CE TEST REPORT

of

EN55022 / CISPR 22 / AS/NZS CISPR 22
Class B
EN55024 / CISPR 24 / IMMUNITY
EN61000-3-2 / EN61000-3-3

Product : **1.8" SATA SSD**

Model(s): **SFD18H/-M**

Brand: **Apacer**

Applicant: **Apacer Technology Inc.**

Address: **1F., No.32, Zhongcheng Rd., Tucheng Dist., New Taipei City 236, Taiwan, R.O.C.**

Test Performed by:

International Standards Laboratory

<Lung-Tan LAB>
*Site Registration No.
BSMI: SL2-IN-E-0013; SL2-R1/R2-E-0013; TAF: 0997
FCC: TW1036; IC: IC4067B-1; NEMKO: ELA 113B
VCCI: <Conduction 02>C-1440, T-1676, <Conduction 03>C-2845, T-1464, <Chamber 02>R-1435, G-17, <Chamber 12>R-2598,G-16, <Chamber 14>G-211,
*Address:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
*Tel: 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-14LE379CE**

Issue Date : **September 11, 2014**

This report totally contains 49 pages including this cover page and contents page.

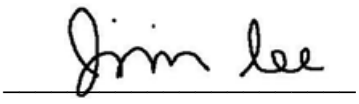
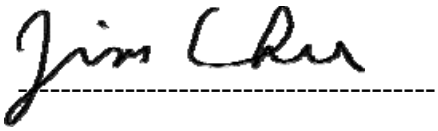
Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

Contents of Report

Contents of Report

1. General

1.1 Certification of Accuracy of Test Data

Standards:	Please refer to 1.2
Equipment Tested:	1.8" SATA SSD
Model:	SFD18H/-M
Brand:	Apacer
Applicant:	Apacer Technology Inc.
Sample received Date:	August 4, 2014
Final test Date:	EMI: refer to the date of test data
	EMS: August 8, 2014
Test Site:	International Standards Laboratory
	Chamber 02; Chamber 14; Conduction 02; Immunity 02
Test Distance:	10M; 3M (above1GHz) (EMI test)
Temperature:	refer to each site test data
Humidity:	refer to each site test data
Input power:	Conduction input power: AC 230 V / 50 Hz
	Radiation input power: AC 230 V / 50 Hz
	Immunity input power: AC 230 V / 50 Hz
Test Result:	**PASS**
Report Engineer:	Elly Duan
Test Engineer:	
	Jiin Lee
Approved By:	
	Jim Chu / Director

1.2 Test Standards

The tests which this report describes were conducted by an independent electromagnetic compatibility consultant, International Standards Laboratory in accordance with the following

EN 55022:2010+AC:2011, CISPR 22:2008 (modified) and AS/NZS CISPR 22: 2009+A1:2010: Class B: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment.

EN 55024:2010 and CISPR 24:2010: Information technology equipment-Immunity characteristics - Limits and methods of measurement.

Standard	Description	Results	Criteria
EN 61000-4-2:2009 IEC 61000-4-2:2008	Electrostatic Discharge	Pass	B
EN 61000-4-3:2006+A1:2008 +A2:2010 IEC 61000-4-3:2006+A1:2007+A2:2010	Radio-Frequency, Electromagnetic Field	Pass	A
EN 61000-4-4: 2004 +A1:2010 IEC 61000-4-4: 2004 +A1:2010	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5: 2006 IEC 61000-4-5: 2005	Surge	Pass	B
EN 61000-4-6:2009 IEC 61000-4-6:2008	Conductive Disturbance	Pass	A
EN 61000-4-8:2010 IEC 61000-4-8:2009	Power Frequency Magnetic Field	Pass	A
EN 61000-4-11: 2004 IEC 61000-4-11: 2004	Voltage Dips / Short Interruption and Voltage Variation		
	>95% in 0.5 period	Pass	B
	30% in 25 period	Pass	C
	>95% in 250 period	Pass	C

Standard	Description	Results
EN 61000-3-2: 2006 +A1:2009 +A2:2009 IEC 61000-3-2: 2005 +A1:2008 +A2:2009	Limits for harmonics current emissions	Pass
EN 61000-3-3: 2013 IEC 61000-3-3: 2013	Limits for voltage fluctuations and flicker in low-voltage supply systems.	Pass

1.2.1 Performance Criteria for Compliance: EN 55024

Performance criterion A
During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.

Performance criterion B
After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.

Performance criterion C
During and after testing, a temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions.
Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

1.3 Description of EUT

EUT

Description: 1.8" SATA SSD
Condition: Pre-Production
Model: SFD18H/-M
Memory Capacity: 1GB~512GB
Serial Number: N/A
Control IC: SRP39CB0; SRP39EB0
PCBA Number: FSB0CG140DL2-MN
Highest working frequency: 6GHz
The radiation test should be tested till 6GHz

The memory capacities listed below are chosen by the applicant to be the representative configuration for testing in this report.

For EMI&EMS test configurations:

Configuration	Control IC	Memory Capacity
1	SRP39CB0	512GB

Model Difference:

Model	Memory Capacity	Control IC	Market
SFD18H/-M	1GB~512GB	SRP39CB0; SRP39EB0	For different customer

EMI Noise Source:

Refer to the photo	Crystal	Point
EUT-9	In Control IC	U1

EMI Noise Source:
N/A

1.4 Description of Support Equipment

For EMI Support unit: 1~6
For EMS Support unit 1、4~5、7~9

No	Unit	Model / Serial No.	Brand	Power Cord	FCC ID
1	Personal Computer	WLIH77G12B7 S/N: N/A	LEMEL	Non-shielded	FCC DOC
2	PS/2 Keyboard	SK-8110 S/N: N/A	DELL	N/A	FCC DOC
3	USB Mouse	MO56U0 S/N: NA	DELL	Non-shielded	FCC DOC
4	HP Printer	C930 S/N: N/A	HP	Non-shielded	FCC DOC
5	Aceex Modem	DM1414 S/N: N/A	Aceex	Non-shielded	FCC DOC
6	24” LCD Monitor	ST 2420Lb S/N: NA	DELL	Non-shielded	FCC DOC
7	24” LCD Monitor	U2410F S/N: N/A	DELL	Non-shielded	FCC DOC
8	USB Mouse	MOCZUL S/N: NA	DELL	Non-shielded	FCC DOC
9	PS/2 Keyboard	Y-S0002 S/N: N/A	Logitch	N/A	FCC DOC

1.5 Software for Controlling Support Unit

Test programs exercising various part of EUT were used. The programs were executed as follows:

For EMI & EMS test configuration:

1. PC running Winthrax to read and write the EUT.
2. Send signal to the Printer through PC Parallel Port.
3. Send signal to the Modem through PC Serial Port.
4. Send H pattern to the 24" LCD Monitor through PC D-SUB Port.
5. Repeat the above steps.

	Filename	Issued Date
EUT	Winthrax	06/04/2005
Printer	IntelEMC.exe	04/11/2007
Modem	IntelEMC.exe	04/11/2007
Monitor	IntelEMC.exe	04/11/2007

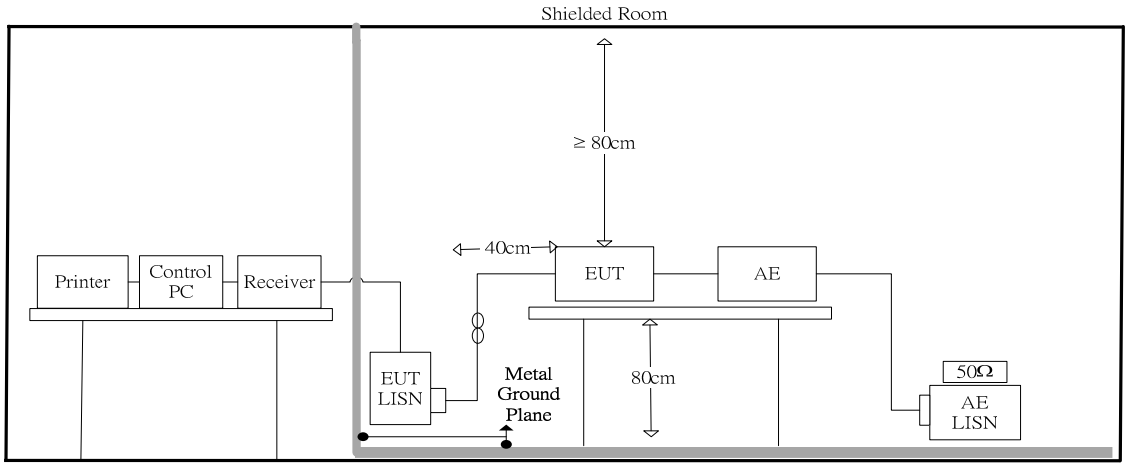
1.6 I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type
AC Power Cable	110V (~240V) to PC SPS	1.8m	Non-shielded
PS/2 Keyboard Data Cable	PS/2 Keyboard to PC PS/2 Keyboard Port	1.8m	Shielded
USB Mouse Data Cable	USB Mouse to PC USB 2.0 Port	1.8m	Shielded
Printer Data Cable	Printer to PC Parallel Port	1.8m	Shielded
Modem Data Cable	Modem to PC Serial Port	1.8m	Shielded
Monitor Data Cable	Monitor D-SUB Port to PC D-SUB Port	1.8m	Shielded (with core)

2. Power Main Port Conducted Emissions

2.1 Test Setup and Procedure

2.1.1 Test Setup



2.1.2 Test Procedure

The measurements are performed in a 3.5m x 3.4m x 2.5m shielded room, which referred as Conduction 01 test site, or a 3m x 3m x 2.3m test site, which referred as Conduction 02 test site. The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

The interconnecting cables were arranged and moved to get the maximum measurement. Both the line of power cord, hot and neutral, were measured. All of the interface cables were manipulated according to EN 55022 requirements.

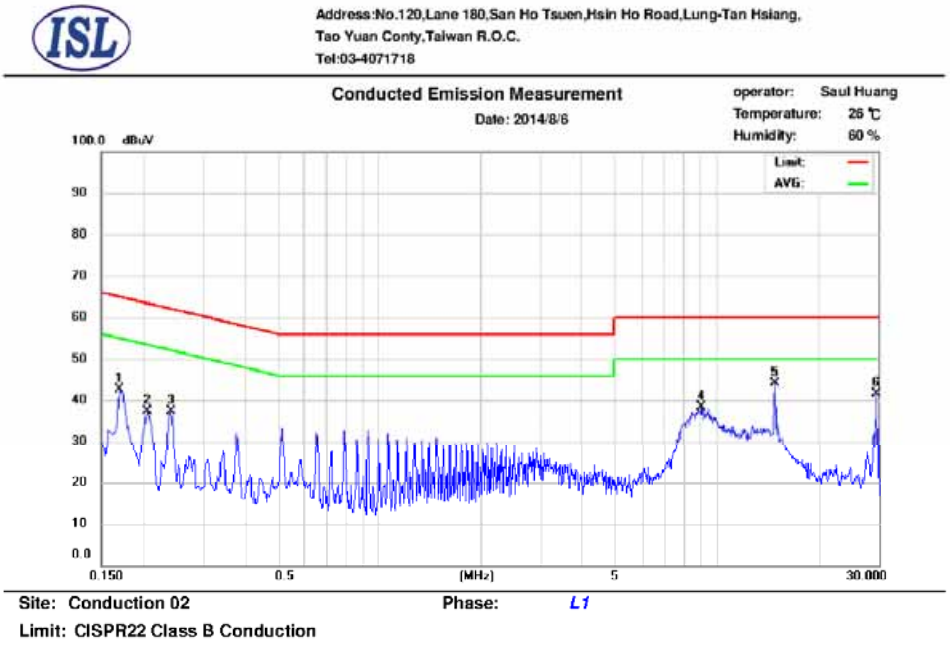
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

2.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	150KHz--30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9KHz

2.2 Conduction Test Data: Configuration 1

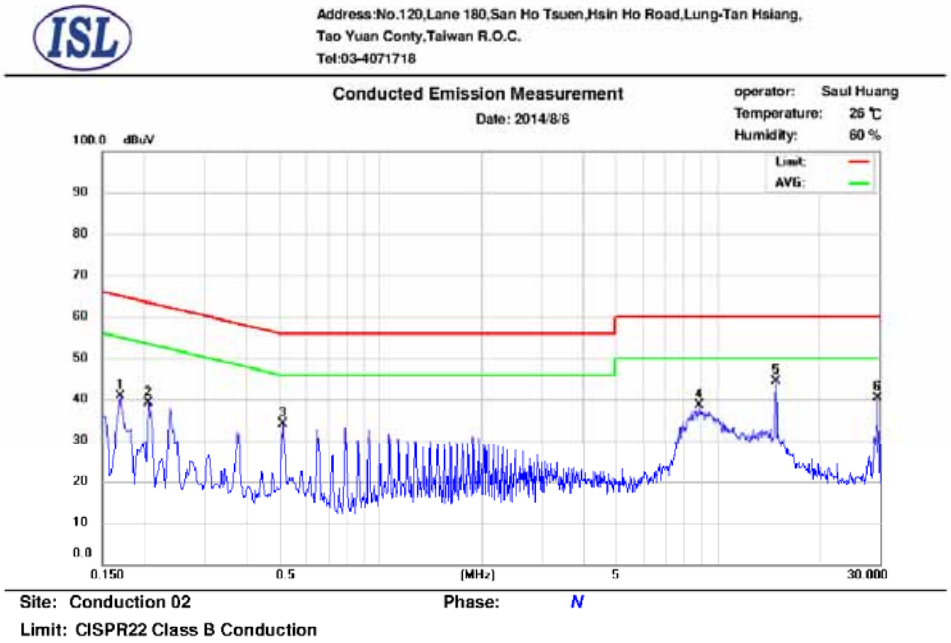
Table 2.2.1 Power Line Conducted Emissions (Line)



No.	Frequency (MHz)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)	Note
1	0.170	9.66	40.96	64.96	-24.00	36.20	54.96	-18.76	
2	0.206	9.65	37.66	63.37	-25.71	26.93	53.37	-26.44	
3	0.242	9.66	36.09	62.03	-25.94	32.05	52.03	-19.98	
4	9.046	9.88	33.22	60.00	-26.78	25.76	50.00	-24.24	
5	14.854	9.96	39.92	60.00	-20.08	37.59	50.00	-12.41	
6	29.702	9.92	38.91	60.00	-21.09	36.10	50.00	-13.90	

Note:
Margin = QP/AVG Emission - Limit
QP/AVG Emission = Receiver Reading + Correct Factor
Correct Factor = LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

Table 2.2.2 Power Line Conducted Emissions (Neutral)



No.	Frequency (MHz)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)	Note
1	0.170	9.64	40.38	64.96	-24.58	33.20	54.96	-21.76	
2	0.206	9.64	37.30	63.37	-26.07	25.63	53.37	-27.74	
3	0.514	9.67	32.96	56.00	-23.04	32.13	46.00	-13.87	
4	8.838	9.87	32.65	60.00	-27.35	24.78	50.00	-25.22	
5	14.850	9.85	42.92	60.00	-17.08	40.62	50.00	-9.38	
6	29.702	9.95	38.72	60.00	-21.28	35.93	50.00	-14.07	

Note:
Margin = QP/AVG Emission - Limit
QP/AVG Emission = Receiver Reading + Correct Factor
Correct Factor = LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

2.3 Test Setup Photo

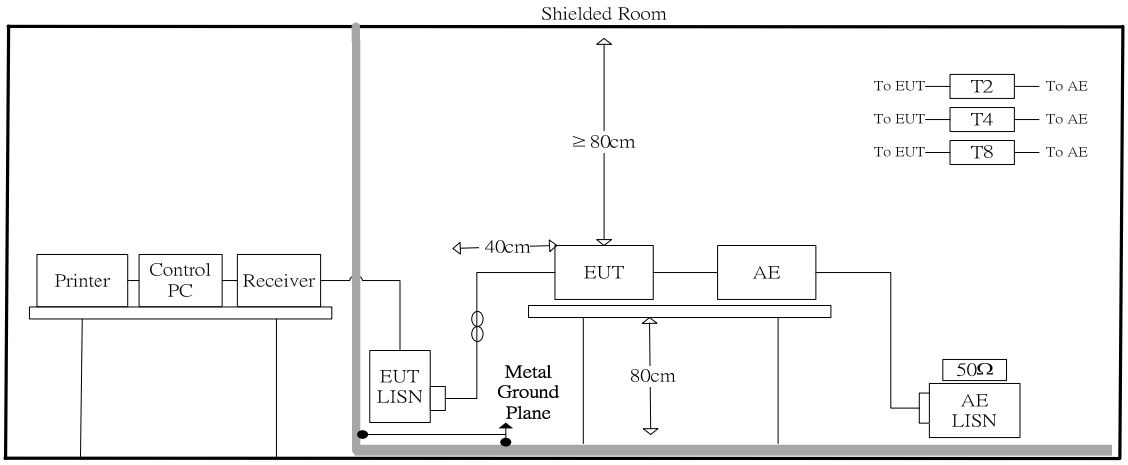
Front View

Back View

3. Telecommunication Port Conducted Emissions

3.1 Test Setup and Procedure

3.1.1 Test Setup



3.1.2 Test Procedure

The measurements are performed in a 3.5m x 3.4m x 2.5m shielded room, which referred as Conduction 01 test site, or a 3m x 3m x 2.3m test site, which referred as Conduction 02 test site. The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

The EUT, any support equipment, and any interconnecting cables were arranged and moved to get the maximum measurement. All of the interface cables were manipulated according to EN 55022 requirements.

The port of the EUT was connected to the support equipment through the ISN and linked in normal condition.

AC input power for the EUT & the support equipment power outlets were obtained from the same filtered source that provided input power to the LISN.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information could be useful in reducing their amplitude.

3.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

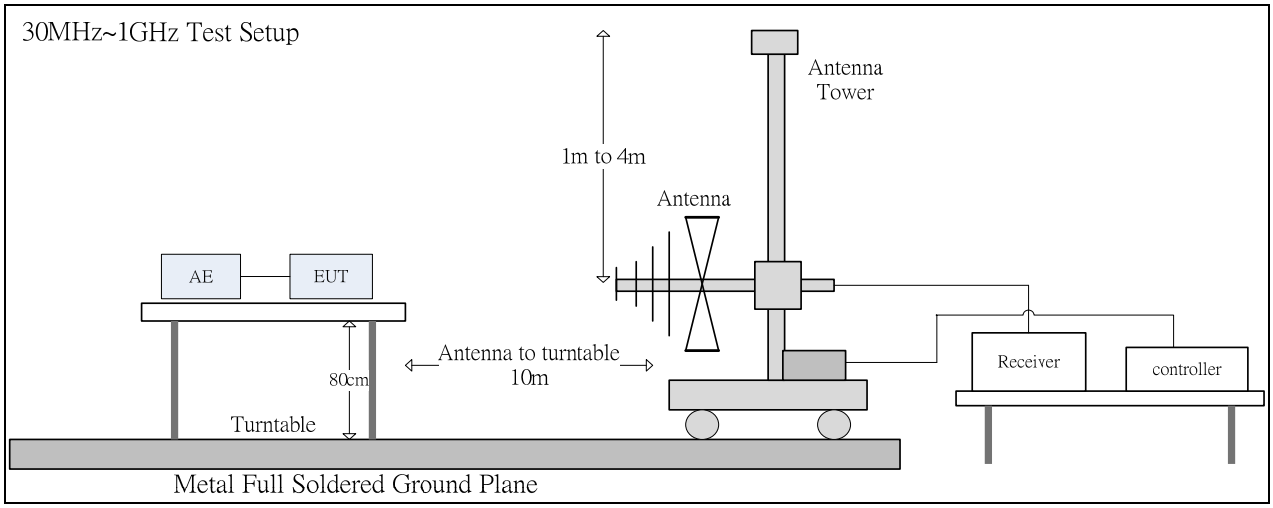
Frequency Range:	150KHz--30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9KHz

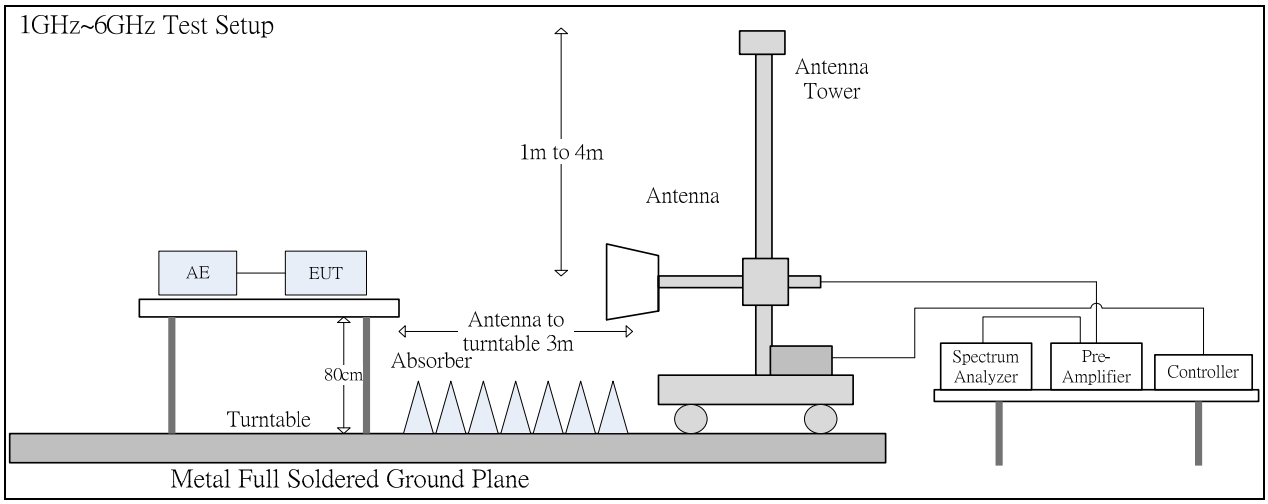
****Remarks: It is not necessary to be tested on this item.**

4. Radiated Disturbance Emissions

4.1 Test Setup and Procedure

4.1.1 Test Setup





4.1.2 Test Procedure

The radiated emissions test will then be repeated on the open site or chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipment are set up on the turntable of one of 10 meter open field sites or 10 meter chamber. Desktop EUT are set up on a wooden stand 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference plane. The test volume for a height of up to 30 cm may be obstructed by absorber placed on the ground plane.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. The highest emissions between 30 MHz to 1000 MHz were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions. The highest emissions between 1 GHz to 6 GHz were analyzed in details by operating the spectrum analyzer in peak and average mode to determine the precise amplitude of the emissions.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum measurement. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings. All of the interface cables were manipulated according to EN 55022 requirements.

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

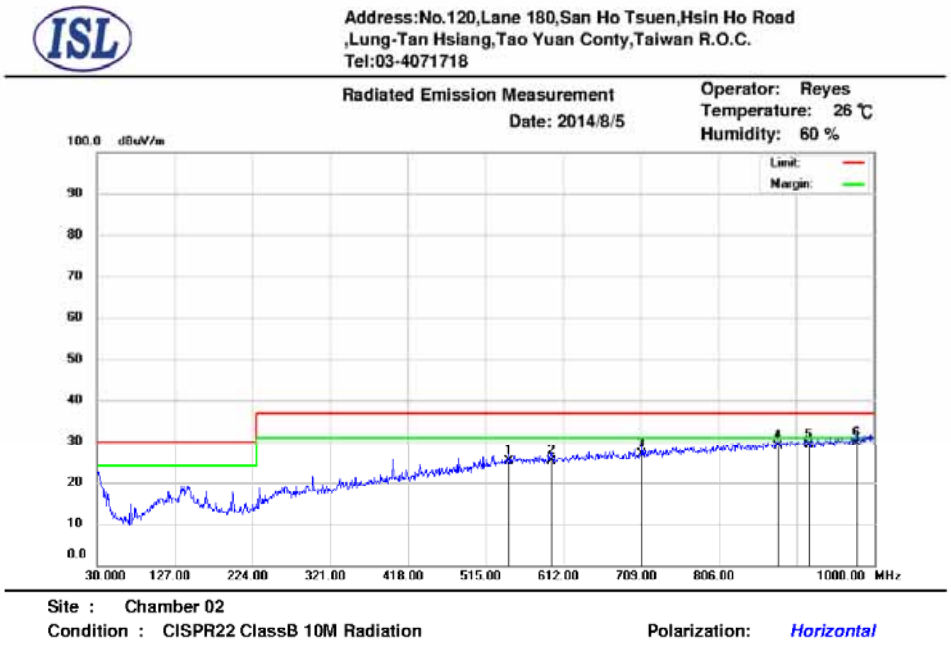
4.1.3 Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	30MHz--1000MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz

Frequency Range:	Above 1 GHz to 6 GHz
Detector Function:	Peak/Average Mode
Resolution Bandwidth:	1MHz

4.2 Radiation Test Data: Configuration 1

Table 4.2.1 Radiated Emissions (Horizontal)

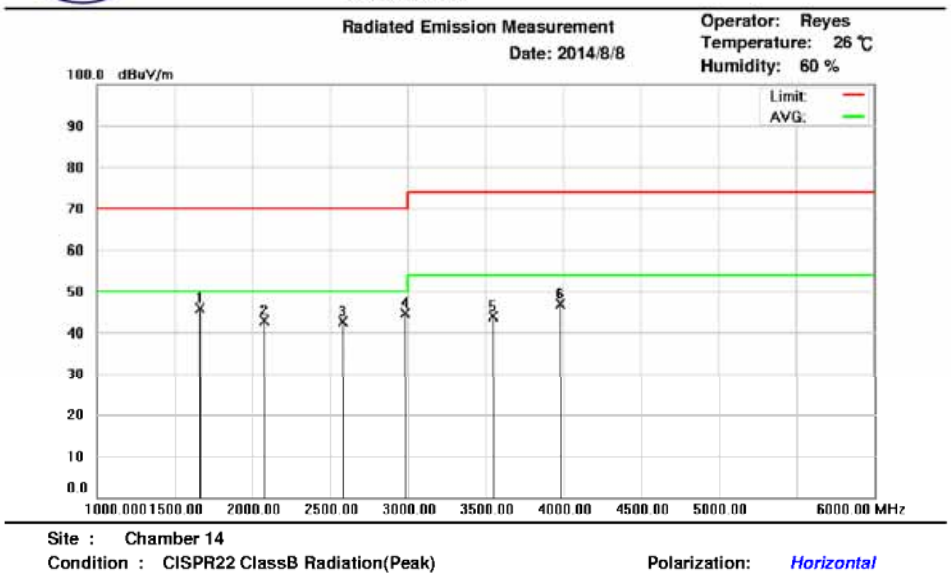


Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	544.10	1.84	23.20	25.04	37.00	-11.96	145	218	QP
2	597.45	2.01	23.19	25.20	37.00	-11.80	100	89	QP
3	709.97	2.60	24.20	26.80	37.00	-10.20	142	167	QP
4	880.69	2.14	26.74	28.88	37.00	-8.12	100	210	QP
5	918.52	1.95	27.18	29.13	37.00	-7.87	100	36	QP
6	978.66	1.65	27.96	29.61	37.00	-7.39	100	196	QP

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meters

Below 1GHz test, if the peak measured value meets the QP limit, it is unnecessary to perform the QP measurement.

Address:No.120,Lane 180,San Ho Tsuen,Hsin Ho Road
,Lung-Tan Hsiang,Tao Yuan Conty,Taiwan R.O.C.
Tel:03-4071718

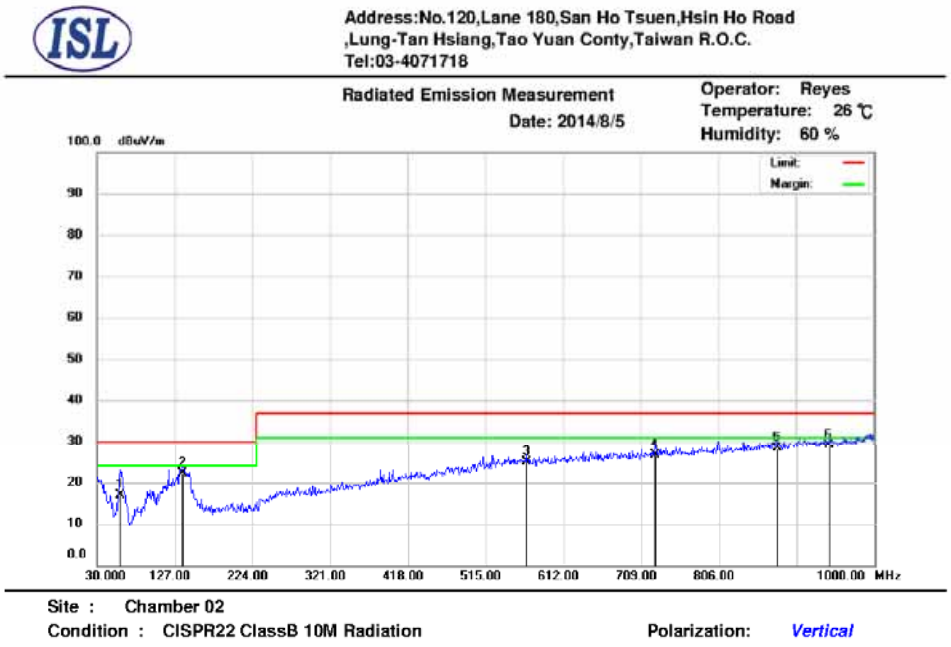


Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	1665.00	60.79	-15.01	45.78	70.00	-24.22	104	213	peak
2	2075.00	55.18	-12.29	42.89	70.00	-27.11	100	106	peak
3	2585.00	54.05	-11.30	42.75	70.00	-27.25	269	164	peak
4	2985.00	55.12	-10.38	44.74	70.00	-25.26	315	184	peak
5	3550.00	54.04	-10.19	43.85	74.00	-30.15	100	319	peak
6	3985.00	56.51	-9.60	46.91	74.00	-27.09	293	270	peak

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Horn Antenna Distance: 3 meters

Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

Table 4.2.2 Radiated Emissions (Vertical)

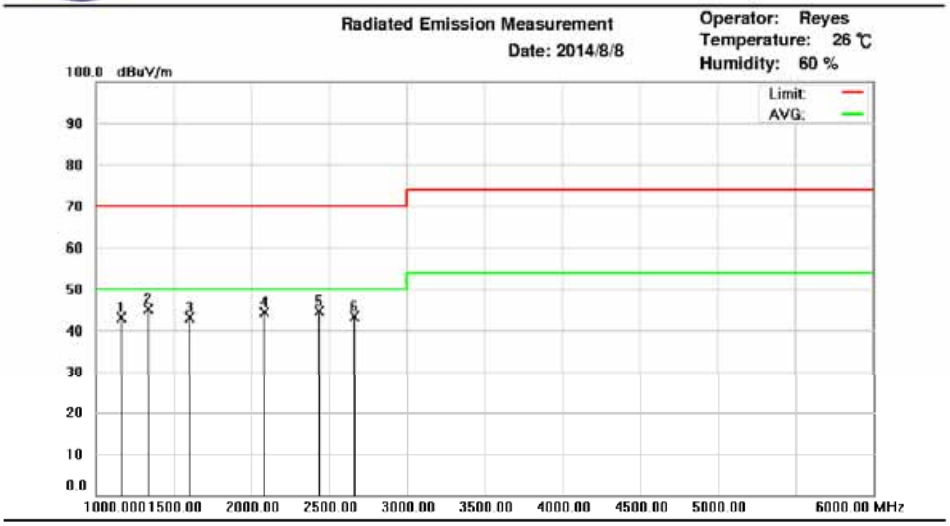


Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	59.10	8.65	8.27	16.92	30.00	-13.08	100	353	QP
2	136.70	8.54	13.51	22.05	30.00	-7.95	100	245	QP
3	565.44	1.65	23.33	24.98	37.00	-12.02	145	16	QP
4	726.46	2.11	24.60	26.71	37.00	-10.29	178	37	QP
5	878.75	1.67	26.71	28.38	37.00	-8.62	198	66	QP
6	943.74	1.54	27.47	29.01	37.00	-7.99	188	37	QP

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meters

Below 1GHz test, if the peak measured value meets the QP limit, it is unnecessary to perform the QP measurement.

Address:No.120,Lane 180,San Ho Tsuen,Hsin Ho Road
,Lung-Tan Hsiang,Tao Yuan Conty,Taiwan R.O.C.
Tel:03-4071718



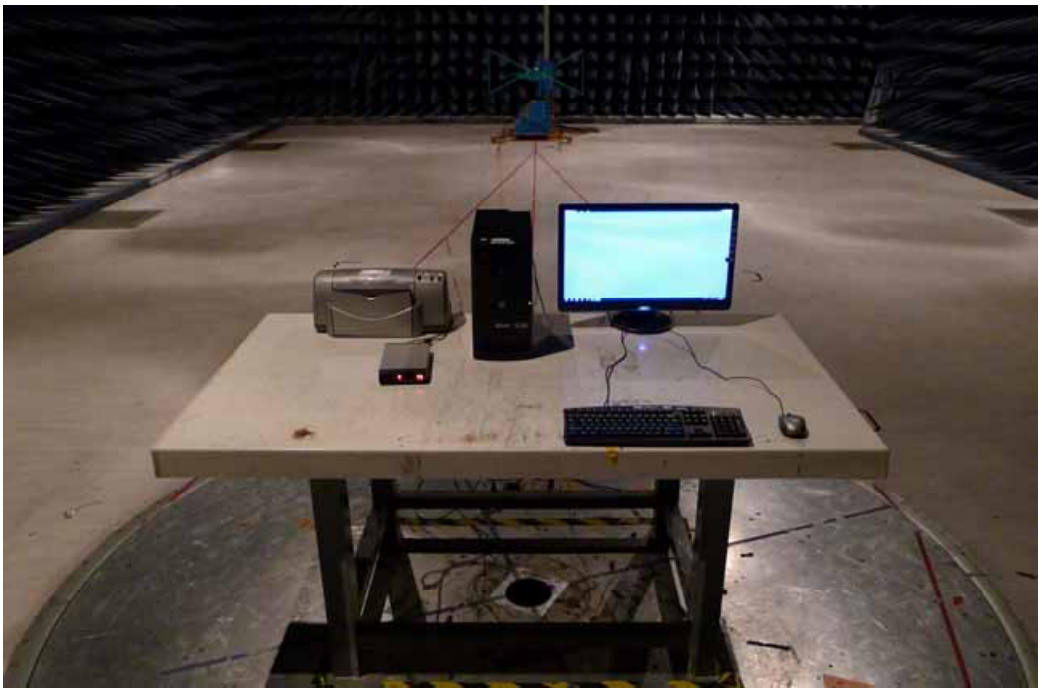
Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	1165.00	59.58	-16.51	43.07	70.00	-26.93	376	318	peak
2	1335.00	61.57	-16.40	45.17	70.00	-24.83	174	282	peak
3	1605.00	58.58	-15.48	43.10	70.00	-26.90	155	15	peak
4	2080.00	56.58	-12.28	44.30	70.00	-25.70	100	69	peak
5	2435.00	56.34	-11.61	44.73	70.00	-25.27	354	226	peak
6	2665.00	54.47	-11.11	43.36	70.00	-26.64	254	93	peak

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Horn Antenna Distance: 3 meters

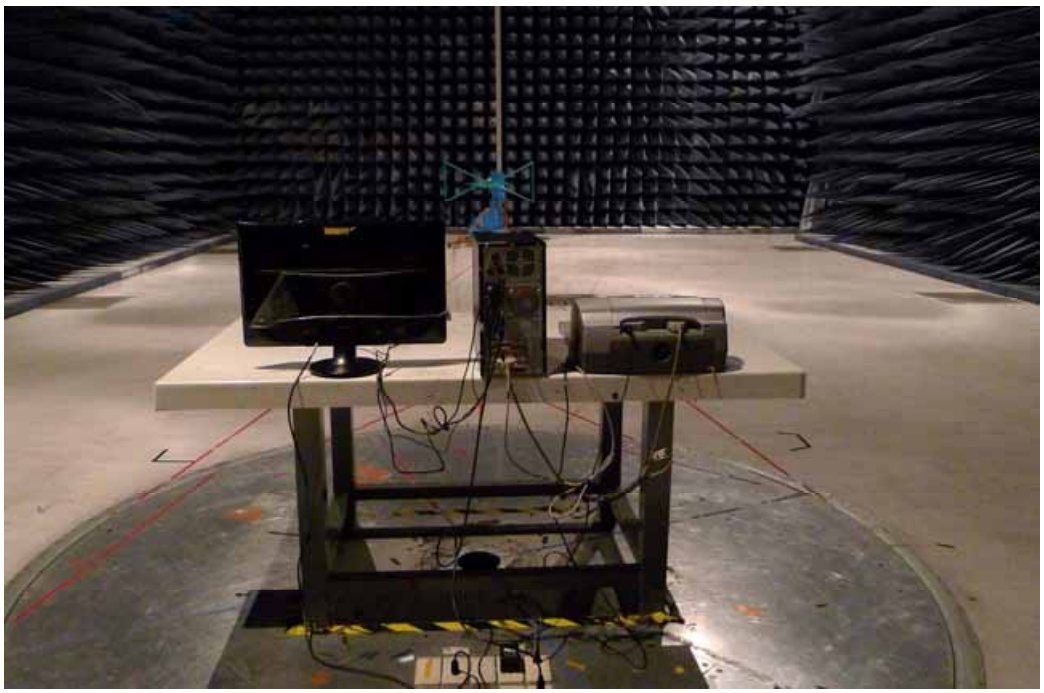
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

4.3 Test Setup Photo

Front View (30MHz~1GHz)



Back View (30MHz~1GHz)



Front View (above 1GHz)

Back View (above 1GHz)

5. Electrostatic discharge (ESD) immunity

5.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-2/ IEC EN61000-4-2 (details referred to Sec 1.2)
Test Level:	Air +/- 2 kV, +/- 4 kV, +/- 8 kV Contact +/- 4 kV
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S7
Temperature:	22 °C
Humidity:	45%

Selected Test Point

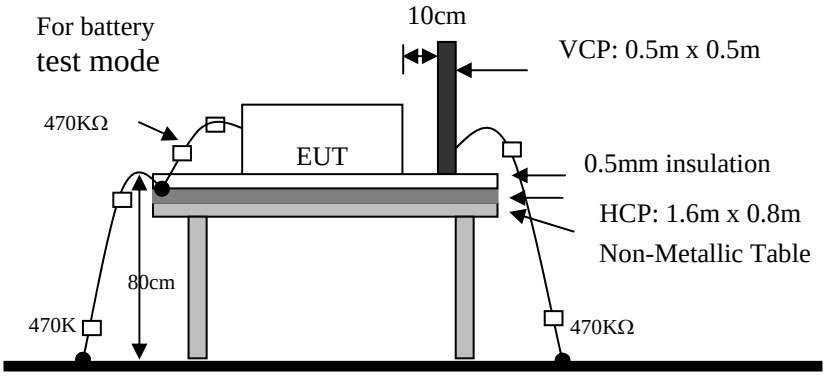
Air: discharges were applied to slots, aperture or insulating surfaces. 10 single air discharges were applied to each selected points.

Contact: Total 200 discharges minimum were to the selected contact points.

Indirect Contact Points: 25 discharges were applied to center of one edge of VCP and each EUT side of HCP with 10 cm away from EUT.

5.2 Test Setup

EUT is 1m from the wall and other metallic structure. When Battery test mode is needed, a cable with one 470KΩ resister at two rare ends is connected from metallic part of EUT and screwed to HCP.



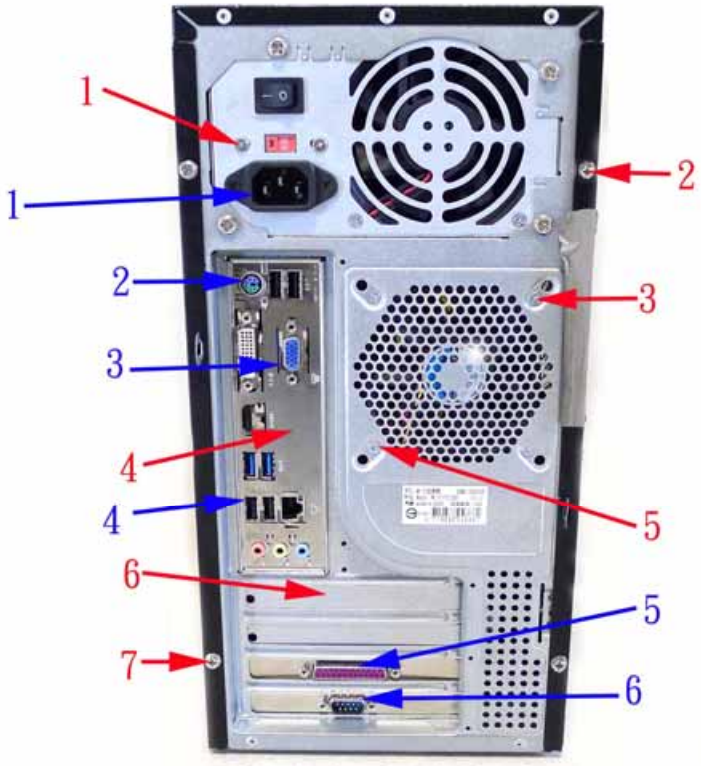
Ground reference Plane

5.3 Test Result

Performance of EUT complies with the given specification.

5.4 Test Point

Red arrow lines indicate the contact points, and blue arrow lines indicate the air points.



5.5 Test Setup Photo

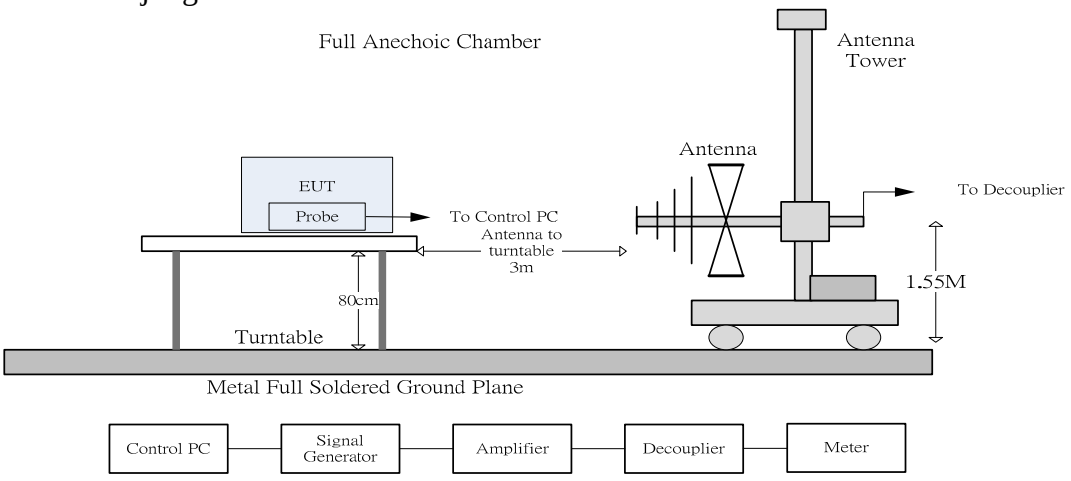
6. Radio-Frequency, Electromagnetic Field immunity

6.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-3/ IEC EN61000-4-3 (details referred to Sec 1.2)
Test Level:	3 V/m
Modulation:	AM 1KHz 80%
Frequency range:	80 MHz~1 GHz
Frequency Step:	1% of last step frequency
Dwell time:	3s
Polarization:	Vertical and Horizontal
EUT Azimuth Angle	☒0° ☒90° ☒180° ☒270°
Criteria:	A
Test Procedure	refer to ISL QA -T4-E-S8
Temperature:	21°C
Humidity:	60%

6.2 Test Setup

The field sensor is placed at one calibration grid point to check the intensity of the established fields on both polarizations. EUT is adjusted to have each side of EUT face coincident with the calibration plane. A CCD camera and speakers are used to monitor the condition of EUT for the performance judgment.



6.3 Test Result

Performance of EUT complies with the given specification.

6.4 Test Setup Photo

7. Electrical Fast transients/burst immunity

7.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-4/ IEC EN61000-4-4 (details referred to Sec 1.2)
Test Level:	AC Power Port: +/- 1 kV
Rise Time:	5ns
Hold Time:	50ns
Repetition Frequency:	5KHz
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S9
Temperature:	21 °C
Humidity:	61%

Test Procedure

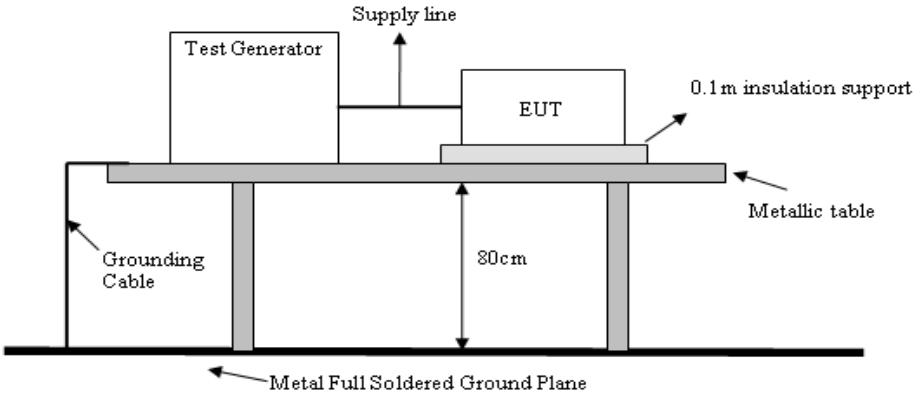
The EUT was setup on a nonconductive table 0.1 m above a reference ground plane.

Test Points	Polarity	Result	Comment
Line	+	N	60 sec
	-	N	60 sec
Neutral	+	N	60 sec
	-	N	60 sec
Ground	+	N	60 sec
	-	N	60 sec
Line to Neutral	+	N	60 sec
	-	N	60 sec
Line to Ground	+	N	60 sec
	-	N	60 sec
Neutral to Ground	+	N	60 sec
	-	N	60 sec
Line to Neutral to Ground	+	N	60 sec
	-	N	60 sec

Note: 'N' means normal, the EUT function is correct during the test.

7.2 Test Setup

EUT is at least 50cm from the conductive structure.



7.3 Test Result

Performance of EUT complies with the given specification.

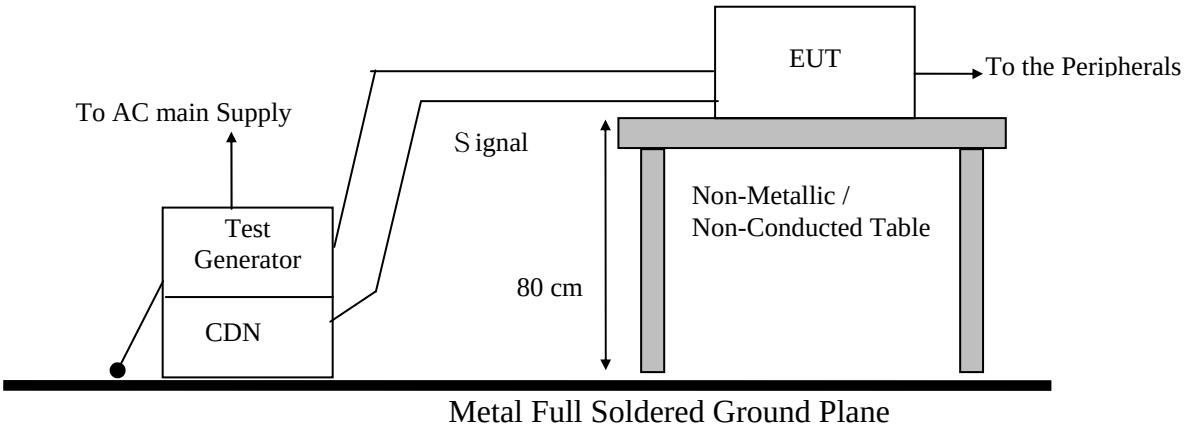
7.4 Test Setup Photo

8. Surge Immunity

8.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-5/ IEC EN61000-4-5 (details referred to Sec 1.2)
Test Level:	Line to Line: +/- 0.5 kV, +/- 1 kV Line to Earth: +/- 0.5 kV, +/- 1 kV, +/- 2kV
Rise Time:	1.2us
Hold Time:	50us
Repetition Rate:	30 seconds
Angle:	☒0° ☒90° ☒180° ☒270°
Criteria:	B
Test Procedure:	refer to ISL QA -T4-E-S10
Temperature:	20°C
Humidity:	61%

8.2 Test Setup



8.3 Test Result

Performance of EUT complies with the given specification.

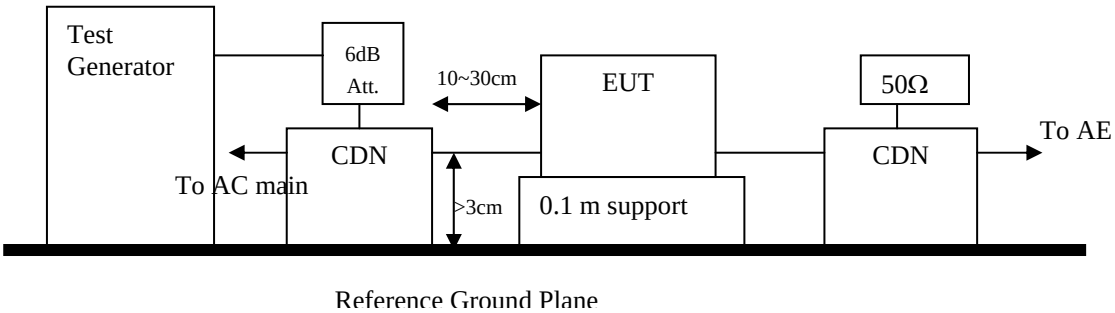
8.4 Test Setup Photo

9. Immunity to Conductive Disturbance

9.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-6/ IEC EN61000-4-6 (details referred to Sec 1.2)
Test Level:	3 V
Modulation:	AM 1KHz 80%
Frequency range:	0.15 MHz - 80MHz
Frequency Step:	1% of last Frequency
Dwell time:	3s
Criteria:	A
CDN Type:	CDN M2+M3
Test Procedure	refer to ISL QA -T4-E-S11
Temperature:	22°C
Humidity:	62%

9.2 Test Setup



9.3 Test Result

Performance of EUT complies with the given specification.

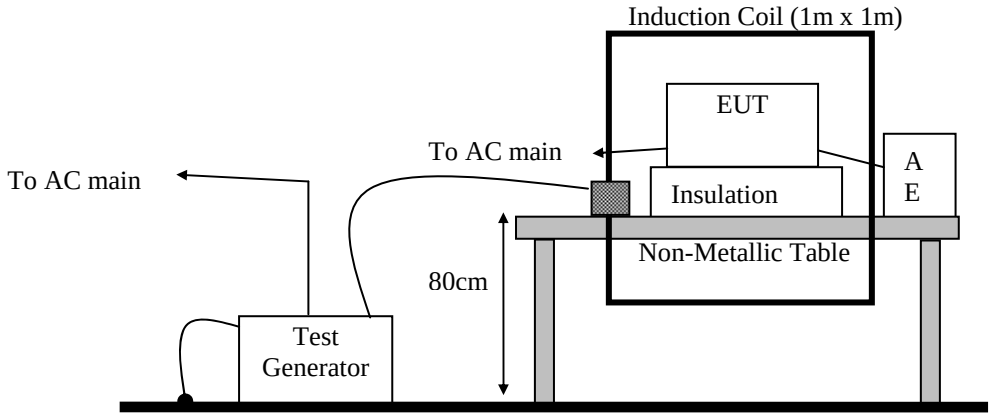
9.4 Test Setup Photo

10. Power Frequency Magnetic Field immunity

10.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-8/ IEC EN61000-4-8 (details referred to Sec 1.2)
Test Level:	1A/m
Polarization:	X, Y, Z
Criteria:	A
Test Procedure	refer to ISL QA -T4-E-S12
Temperature:	20°C
Humidity:	60%

10.2 Test Setup



10.3 Test Result

Performance of EUT complies with the given specification.

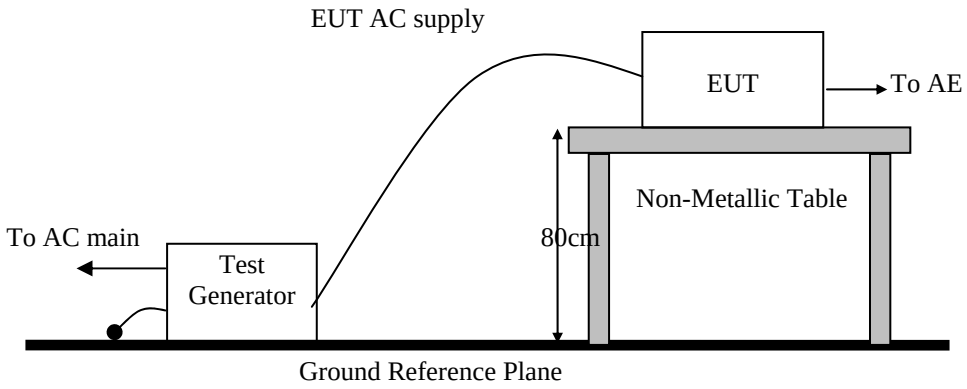
10.4 Test Setup Photo

11. Voltage Dips, Short Interruption and Voltage Variation immunity

11.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-11/ IEC EN61000-4-11 (details referred to Sec 1.2)
Test Level: Criteria:	>95% in 0.5 period B
Test Level: Criteria:	30% in 25 period C
Test Level: Criteria:	>95% in 250 period C
Phase:	0°; 180°
Test intervals:	3 times with 10s each
Test Procedure	refer to ISL QA -T4-E-S13
Temperature:	21°C
Humidity:	60%

11.2 Test Setup



11.3 Test Result

Performance of EUT complies with the given specification.

11.4 Test Setup Photo

12. Harmonics

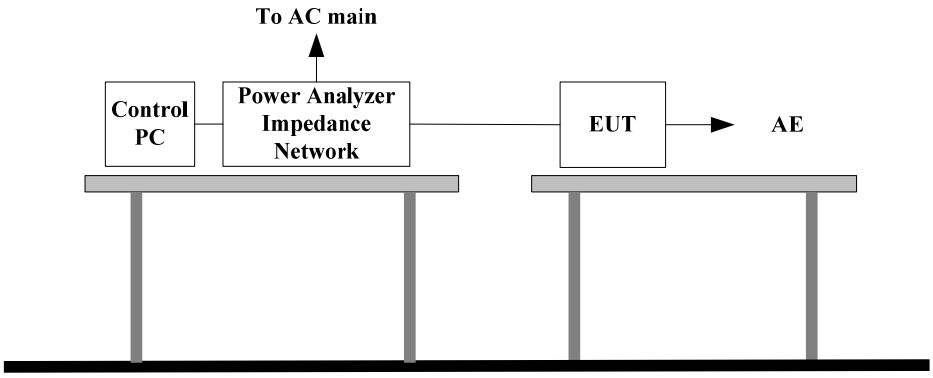
12.1 Test Specification

Port:	AC mains
Active Input Power:	<75W
Basic Standard:	EN61000-3-2/IEC 61000-3-2 (details referred to Sec 1.2)
Test Duration:	2.5min
Class:	D
Test Procedure	refer to ISL QA -T4-E-S14
Temperature:	20°C
Humidity:	61%

Test Procedure

The EUT is supplied in series with shunts or current transformers from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the EUT. The EUT is configured to its rated current with additional resistive load when the testing is performed.
Equipment having more than one rated voltage shall be tested at the rated voltage producing the highest harmonics as compared with the limits.

12.2 Test Setup



12.3 Test Result

Active input power under 75W, no limit apply, declare compliance

13. Voltage Fluctuations

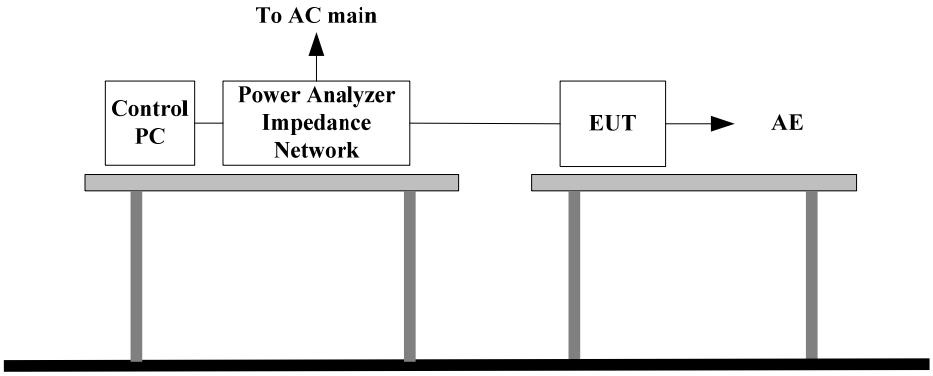
13.1 Test Specification

Port:	AC mains
Basic Standard:	EN61000-3-3/IEC61000-3-3 (details referred to Sec 1.2)
Test Procedure	refer to ISL QA -T4-E-S14
Observation period:	For Pst 10min
	For Plt 2 hours
Temperature:	20°C
Humidity:	61%

Test Procedure

The EUT is supplied in series with reference impedance from a power source with the voltage and frequency as the nominal supply voltage and frequency of the EUT.

13.2 Test Setup

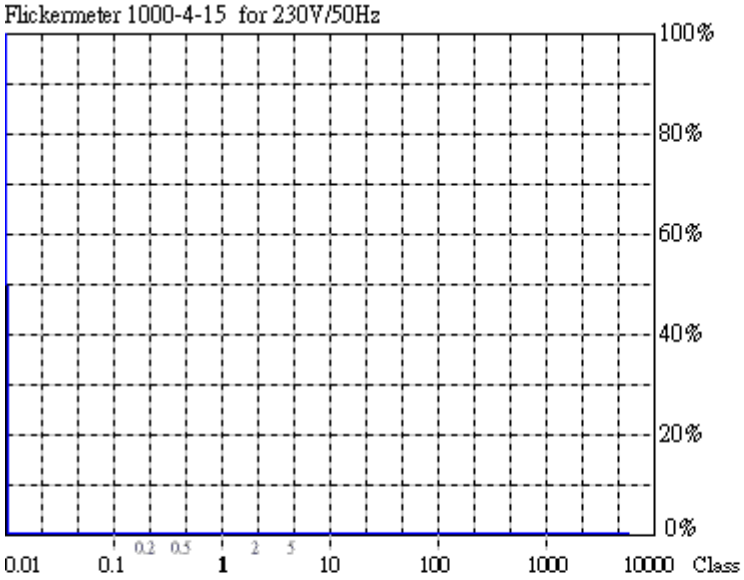


13.3 Test Result

Performance of EUT complies with the given specification.

13.4 Test Data

Flickermeter 1000-4-15 for 230V/50Hz



Actual Flicker (Fli):	**0.00**
Short-term Flicker (Pst):	**0.07**
Limit (Pst):	1.00
Long-term Flicker (Plt):	**0.07**
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	**0.00%**
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	**0.04%**
Limit (dc):	3.30%
Maximum Interval exceeding 3.30% (dt):	**0.00ms**
Limit (dt>Lim):	500ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3

Urms =	230.3	V	P =	35.49	W
Irms =	0.344	A	pf =	0.448	

Range:	2 A
V-nom:	230 V
TestTime:	120 min (10000%)

Test completed, Result: PASSED

HAR-1000 EMC-Retest

13.5 Test Setup Photo

14. Appendix

14.1 Appendix A: Test Equipment

14.1.1 Test Equipment List

Location Con02	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction 02	LISN 15	R&S	ENV216	101335	10/08/2013	10/08/2014
Conduction 02	LISN 06	ROHDE&SCHWARZ	ESH3/Z5	828874/009	02/25/2014	02/25/2015
Conduction 02	Conduction 02-1 Cable	WOKEN	CFD 300-NL	Conduction 02-1	07/10/2014	07/10/2015
Conduction 02	EMI Receiver 14	ROHDE& SCHWARZ	ESCI	101034	04/24/2014	04/24/2015

Location Chamber02	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation (Chamber02)	BILOG Antenna 15	Teseq GmbH	CBL6112D	27622	01/23/2014	01/23/2015
Radiation (Chamber02)	Coaxial Cable Chmb 02-10M-02	MIYAZAK	8D-FB	Chmb 02-10M-02	10/14/2013	10/14/2014
Radiation (Chamber02)	EMI Receiver 12	ROHDE & SCHWARZ	ESCI	100804	07/29/2014	07/29/2015

Location Chmb14	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Rad. Above 1GHz	Spectrum Analyzer 22(chamber12)	R&S	FSU43	100143	05/07/2014	05/07/2015
Rad. Above 1GHz	Horn Antenna 06 (1G~18G)	ETS	3117	00066665	11/04/2013	11/04/2014
Rad. Above 1GHz	Preamplifier 13	MITEQ	JS44-00101800-25-10P-44	1329256	07/30/2014	07/30/2015
Rad. Above 1GHz	Microwave Cable 22 (1G~18G)	HUBER SUHNER	SUCOFLEX 106	501360/6 and 501361/6	02/17/2014	02/17/2015

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
EN61K-3-2/3	Harmonic/Flicker Test System 02	EMC PARTNER	HARMONICS-1000	143	04/11/2014	04/11/2015
EN61K-4-2	ESD Gun 05	EM TEST	Dito	V0640101838	05/26/2014	05/26/2015
EN61K-4-3	Broadband Log-Periodic Antenna	AR	AT1080	310698	N/A	N/A
EN61K-4-3	Horn Antenna RF-01	AR	ATS700M11G	0335864	N/A	N/A
EN61K-4-3	Amplifier 80Mz~1GHz 250W	AR	250W1000A	312494	N/A	N/A
EN61K-4-3	Amplifier 800MHz~4.2GHz 50W	AR	50S1G4M1	312762	N/A	N/A
EN61K-4-3	Amplifier 4.0~8.0GHz 35W	AR	35S4G8AM1	0335752	N/A	N/A
EN61K-4-3	Broadband Coupler 80M~1GHz	Amplifier Research	DC6180A	0341805	N/A	N/A
EN61K-4-3	Coaxial Cable	INSULATED	NPS-4806-2360-NP3	108599.003.01.03	N/A	N/A
EN61K-4-3	Broadband Coupler 0.8G~4.26GHz	AR	DC7144A	0335226	N/A	N/A
EN61K-4-3	Broadband Coupler 4G~8GHz	AR	DC7350A	0335817	N/A	N/A
EN61K-4-3	Signal Generator 07	ROHDE& SCHWARZ	SMB100A	107780	09/23/2013	09/23/2014
EN61K-4-4	EFT and SURGE Test System	EM TEST	UCS-500 M6B	V0728102674	11/26/2013	11/26/2014
EN61K-4-5	CDN-UTP8	EMC-PARTNER	CDN-UTP8	017	02/14/2014	02/14/2015
EN61K-4-5	SURGE-TESTER	EMC Partner	MIG0603IN3	523	02/14/2014	02/14/2015
EN61K-4-6	CDN M2+M3 02	Frankonia	M2+M3	A3011024	10/05/2013	10/05/2014
EN61K-4-6	CDN T2 03	FCC Inc.	FCC-801-T2	02066	09/13/2013	09/13/2014
EN61K-4-6	CDN T4 06	FCC Inc.	FCC-801-T4	02017	01/29/2014	01/29/2015
EN61K-4-6	CDN T8 02	FCC Inc.	FCC-801-T8	08019	07/20/2014	07/20/2015
EN61K-4-6	Coaxial Cable 4-6 02-1			4-6 02-1	N/A	N/A
EN61K-4-6	Conducted Immunity Test System 02	Frankonia	CIT-10/75	102D1331	06/26/2014	06/26/2015
EN61K-4-6	EM-Clamp	Schaffner	KEMZ-801	19215	N/A	N/A
EN61K-4-8	Magnetic Field Immunity Loop	FCC	F-1000-4-8-L-1M	01037	06/18/2014	06/18/2015
EN61K-4-8	Magnetic Field Test Generator	FCC	F-1000-4-8-G-125A	01038	06/18/2014	06/18/2015
EN61K-4-11	Voltage Dip and UP Simulator	NoiseKen	VDS-2002	VDS0640162	10/01/2013	10/01/2014

PS: N/A => The equipment does not need calibration.

14.1.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

Test Item	Filename	Version
EN61000-3-2	California Instruments	CTSMXL 1.4.0.15
EN61000-3-3	California Instruments	CTSMXL 1.4.0.15
EN61000-3-2	EMC Partner	4.2
EN61000-3-3	EMC Partner	4.2
EN61000-4-2	N/A	2.0
EN61000-4-3	i2	4.130102k
EN61000-4-4	EMC TEST	4.10
EN61000-4-5	EMC Partner	1.69
EN61000-4-6	EMC Partner	2.22
EN61000-4-8	N/A	
EN61000-4-11	NOISE KEN	2.0

Site	Filename	Version	Issue Date
Conduction/Radiation	EZ EMC	ISL-03A2	3/6/2013

14.2 Appendix B: Uncertainty of Measurement

The measurement uncertainty refers to CISPR 16-4-2:2011. The coverage factor k = 2 yields approximately a 95 % level of confidence.

<Conduction 02>
AMN: ±3.27dB
ISN T2: ±3.86dB
ISN T4: ±3.86dB
ISN T8: ±3.86dB

<Chamber 02 (10M)>
Horizontal
30MHz~200MHz: ±4.05dB
200MHz~1000MHz: ±4.25dB
Vertical
30MHz~200MHz: ±4.77dB
200MHz~1000MHz: ±4.15dB

<Chamber 14 (3M)>
1GHz~6GHz: ±4.71dB
1GHz~18GHz: ±4.76dB
18GHz~26.5GHz: ±4.34dB
26.5GHz~40GHz: ±4.38dB

<Immunity 02>

Test item	Uncertainty	Test item	Uncertainty
EN61000-4-2 (ESD)		EN61000-4-5 (Surge)	
Rise time tr	≦ 15%	Time	± 1.00%
Peak current Ip	≦ 6.3%	Voltage	± 1.41%
current at 30 ns	≦ 6.3%	Current	± 1.11%
current at 60 ns	≦ 6.3%	EN61000-4-6 (CS)	
EN61000-4-3 (RS)	± 2.19dB	CDN	± 1.36dB
EN61000-4-4 (EFT)		EM Clamp	± 3.19dB
Time	± 2.80%	EN61000-4-8 (Magnetic)	± 1.57%
Voltage	± 1.60%	EN61000-4-11 (Dips)	
Current	± 1.60%	Time	± 2.80%
		Voltage	± 0.20%
		Current	± 1.30%

Test item	Uncertainty	Test item	Uncertainty
EN61000-3-2 (Harmonics)	± 5.55%	EN61000-3-3 (Fluctuations and Flicker)	± 5.55 %

14.3 Appendix C: Photographs of EUT

Please refer to the File of **ISL-*14LE379P***