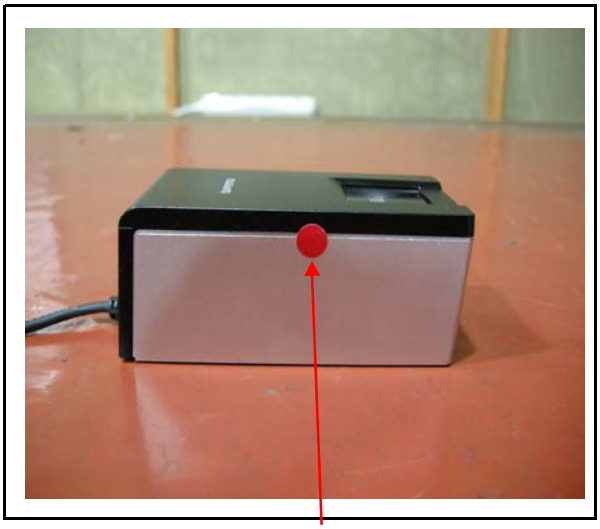

6

1. The Front USB port part
2. The Front cover part
3. The Front fingerprint readers part
4. The Rear cable part
5. The Left cover part
6. The Right cover part

HCP: Indirect Discharge

VCP : Indirect Discharge

5.2 Radiated Electromagnetic Fields test

5.2.1 Test Standard

- Standard : EN 61000-4-3:2006+A1:2008
- Criterion standard : A
- Frequency Range : 80 MHz ~ 1000 MHz
- Test Angle : 0°, 90°, 180°, 270°
- Sweep Capability : 1.5×10^{-3} decade/s
- Step Size : 1 % of Fundamental
- Antenna Polarity : Horizontally/Vertically
- Measurement Distance : 3 m
- Modulation : AM 80 % with 1 kHz sine wave
- Dwell time : 3 s
- Field Strength:3 V/m

5.2.2 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Hybrid Log Periodic Antenna	LPDA-0803	TDK	130243	N/A
Amplifier	250W1000AM1	Amplifier Research	311841	27-Jan-12
Signal Generator	8648C	HP	3623A03549	27-Jan-12
Power Sensor	URV5-Z2	Rohde & Schwarz	100592	27-Jan-12
Power Meter	NRVD	Rohde & Schwarz	DE25524	27-Jan-12
System Interface	SI-300-2	TDK	41610	N/A

5.2.3 Environmental Conditions

Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
24	50	99.9

5.2.4 Test data

Test Date : 27-Oct-11

Range of Frequency (MHz)	Position	Polarity	Electromagnetic Intensity (V/m)	Criterion	Result
80MHz ~ 1 GHz	Front side	H	3	A	A
		V	3	A	A
	Right side	H	3	A	A
		V	3	A	A
	Left side	H	3	A	A
		V	3	A	A
	Rear side	H	3	A	A
		V	3	A	A
Reference		H : Horizontality, V : Verticality			

◆ Setup Figure

5.3 Electrical Fast Transients/Burst test

5.3.1 Test Standard

- Standard : EN 61000-4-4:2004
- Performance appraisal standard : B
- Test voltage : AC power : ± 1 kV , other port : ± 0.5 kV
- Polarity : Positive(+), Negative(-)
- Repetition Frequency : 5 kHz
- Duration Time : 60 s

5.3.2 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Compact Test System	ECOMPACT 4	Haefely Test AG.Basel	153528	21-Mar-12

5.3.3 Environmental Conditions

Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
24	49	100.1

5.3.4 Test data

Test Date : 28-Oct-11

Tested Point		Test Voltage	Duration Time (s)	Criterion	Result	Remark
Input AC	L1	± 1 kV	60 s	B	A	
	L2	± 1 kV	60 s	B	A	
	PE	± 1 kV	60 s	B	A	
	L1+L2	± 1 kV	60 s	B	A	
	L1+PE	± 1 kV	60 s	B	A	
	L2+PE	± 1 kV	60 s	B	A	
	L1 + L2+PE	± 1 kV	60 s	B	A	
Reference	L1: Line, L2: Neutral, PE: Protective earth (Ground)					

◆ Setup Figure

5.4 Surge Test

5.4.1 Test Standard

- Standard : EN 61000-4-5:2006
- Performance appraisal standard : B
- Test voltage AC : line-earth : ± 2 kV, line-line : ±1 kV,
  Telecom. & signal : Line-earth : ± 1 kV, DC port :± 0.5 kV
- Polarity : Positive(+), Negative(-)
- Repetition rate:max 1 / min.
- Number of tests:at least five positive and five negative at the selected points.
- Phase shifting:in a range between 0 to 360 versus the a.c. line phase angle.

5.4.2 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Compact Test System	ECOMPACT 4	Haefely Test AG.Basel	153528	21-Mar-12

5.4.3 Environmental Conditions

Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
23	50	99.9

5.4.4 Test data

Test Date : 28-Oct-11

Tested Point		Test Voltage	Criterion	Result	Remark
Input AC	L1 - L2	± 1 kV	B	A	
	L1 - PE	± 2 kV	B	A	
	L2 - PE	± 2 kV	B	A	
Reference		L1: Line, L2: Neutral, PE: Protective earth (Ground)			

◆ Setup Figure

5.5 Conducted Disturbance test

5.5.1 Test Standard

- Standard :EN 61000-4-6:2009
- Performance appraisal standard : A
- Frequency Range : 0.15 MHz ~ 80 MHz
- Field Strength : 3.0 V
- Modulation : AM 80 % with 1 kHz sine wave
- Dwell time : 3 s
- Sweep Capability : 1.5 ×10-3 decade/s
- Step Size : 1 % of Fundamental

5.5.2 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
CDN	FCC-801-M3-32A	FCC	99128	21-Mar-12
Continuous Wave Simulator	CWS 500C	EM TEST	1101-07	27-Jan-12
Attenuator	ATT6/75	EM TEST	1001-43	21-Mar-12

5.5.3 Environmental Conditions

Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
23	48	100

5.5.4 Test data

Test Date : 28-Oct-11

Freq [MHz]	Level [V]	Tested point	Criterion	Result	Remark
0.15~80	3	Mains(M3)	A	A	
Reference					

◆ Setup Figure

5.6 Voltage Dips and Interruptions test

5.6.1 Test Standard

- Standard : EN 61000-4-11:2004
- Performance appraisal standard and Voltage Reduction

  >95 % 250 cycles : C , >95 % 0.5c ycles : B, 30 % 25 cycles : C
- Number of pulses : 3 at each level
- Recovery time between pulses : 10 s
- Additional angles : 45°,90°,135°,180°,225°,270°,315°
- We tested both lower voltage (100 Va.c.) and higher voltage (240 Va.c.).

5.6.2 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Test system	PHF555	HAEFFLY	08419-11	29-Nov-11
Harmonics & Flicker Analyzer	DPA 500N	EM TEST AG	V1033107193	27-Sep-12

5.6.3 Environmental Conditions

Temperature (°C)	Humidity (% R.H.)	Pressure (kPa)
24	50	100

5.6.4 Test data

Test Date : 28-Oct-11

Voltage Reduction	Duration Cycles	criteria	Result	Remark
> 95 %	0.5	B	A	
30%	(25/30)	C	A	
> 95 %	(250/300)	C	A	
Reference	We tested both lower voltage (100 Va.c.) and higher voltage (240 Va.c.).			

◆ Setup Figure

6. EUT Photographs

EUT

[Front]

[Rear]

[Inside]