Certificate

Issue Date: August 2, 2017
Ref. Report No. ISL-17LE479CE

Product Name	:	Display Module
Model(s)	:	Display Module
Brand	:	WINSTAR
Applicant	:	WINSTAR DISPLAY CO., LTD.
Address	:	Central Taiwan Science Park 5F., No. 31, Keya Rd., Daya Dist., Taichung City 428, Taiwan

We, **International Standards Laboratory**, hereby certify that:

The device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in European Council Directive- EMC Directive 2014/30/EU. The device was passed the test performed according to :

CE

Standards:

EN 55032:2012+AC:2013, CISPR 32:2012
AS/NZS CISPR 32:2013
EN 55032:2015+AC:2016, CISPR 32: 2015+COR1:2016
AS/NZS CISPR 32:2015
EN 61000-3-2:2014 and IEC 61000-3-2:2014
EN 61000-3-3: 2013 and IEC 61000-3-3: 2013
EN 55024: 2010+A1:2015 and CISPR 24: 2010+A1:2015
EN 61000-4-2: 2009 and IEC 61000-4-2: 2008
EN 61000-4-3: 2006+A1: 2008 +A2: 2010 and
IEC 61000-4-3:2006+A1: 2007+A2: 2010
EN 61000-4-4:2012 and IEC 61000-4-4:2012
EN 61000-4-5: 2014 and IEC 61000-4-5: 2014
EN 61000-4-6:2014+AC:2015 and IEC 61000-4-6:2013
EN 61000-4-8: 2010 and IEC 61000-4-8: 2009
EN 61000-4-11: 2004 and IEC 61000-4-11: 2004

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

International Standards Laboratory

Bert Chen / Director

☐ **Hsi-Chih LAB**:
No. 65, Gu Dai Keng Street, Hsi-Chih Dist.,
New Taipei City 221, Taiwan
Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

ELA113A

☒ **Lung-Tan LAB**:
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ELA113B

CE MARK TECHNICAL FILE

AS/NZS EMC CONSTRUCTION FILE

of

Product Name

Display Module

Model

Display Module

Brand

WINSTAR

Contains:

1. Declaration of Conformity
2. EN55032/CISPR 32, AS/NZS CISPR 32 EMI test report
3. EN55024/CISPR 24, EN61000-3-2 / IEC 61000-3-2, and EN61000-3-3 / IEC 61000-3-3 test report
4. Block Diagram and Schematics
5. Users' manual

Declaration of Conformity

Name of Responsible Party:	WINSTAR DISPLAY CO., LTD.
Address of Manufacturer:	Central Taiwan Science Park 5F., No. 31, Keya Rd., Daya Dist., Taichung City 428, Taiwan
Declares that product:	Display Module
Model:	Display Module
Brand:	WINSTAR
Assembled by:	Same as above
Address:	Same as above

Conforms to the EMC Directive 2014/30/EU as attested by conformity with the following harmonized standards:

EN 55032:2012+AC:2013, CISPR 32:2012: Electromagnetic compatibility of multimedia equipment - Emission requirements
AS/NZS CISPR 32:2013: Electromagnetic compatibility of multimedia equipment- Emission requirements
EN 55032:2015+AC:2016, CISPR 32: 2015+COR1:2016: Electromagnetic compatibility of multimedia equipment - Emission requirements.
AS/NZS CISPR 32:2015: Electromagnetic compatibility of multimedia equipment- Emission requirements

Performed Item	Test Performed	Deviation	Result
Conducted emissions from the AC mains power ports	Yes	No	PASS
Telecommunication Port Conducted Emissions (asymmetric mode)	Yes	No	PASS
Radiated emissions at frequencies below 1 GHz	Yes	No	PASS
Radiated emissions at frequencies above 1 GHz	Yes	No	PASS
Radiated emissions from FM receivers	N/A	N/A	N/A
Voltage Disturbance Emissions at Antenna Terminals	N/A	N/A	N/A
Differential voltage emissions	N/A	N/A	N/A
Outdoor units of home satellite receiving systems	N/A	N/A	N/A

<to be continued>

EN 55024:2010+A1:2015 and CISPR 24:2010+A1:2015: 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 61000-4-4:2012 IEC 61000-4-4:2012	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5:2014 IEC 61000-4-5:2014	Surge	Pass	B
EN 61000-4-6:2014+AC:2015 IEC 61000-4-6:2013	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 61000-3-2:2014 IEC 61000-3-2:2014	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

We, WINSTAR DISPLAY CO., LTD., hereby declare that the equipment bearing the trade name and model number specified above was tested conforming to the applicable Rules under the most accurate measurement standards possible, and that all the necessary steps have been taken and are in force to assure that production units of the same equipment will continue to comply with the requirements.

WINSTAR DISPLAY CO., LTD.
Date: August 2, 2017

Declaration of Conformity

Name of Responsible Party:	WINSTAR DISPLAY CO., LTD.
Address of Manufacturer:	Central Taiwan Science Park 5F., No. 31, Keya Rd., Daya Dist., Taichung City 428, Taiwan
Declares that product:	Display Module
Model:	Display Module
Brand:	WINSTAR
Assembled by:	Same as above
Address:	Same as above

Conforms to the EMI part of RCM Mark requirements as attested by conformity with the following standards:

AS/NZS CISPR 32:2013: Class A: Electromagnetic compatibility of multimedia equipment- Emission requirements
AS/NZS CISPR 32:2015: Electromagnetic compatibility of multimedia equipment- Emission requirements

We, WINSTAR DISPLAY CO., LTD., hereby declare that the equipment bearing the trade name and model number specified above was tested conforming to the applicable Rules under the most accurate measurement standards possible, and that all the necessary steps have been taken and are in force to assure that production units of the same equipment will continue to comply with the requirements.

WINSTAR DISPLAY CO., LTD.
Date: August 2, 2017

CE TEST REPORT

of

EN55032 / CISPR 32 / AS/NZS CISPR 32
Class A
EN55024 / CISPR 24 / IMMUNITY
EN61000-3-2 / EN61000-3-3

Product : **Display Module**

Model(s): **Display Module**

Brand: **WINSTAR**

Applicant: **WINSTAR DISPLAY CO., LTD.**

Address: **Central Taiwan Science Park**
5F., No. 31, Keya Rd., Daya Dist.,
Taichung City 428, Taiwan

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-11440, T-1676, <Conduction 03>C-2845, T-1464, <Conduction 04>C-4778, T-2295, <Chamber 02>R-1435, G-17, <Chamber 12>R-2598, G-16, <Chamber 14>G-211,
*Address:
No. 120, Lane 180, Hsin Ho Rd.,
Lung-Tan Dist., Tao Yuan City 325, Taiwan
*Tel: 886-3-407-1718; Fax: 886-3-407-1738

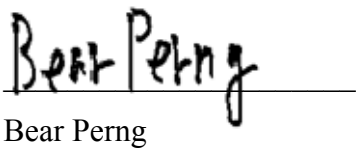
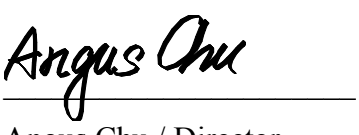
Report No.: **ISL-17LE479CE**
Issue Date : **August 2, 2017**

This report totally contains 60 pages including this cover page and contents page.

Contents of Report

1. General

1.1 Certification of Accuracy of Test Data

Standards:	Please refer to 1.2
Equipment Tested:	Display Module
Model:	Display Module
Brand:	WINSTAR
Applicant:	WINSTAR DISPLAY CO., LTD.
Sample received Date:	July 19, 2017
Final test Date:	EMI: refer to the date of test data
	EMS: July 26, 2017
Test Site:	International Standards Laboratory
	Chamber 12; 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
Atmospheric Pressure:	86 kPa to 106 kPa
Input power:	Conduction input power: AC 230 V / 50 Hz
	Radiation input power: AC 230 / 50 Hz
	Immunity input power: AC 230 V / 50 Hz
Test Result:	**PASS**
Report Engineer:	Cheryl Tung
Test Engineer:	 Bear Perng
Approved By:	 Angus 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 55032:2012+AC:2013, CISPR 32:2012: Class A: Electromagnetic compatibility of multimedia equipment - Emission requirements
AS/NZS CISPR 32:2013: Class A: Electromagnetic compatibility of multimedia equipment- Emission requirements
EN 55032:2015+AC:2016, CISPR 32: 2015+COR1:2016: Class A: Electromagnetic compatibility of multimedia equipment - Emission requirements.
AS/NZS CISPR 32:2015: Class A: Electromagnetic compatibility of multimedia equipment- Emission requirements

Performed Item	Test Performed	Deviation	Result
Conducted emissions from the AC mains power ports	Yes	No	PASS
Telecommunication Port Conducted Emissions (asymmetric mode)	Yes	No	PASS
Radiated emissions at frequencies below 1 GHz	Yes	No	PASS
Radiated emissions at frequencies above 1 GHz	Yes	No	PASS
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Voltage Disturbance Emissions at Antenna Terminals	N/A	N/A	N/A
Differential voltage emissions	N/A	N/A	N/A
Outdoor units of home satellite receiving systems	N/A	N/A	N/A

EN 55024:2010+A1:2015 and CISPR 24:2010+A1:2015: 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 61000-4-4:2012 IEC 61000-4-4:2012	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5:2014 IEC 61000-4-5:2014	Surge	Pass	B
EN 61000-4-6:2014+AC:2015 IEC 61000-4-6:2013	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 61000-3-2:2014 IEC 61000-3-2:2014	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	Display Module
Condition	Pre-Production
Model	Display Module
Serial Number	N/A
Highest working frequency: 165MHz The radiation test should be tested till 2GHz	

The devices can be installed inside the EUT are listed below:

Components	Vendor	Model Name
LCD Panel	WINSTAR Display Co., Ltd.	WF50BTIFGDHGX#
		WF50BTIFGDHTX#
		WF50BTIFGDHNX#

The I/O ports of EUT are listed below:

I/O Port Type	Quantity
HDMI Port	1
Micro USB Port	1

Pretest Test configuration:

Configuration	LCD Panel	Voltage
1	WF50BTIFGDHNX#	230V
2	WF50BTIFGDHNX#	110V

All the devices listed below are chosen by the applicant to be the representative configuration for testing in this report.
Test configuration:

Configuration	LCD Panel	Voltage
1	WF50BTIFGDHNX#	230V

EMI Noise Source:
Please refer to the technical documentation for details

EMI Solution:
Please refer to the technical documentation for details

1.4 Description of Support Equipment

No	Unit	Model / Serial No.	Brand	Power Cord	FCC ID
1	AC Adapter	ADP-10AW S/N: N/A	Lenovo	N/A	N/A
2	Control Personal Computer	RASPBERRY PI 3 MODEL B S/N: N/A	Raspberry Pi Foundation	N/A	N/A

1.5 Software for Controlling Support Unit

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

1. Send Color Bar to the EUT through EUT HDMI Port..
2. Repeat the above steps.

	Filename	Issued Date
EUT Monitor	Omplayer	06/05/2016

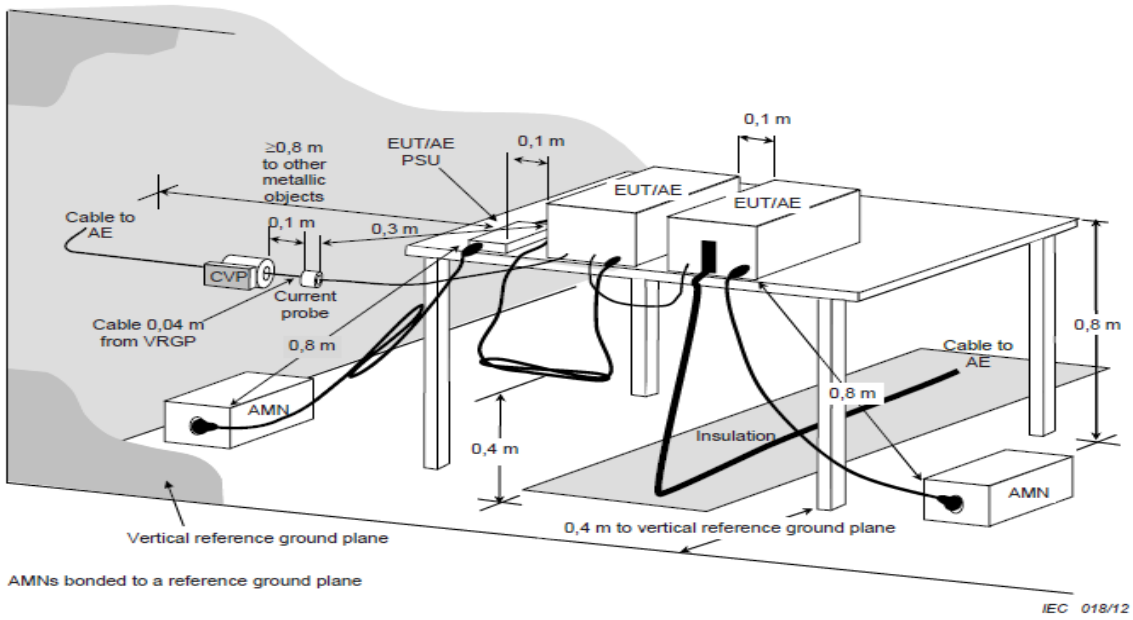
1.6 I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type
USB Power Cable	AC Adapter USB port to Control Personal Computer Micro USB Port	1.0m	Shielded
HDMI Data Cable	EUT HDMI Port to Control Personal Computer HDMI 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 shielded room 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, live and neutral, were measured. All of the interface cables were manipulated according to EN 55032 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

2.1.4 Limit

Conducted emissions from the AC mains power ports of Class A equipment:

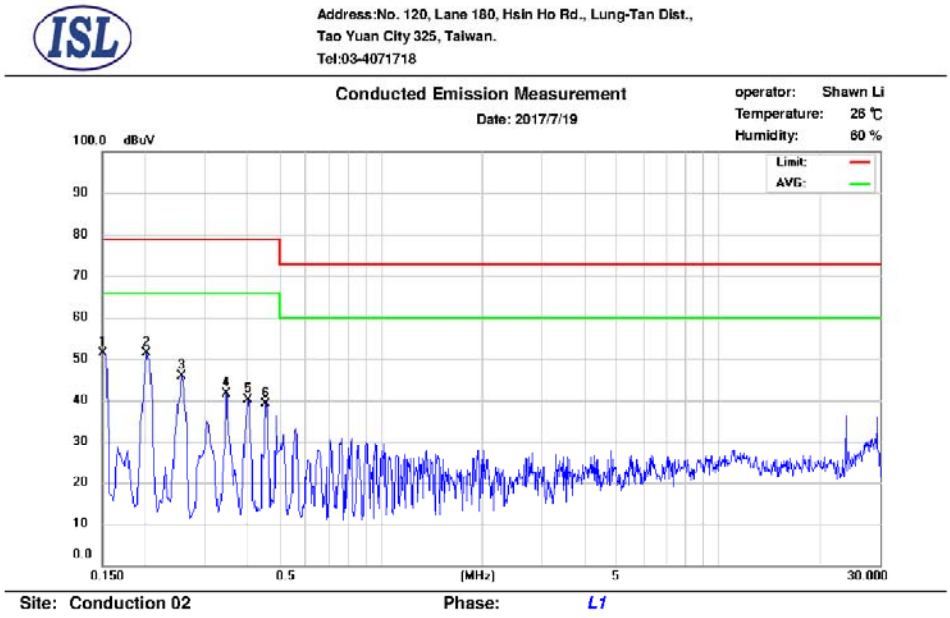
Frequency	QP	AV
MHz	dB(μV)	dB(μV)
0.15-0.50	79	73
5.0-30	66	60
Note: The lower limit shall apply at the transition frequencies		

Conducted emissions from the AC mains power ports of Class B equipment:

Frequency	QP	AV
MHz	dB(μV)	dB(μV)
0.15-0.50	66-56	56-46
0.50-5.0	56	46
5.0-30	60	50
Note: The lower limit shall apply at the transition frequencies		

2.2 Conduction Test Data: Configuration 1

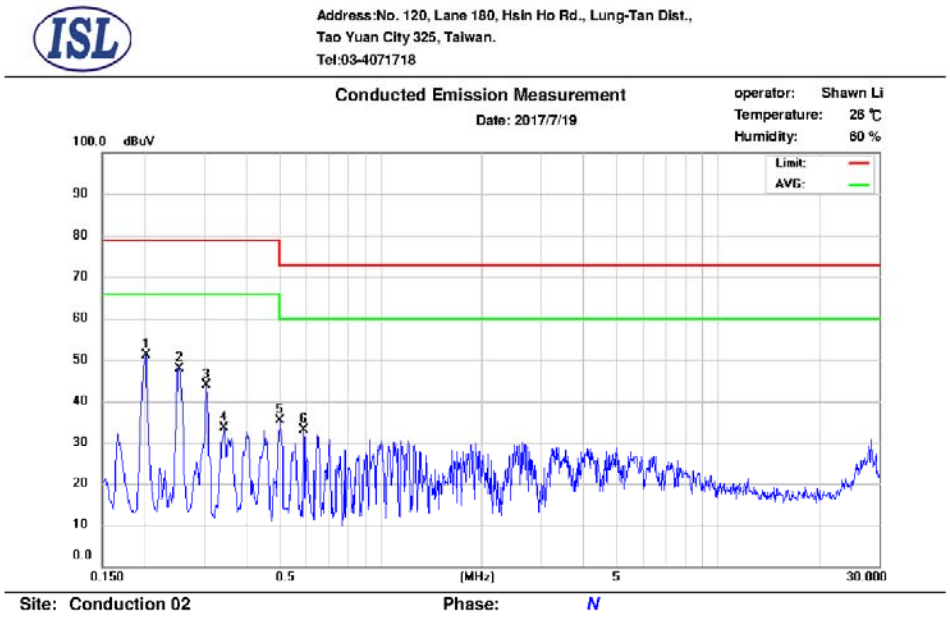
- Live



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.150	42.17	28.39	9.70	51.87	79.00	-27.13	38.09	66.00	-27.91
2	0.202	40.47	30.86	9.76	50.23	79.00	-28.77	40.62	66.00	-25.38
3	0.258	32.67	22.74	9.75	42.42	79.00	-36.58	32.49	66.00	-33.51
4	0.350	29.41	18.84	9.75	39.16	79.00	-39.84	28.59	66.00	-37.41
5	0.406	29.27	19.81	9.75	39.02	79.00	-39.98	29.56	66.00	-36.44
6	0.458	26.09	19.61	9.75	35.84	79.00	-43.16	29.36	66.00	-36.64

Note:
Margin = QP/AVG Emission - Limit
QP/AVG Emission = QP_R/AVG_R + 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.

- Neutral



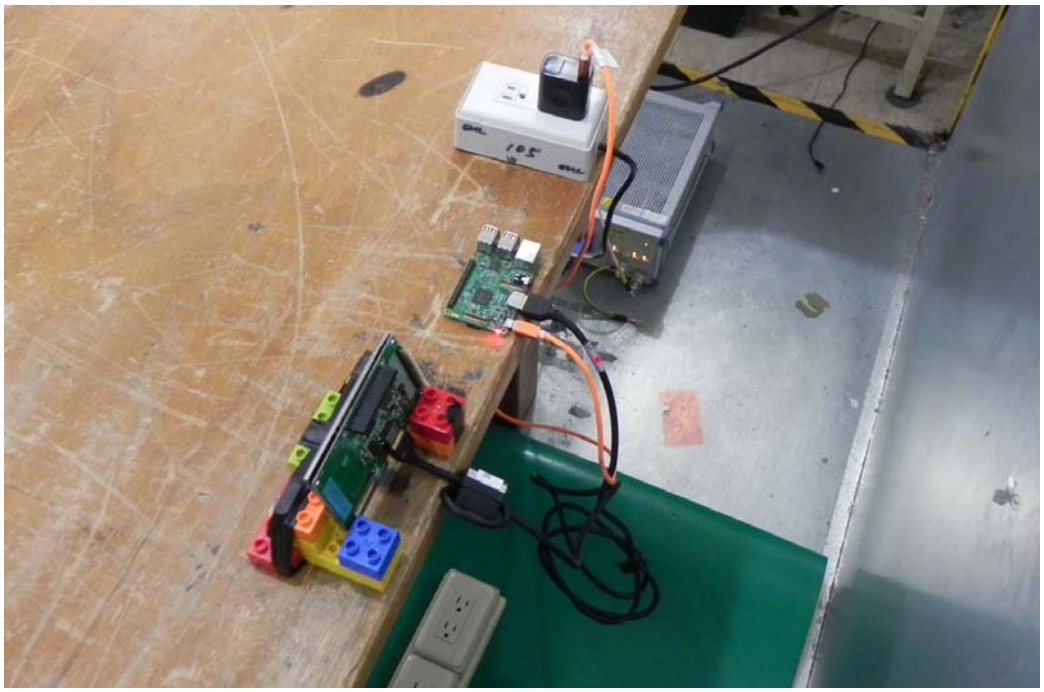
No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.202	39.66	22.65	9.71	49.37	79.00	-29.63	32.36	66.00	-33.64
2	0.254	35.70	24.13	9.70	45.40	79.00	-33.60	33.83	66.00	-32.17
3	0.306	29.99	18.85	9.69	39.68	79.00	-39.32	28.54	66.00	-37.46
4	0.346	27.64	11.20	9.69	37.33	79.00	-41.67	20.89	66.00	-45.11
5	0.506	26.44	20.43	9.70	36.14	73.00	-36.86	30.13	60.00	-29.87
6	0.594	15.09	1.85	9.72	24.81	73.00	-48.19	11.57	60.00	-48.43

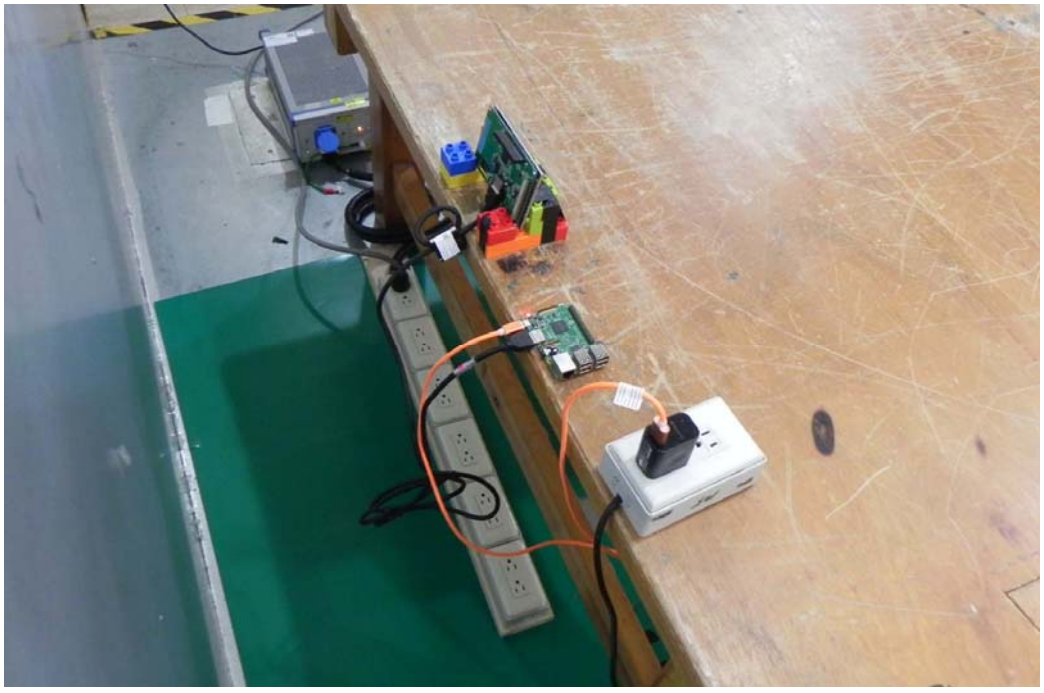
Note:
Margin = QP/AVG Emission - Limit
QP/AVG Emission = QP_R/AVG_R + Correct Factor
Correct Factor = LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak 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

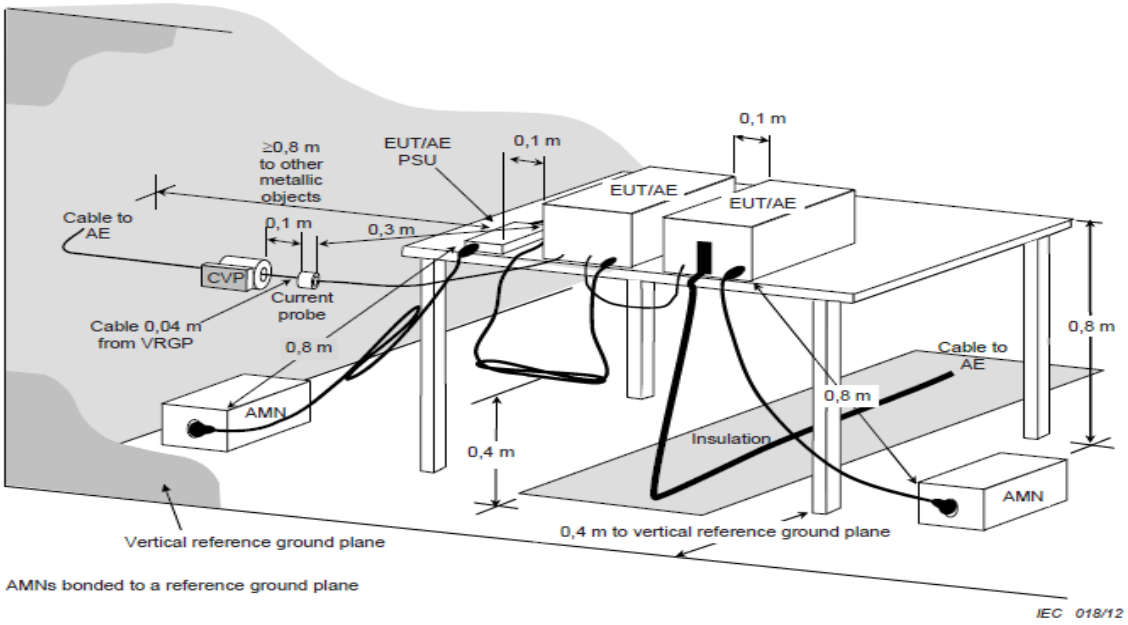




3. Telecommunication Port Conducted Emissions

3.1 Test Setup and Procedure

3.1.1 Test Setup



3.1.2 Test Procedure

The measurements are performed in a shielded room 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 55032 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

3.1.4 Limit

Asymmetric mode conducted emissions from Class A equipment:
Applicable to
1. wired network ports.
2. optical fibre ports with metallic shield or tension members.
3. antenna ports.

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A voltage limits dB(μV)	Class A current limits dB(μA)
0.15-0.5	AAN	Quasi Peak / 9 kHz	97-87	n/a
0.5-30			87	
0.15-0.5	AAN	Average / 9 kHz	84-74	
0.5-30			74	
0.15-0.5	CVP and current probe	Quasi Peak / 9 kHz	97-87	53-43
0.5-30			87	43
0.15-0.5	CVP and current probe	Average / 9 kHz	84-74	40-30
0.5-30			74	30
0.15-0.5	Current Probe	Quasi Peak / 9 kHz	n/a	53-43
0.5-30				43
0.15-0.5	Current Probe	Average / 9 kHz		40-30
0.5-30				30

Asymmetric mode conducted emissions from Class B equipment:
Applicable to:
1. wired network ports.
2. optical fibre ports with metallic shield or tension members.
3. broadcast receiver tuner ports.
4. antenna ports.

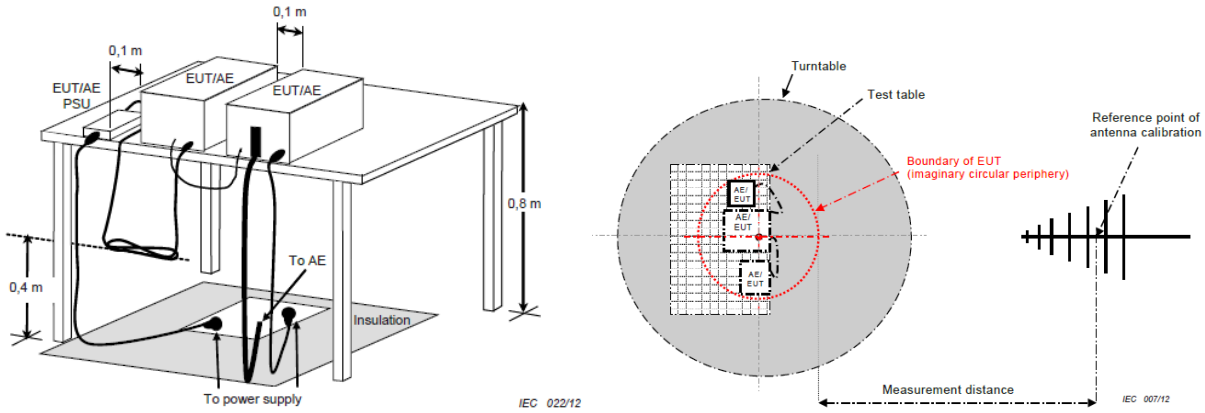
Frequency range MHz	Coupling device	Detector type / bandwidth	Class B voltage limits dB(μV)	Class B current limits dB(μA)
0.15-0.5	AAN	Quasi Peak / 9 kHz	84-74	n/a
0.5-30			74	
0.15-0.5	AAN	Average / 9 kHz	74-64	
0.5-30			64	
0.15-0.5	CVP and current probe	Quasi Peak / 9 kHz	84-74	40-30
0.5-30			74	30
0.15-0.5	CVP and current probe	Average / 9 kHz	74-64	30-20
0.5-30			64	20
0.15-0.5	Current Probe	Quasi Peak / 9 kHz	n/a	40-30
0.5-30				30
0.15-0.5	Current Probe	Average / 9 kHz		30-20
0.5-30				20

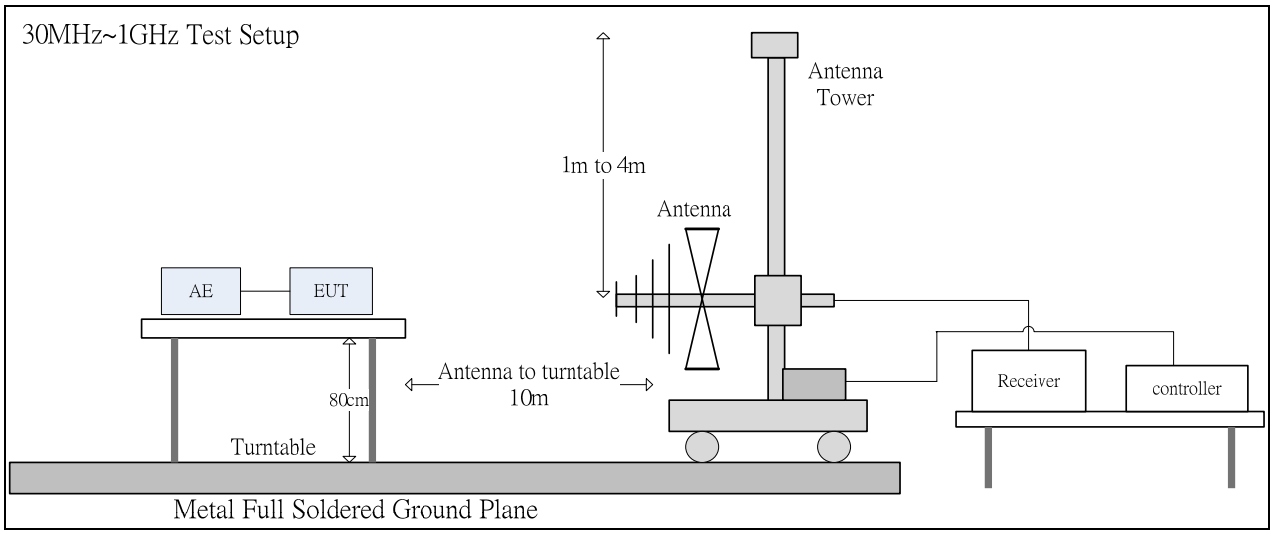
****Remarks: It is not necessary to be tested on this item.**

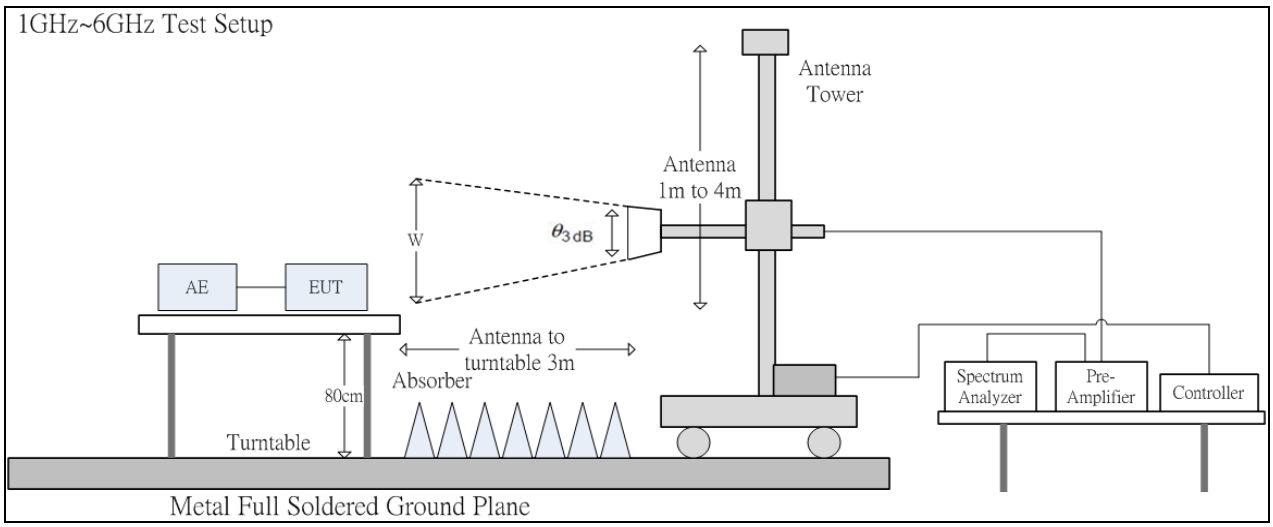
4. Radiated Disturbance Emissions

4.1 Test Setup and Procedure

4.1.1 Test Setup







The 3dB beam width of the horn antenna used for the test is as shown in the table below.

Frequency (GHz)	E-plane	H-plane	$\theta_{3\,dB}$ **(min)**	d= 3 m
				w (m)
1	88°	147°	88°	5.79
2	68°	119°	68°	4.04
3	73°	92°	73°	4.44
4	70°	89°	70°	4.20
5	55°	60°	55°	3.12
6	63°	62°	62°	3.60

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 FRP stand 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference 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. The test volume for a height of up to 30 cm may be obstructed by absorber placed on the ground plane.

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 55032 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 Limit

Radiated emissions at frequencies up to 1 GHz for Class A equipment:

Frequency range MHz	Measurement		Class A limits dB(μV/m)
	Distance m	Detector type / bandwidth	OATS/SAC
30-230	10	Quasi Peak / 120 kHz	40
230-1000			47
30-230	3		50
230-1000			57

Radiated emissions at frequencies above 1 GHz for Class A equipment:

Frequency range MHz	Measurement		Class A limits dB(μV/m)
	Distance m	Detector type / bandwidth	FSOATS
1000-3000	3	Average / 1MHz	56
3000-6000			60
1000-3000		Peak / 1MHz	76
3000-6000			80

Radiated emissions at frequencies up to 1 GHz for Class B equipment:

Frequency range MHz	Measurement		Class B limits dB(μV/m)
	Distance m	Detector type / bandwidth	OATS/SAC
30-230	10	Quasi Peak / 120 kHz	30
230-1000			37
30-230	3		40
230-1000			47

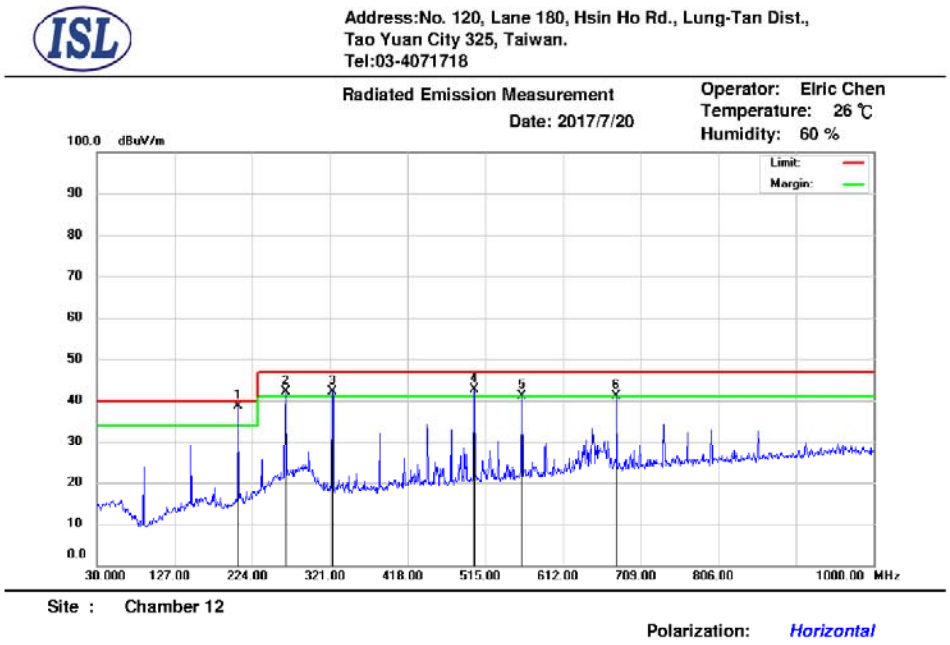
Radiated emissions at frequencies above 1 GHz for Class B equipment:

Frequency range MHz	Measurement		Class B limits dB(μV/m)
	Distance m	Detector type / bandwidth	FSOATS
1000-3000	3	Average / 1MHz	50
3000-6000			54
1000-3000		Peak / 1MHz	70
3000-6000			74

Radiated emissions from FM receivers:

Frequency range MHz	Measurement		Class B limits dB(μV/m)	
	Distance m	Detector type / bandwidth	Fundamental	Harmonics
			OATS/SAC	OATS/SAC
30-230	10	Quasi Peak / 120 kHz	50	42
230-300				42
300-1000				46
30-230	3		60	52
230-300				52
300-1000				56

4.3 Radiation Test Data: Configuration 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	206.54	57.68	-18.93	38.75	40.00	-1.25	100	285	peak
2	265.71	58.33	-16.16	42.17	47.00	-4.83	100	303	peak
3	323.91	56.22	-14.20	42.02	47.00	-4.98	373	291	peak
4	501.42	52.33	-9.80	42.53	47.00	-4.47	100	236	peak
5	560.59	49.99	-8.88	41.11	47.00	-5.89	245	326	peak
6	678.93	47.87	-6.68	41.19	47.00	-5.81	100	67	peak

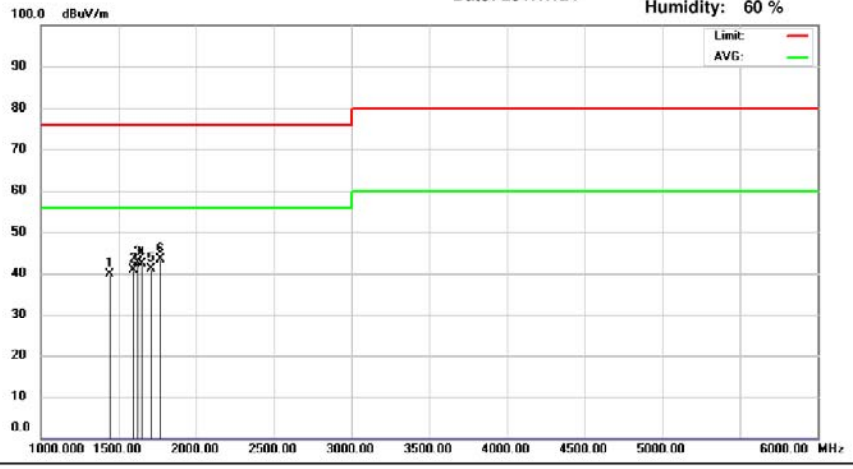
* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meters

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, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-4071718

Radiated Emission Measurement
Date: 2017/7/24

Operator: Shawn Li
Temperature: 26 ℃
Humidity: 60 %



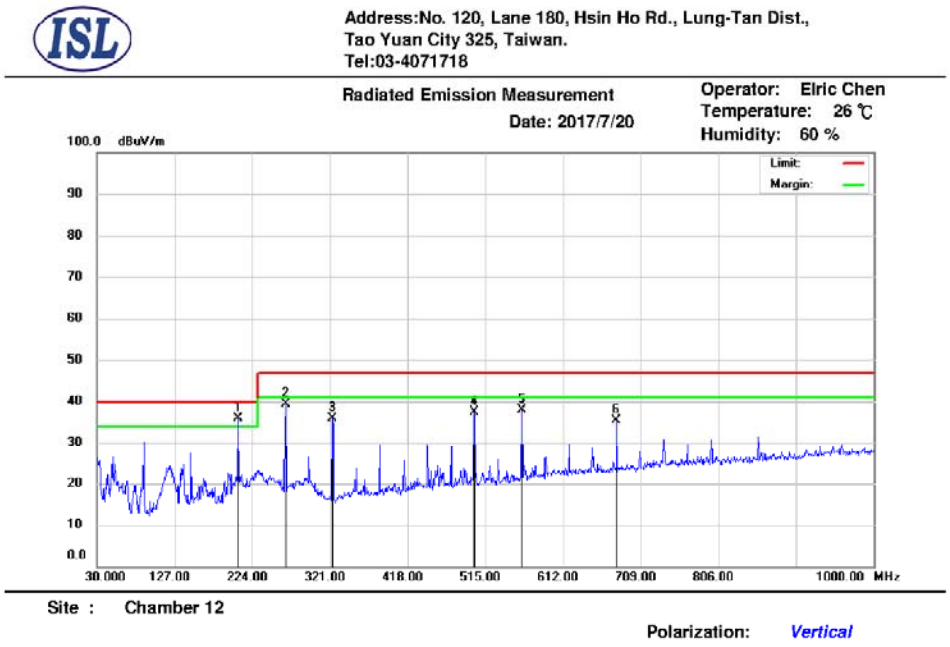
Site : Conduction 02

Polarization: *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	1445.00	55.42	-15.61	39.81	76.00	-36.19	100	125	peak
2	1595.00	55.76	-14.81	40.95	76.00	-35.05	100	345	peak
3	1625.00	57.17	-14.56	42.61	76.00	-33.39	399	181	peak
4	1650.00	56.64	-14.35	42.29	76.00	-33.71	238	10	peak
5	1710.00	55.02	-13.87	41.15	76.00	-34.85	125	70	peak
6	1770.00	56.78	-13.38	43.40	76.00	-32.60	183	346	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.

-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	206.54	54.89	-18.93	35.96	40.00	-4.04	100	156	peak
2	265.71	55.61	-16.16	39.45	47.00	-7.55	398	112	peak
3	323.91	50.05	-14.20	35.85	47.00	-11.15	315	291	peak
4	501.42	47.09	-9.80	37.29	47.00	-9.71	382	342	peak
5	560.59	46.72	-8.88	37.84	47.00	-9.16	100	161	peak
6	678.93	42.12	-6.68	35.44	47.00	-11.56	274	198	peak

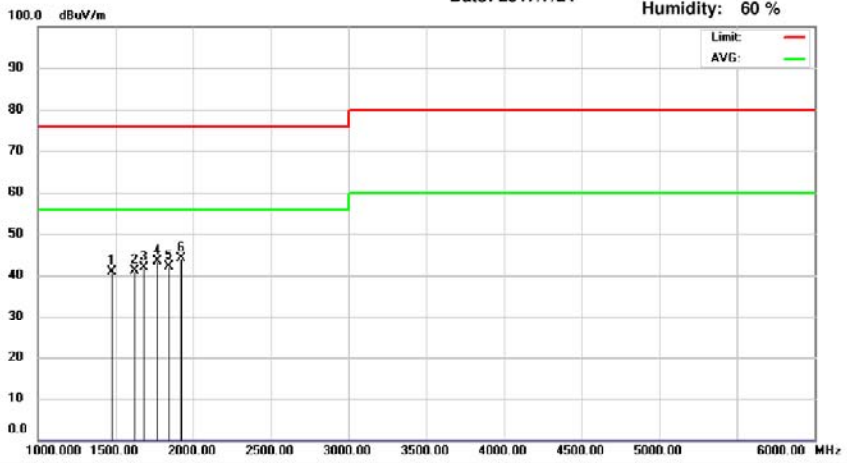
* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meters

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, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-4071718

Radiated Emission Measurement
Date: 2017/7/24

Operator: Shawn Li
Temperature: 26 ℃
Humidity: 60 %



Site : Conduction 02

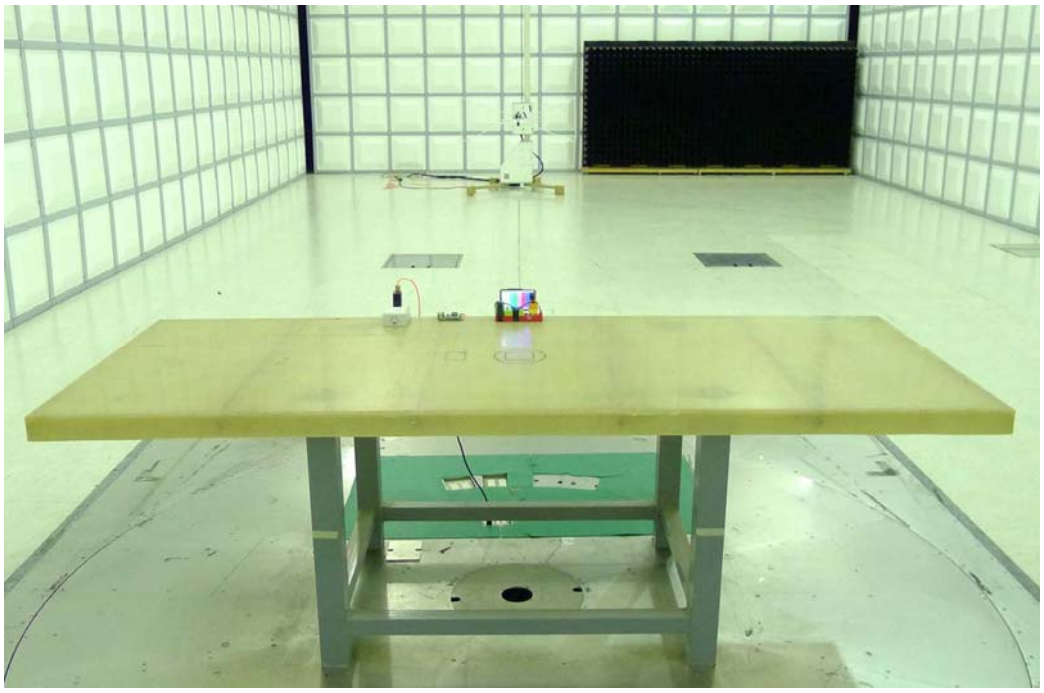
Polarization: *Vertical*

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	1475.00	56.53	-15.60	40.93	76.00	-35.07	100	125	peak
2	1625.00	55.75	-14.56	41.19	76.00	-34.81	333	187	peak
3	1680.00	56.06	-14.11	41.95	76.00	-34.05	131	11	peak
4	1770.00	56.83	-13.38	43.45	76.00	-32.55	158	177	peak
5	1845.00	54.83	-12.77	42.06	76.00	-33.94	100	103	peak
6	1920.00	56.17	-12.15	44.02	76.00	-31.98	141	211	peak

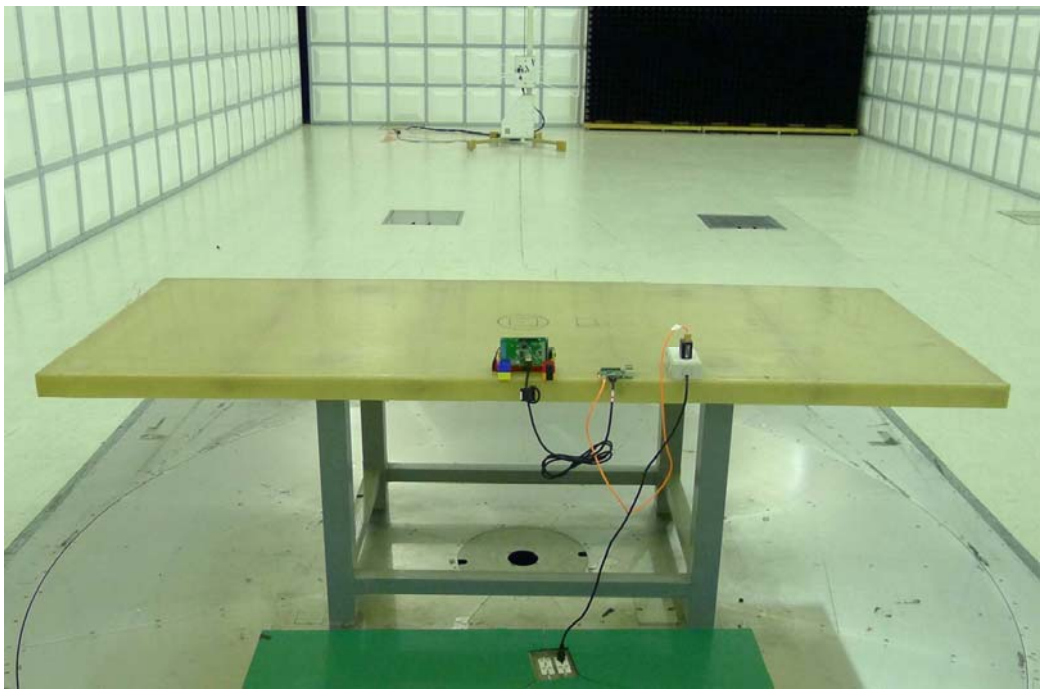
* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Horn Antenna Distance: 3 meters
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

4.4 Test Setup Photo

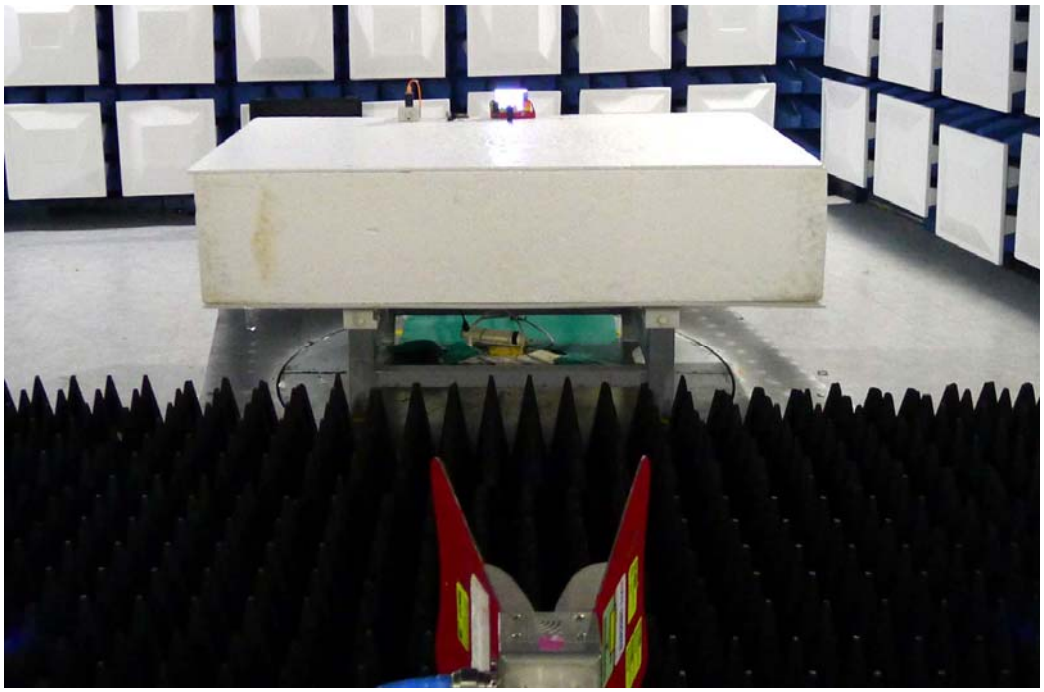
Front View (30MHz~1GHz)



Back View (30MHz~1GHz)



Front View (above 1GHz)

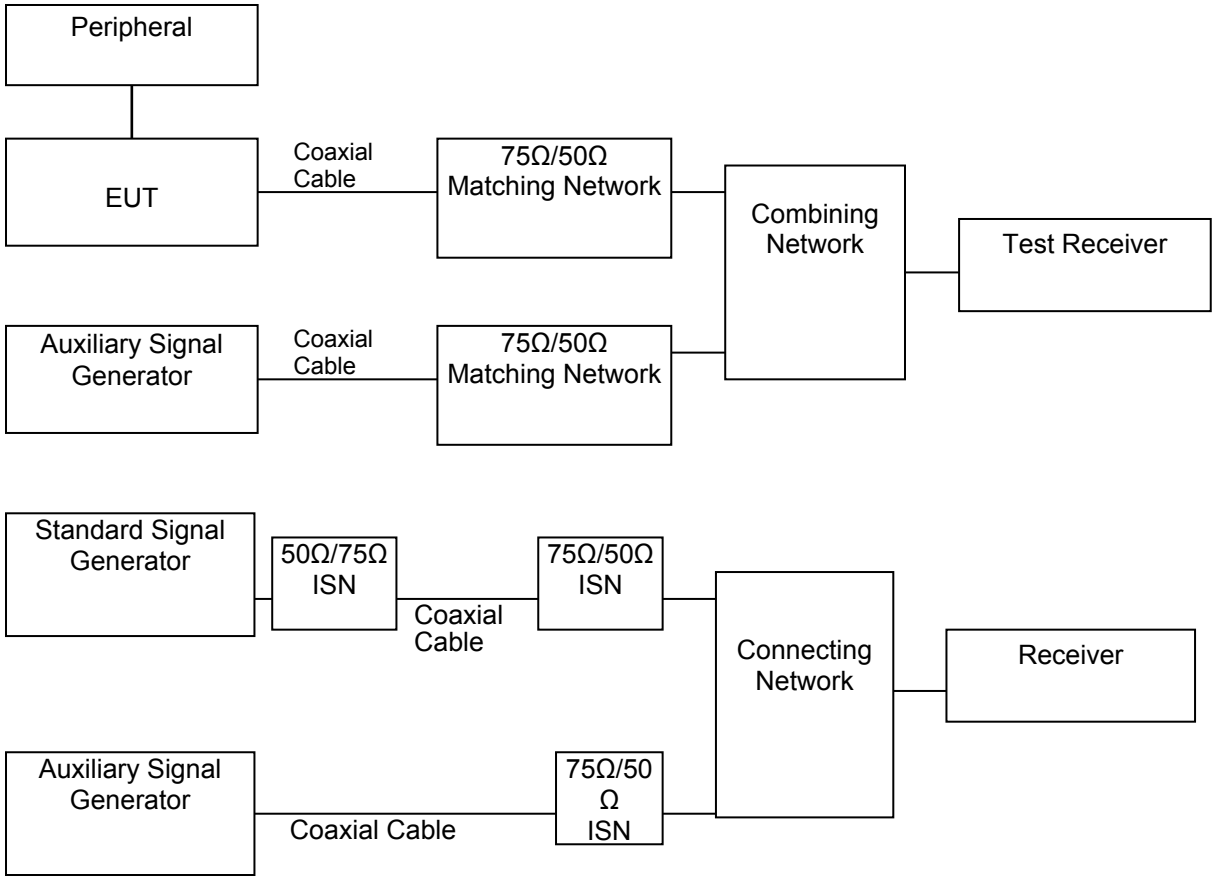


Back View (above 1GHz)

5. Voltage Disturbance Emissions at Antenna Terminals

5.1 Test Setup and Procedure

5.1.1 Test Setup



5.1.2 Test Procedure

The output level of the auxiliary signal generator was set to 70dBuV at the EUT antenna terminal with 75 ohms impedance with an un-modulated carrier.

The highest emissions 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 power of EUT was switched off to make sure the emission was not contributed by the auxiliary signal generator. While doing so, the interconnecting cables and major parts of the system were moved around to maximize the emission.

5.1.3 EMI Receiver Configuration (for the frequencies tested)

Frequency Range:	30MHz-2150MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz

5.1.4 Limit

Applicable to:

1. TV broadcast receiver tuner ports with an accessible connector.

2. RF modulator output ports.

3. FM broadcast receiver tuner ports with an accessible connector.

Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB(μV) 75 Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies ≤1 GHz Quasi Peak/ 120 kHz	46	46	46	See a)
	950 – 2 150		46	54	54	
A12.2	950 – 2 150		46	54	54	See b)
A12.3	30 – 300		46	54	50	See c)
	300 – 1 000				52	
A12.4	30 – 300	For frequencies ≥1 GHz Peak/ 1 MHz	46	66	59	See d)
	300 – 1 000				52	
A12.5	30 – 950		46	76	46	See e)
	950 – 2 150			n/a	54	

a) Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.

b) Tuner units (not the LNB) for satellite signal reception.

c) Frequency modulation audio receivers and PC tuner cards.

d) Frequency modulation car radios.

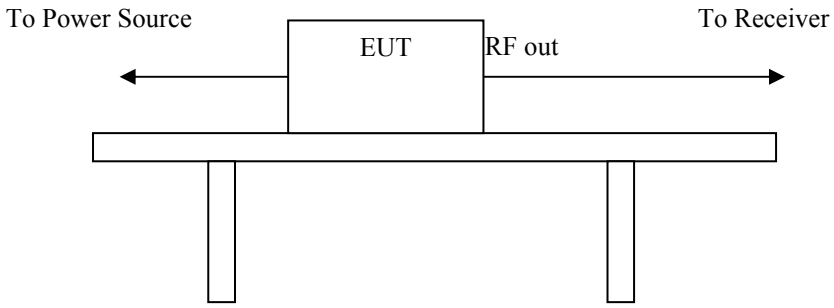
e) Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports.

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

6. Differential Voltage Emissions

6.1 Test Setup and Procedure

6.1.1 Test Setup



6.1.2 Test Procedure

The output level of the auxiliary signal generator was set to 70dBuV at the EUT antenna terminal with 75 ohms impedance with an un-modulated carrier.
The highest emissions 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 power of EUT was switched off to make sure the emission was not contributed by the auxiliary signal generator. While doing so, the interconnecting cables and major parts of the system were moved around to maximize the emission.

6.1.3 EMI Receiver Configuration (for the frequencies tested)

Frequency Range:	30MHz-2150MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz

6.1.4 Limit

Applicable to:

1. TV broadcast receiver tuner ports with an accessible connector.

2. RF modulator output ports.

3. FM broadcast receiver tuner ports with an accessible connector.

Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB(μV) 75 Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies ≤1 GHz Quasi Peak/ 120 kHz	46	46	46	See a)
	950 – 2 150		46	54	54	
A12.2	950 – 2 150		46	54	54	See b)
A12.3	30 – 300		46	54	50	See c)
	300 – 1 000				52	
A12.4	30 – 300	For frequencies ≥1 GHz Peak/ 1 MHz	46	66	59	See d)
	300 – 1 000				52	
A12.5	30 – 950		46	76	46	See e)
	950 – 2 150			n/a	54	

a) Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.

b) Tuner units (not the LNB) for satellite signal reception.

c) Frequency modulation audio receivers and PC tuner cards.

d) Frequency modulation car radios.

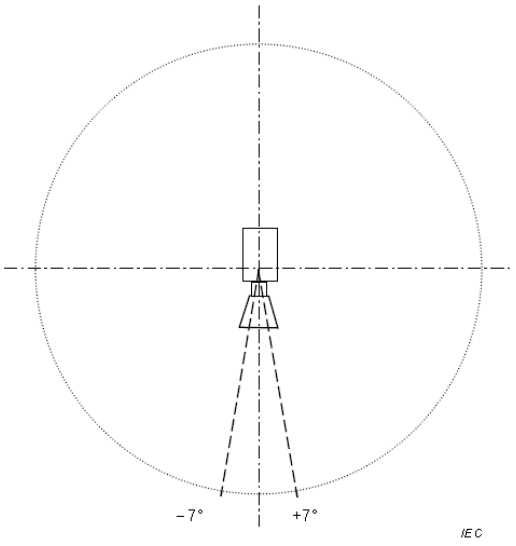
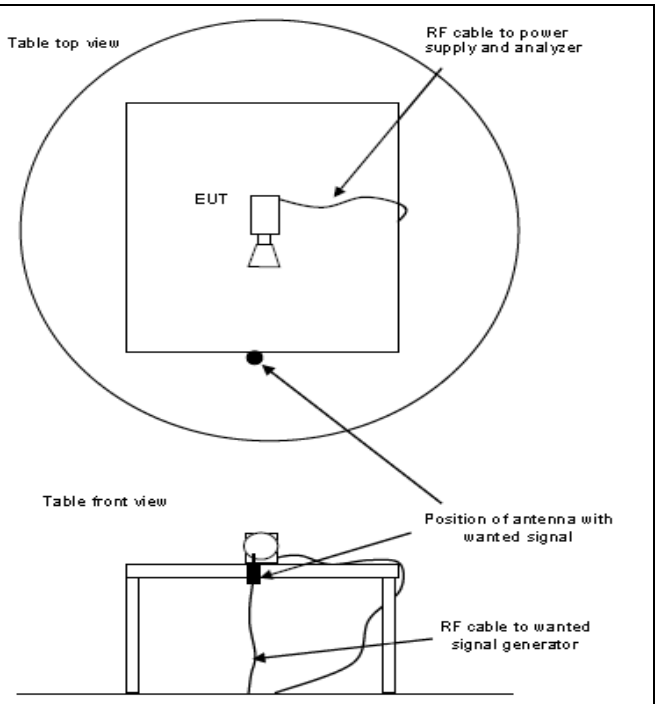
e) Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports.

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

7. Outdoor units of home satellite receiving systems

7.1 Test Setup and Procedure

7.1.1 Test Setup

	
Description of ±7° of the main beam axis of the EUT	Measurement arrangements of transmit antenna for the wanted signal

7.1.2 Test Procedure

The input signal shall be adjusted to get the maximum rated output level from the EUT. For the measurement in the frequency range from 30 MHz to 18 GHz the input signal shall be adjusted so that the output frequency is within this frequency range. For the measurement in the frequency range above 1 GHz, the frequency of the input signal shall be adjusted in such a way that the EUT is measured, as a minimum, at the lowest, middle and highest rated output frequency within the measured frequency range.

7.1.3 Spectrum Analyzer Configuration (for the frequencies tested)

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

Frequency Range: Above 1000MHz
Detector Function: Peak/Average Mode
Resolution Bandwidth: 1MHz

7.1.4 Limit

Table Clause	Frequency Range MHz	Measurement			Class B Limits	Applicable to
		Facility (see Table A.1)	Distance m	Detector type / Bandwidth		
A7.1	30 to 1 000	SAC / OATS / FAR	See Table A.4	Quasi Peak / 120 kHz	See Table A.4	
A7.2	1 000 to 2 500	FSOATS	3	Average / 1 MHz	50 dB(μV/m)	LO leakage and spurious radiated emissions from the EUT, in the region outside ±7° of the main beam axis. See Figure H.1
	2 500 to 18 000				64 dB(μV/m)	
A7.3	1 000 to 18 000	FSOATS	3	Average / 1 MHz	37 dB(μV/m)	LO leakage from the EUT, in the region within ±7° of the main beam axis. See Figure H.1
A7.4	1 000 to 18 000	Conducted (Clause H.4)	n/a	Average / 1 MHz	30 dBpW	
For details of the EUT configuration, see Annex H. For radiated emissions measurements at frequencies up to 1 GHz, the requirements defined in Table A.4 shall be satisfied. Apply the appropriate limits across the entire frequency range. Apply the limits defined in table Clause A7.1 and A7.2. Also apply the limits defined in either table Clause A7.3 or A7.4.						

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

8. Electrostatic discharge (ESD) immunity

8.1 Test Specification and Setup

8.1.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-2/ IEC 61000-4-2 (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

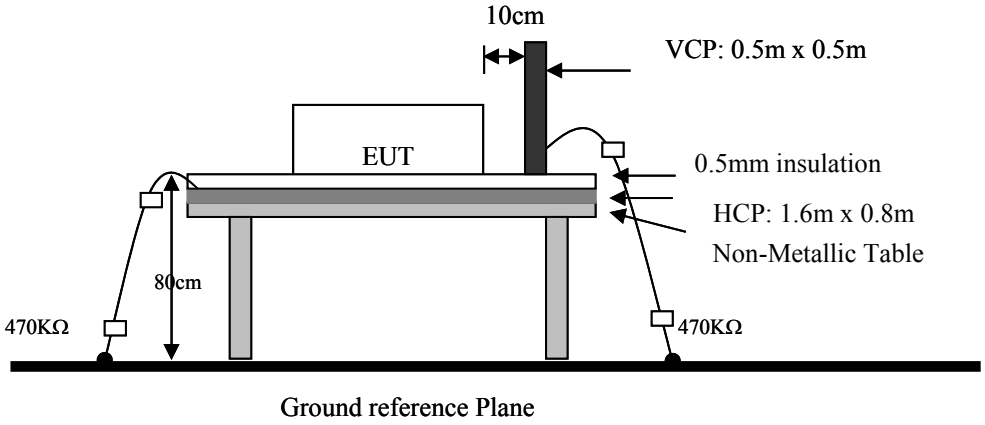
Air: discharges were applied to slots, aperture or insulating surfaces. 10 single air discharges were applied to each selected points.

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.

8.1.2 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.

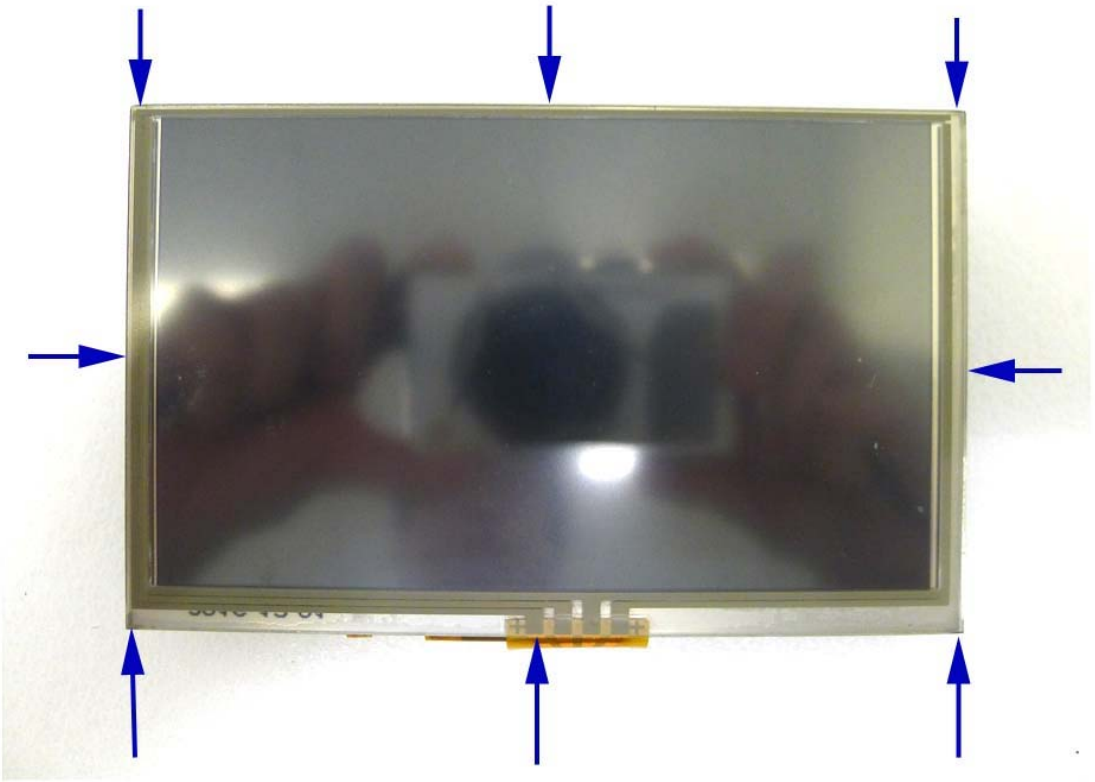


8.1.3 Test Result

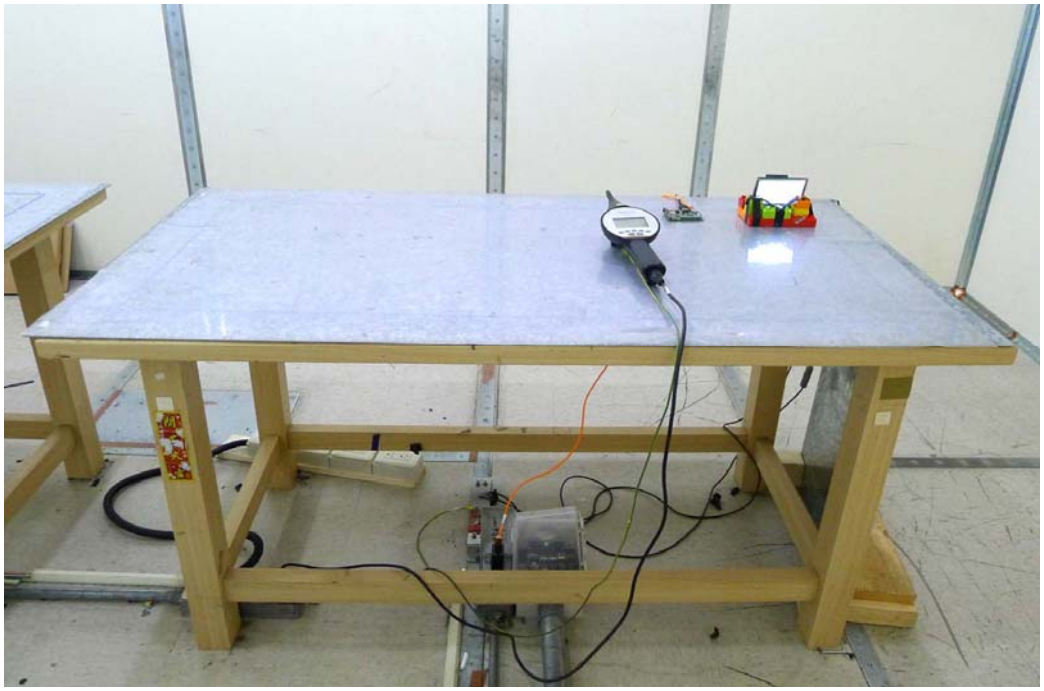
Performance of EUT complies with the given specification

8.2 Test Point

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



8.3 Test Setup Photo



9. Radio-Frequency, Electromagnetic Field immunity

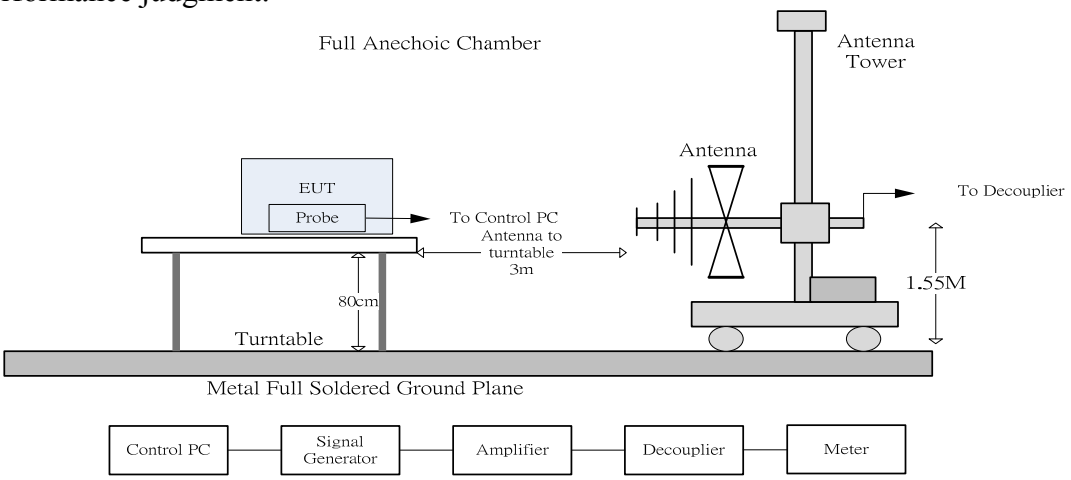
9.1 Test Specification and Setup

9.1.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-3/ IEC 61000-4-3 (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:	23°C
Humidity:	59%

9.1.2 Test Setup

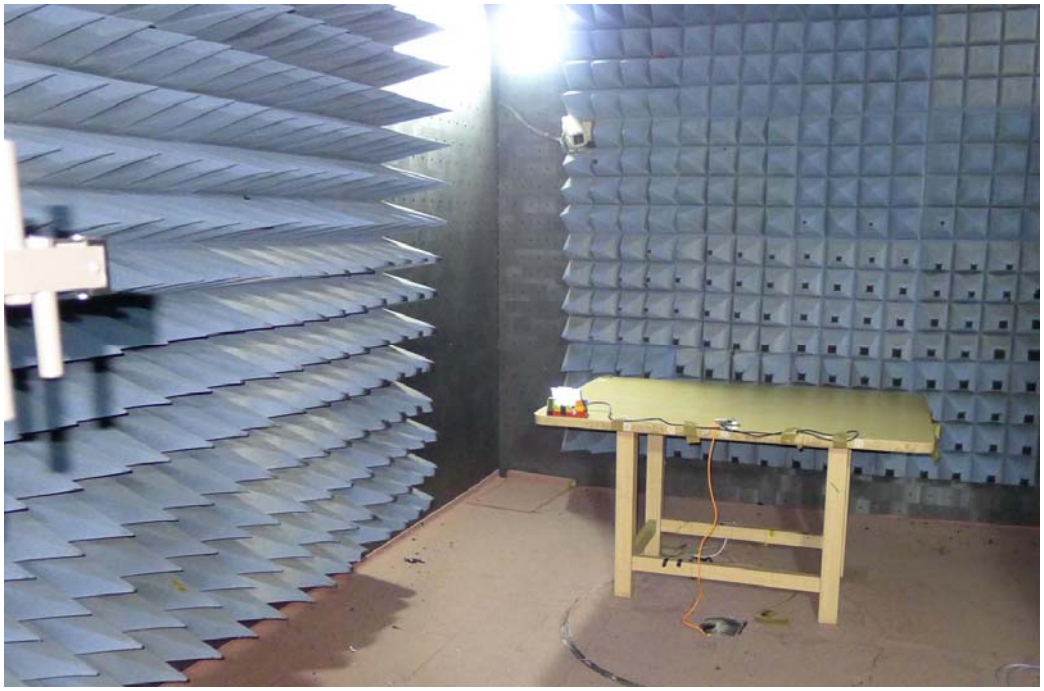
The field sensor is placed at one calibration grid point to check the intensity of the established fields on both polarizations. EUT is adjusted to have each side of EUT face coincident with the calibration plane. A CCD camera and speakers are used to monitor the condition of EUT for the performance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



9.1.3 Test Result

Performance of EUT complies with the given specification

9.2 Test Setup Photo



10. Electrical Fast transients/burst immunity

10.1 Test Specification and Setup

10.1.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-4/ IEC 61000-4-4 (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:	23 °C
Humidity:	60%

Test Procedure

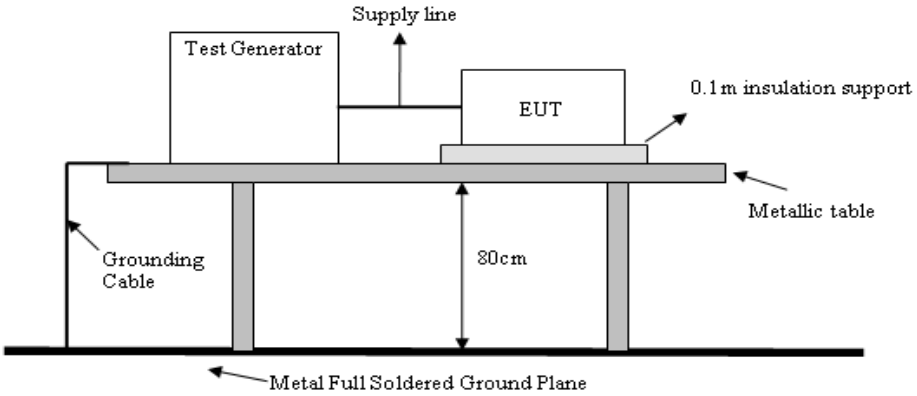
The EUT was setup on a nonconductive table 0.1 m above a reference ground plane.

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

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

10.1.2 Test Setup

EUT is at least 50cm from the conductive structure.



10.1.3 Test Result

Performance of EUT complies with the given specification

10.2 Test Setup Photo

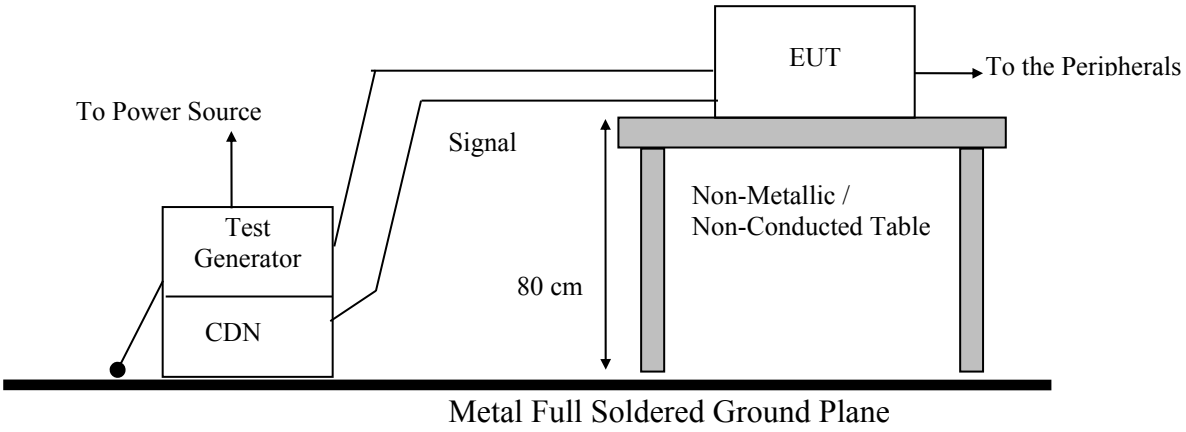
11. Surge Immunity

11.1 Test Specification and Setup

11.1.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-5/ IEC 61000-4-5 (details referred to Sec 1.2)
Test Level:	Line to Line: +/- 0.5 kV, +/- 1 kV
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:	22°C
Humidity:	61%

11.1.2 Test Setup



11.1.3 Test Result

Performance of EUT complies with the given specification

11.2 Test Setup Photo

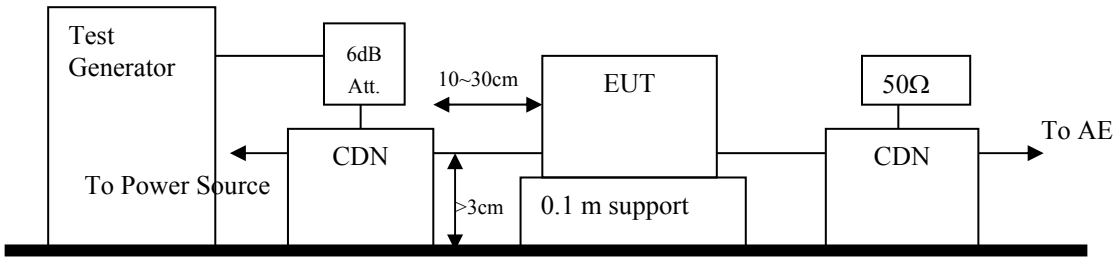
12. Immunity to Conductive Disturbance

12.1 Test Specification and Setup

12.1.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-6/ IEC 61000-4-6 (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:	58%

12.1.2 Test Setup



Reference Ground Plane

12.1.3 Test Result

Performance of EUT complies with the given specification

12.2 Test Setup Photo

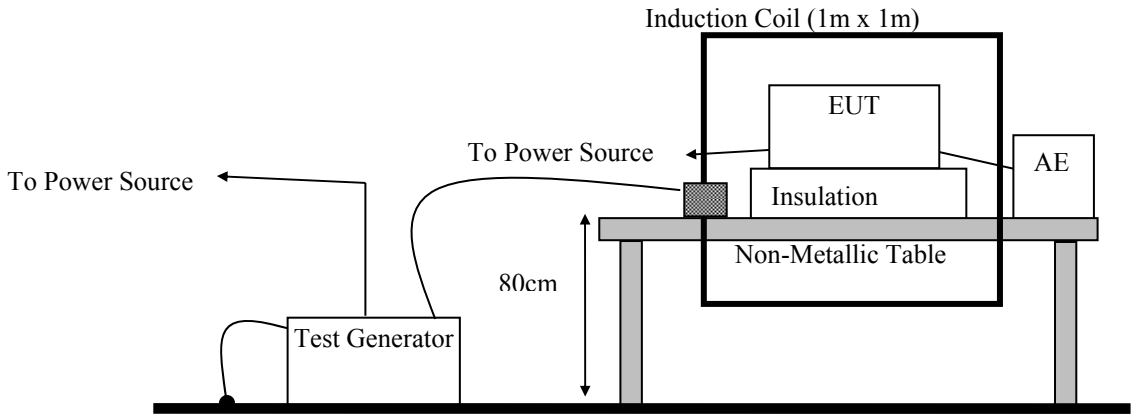
13. Power Frequency Magnetic Field immunity

13.1 Test Specification and Setup

13.1.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-8/ IEC 61000-4-8 (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:	22°C
Humidity:	59%

13.1.2 Test Setup



13.1.3 Test Result

Performance of EUT complies with the given specification

13.2 Test Setup Photo

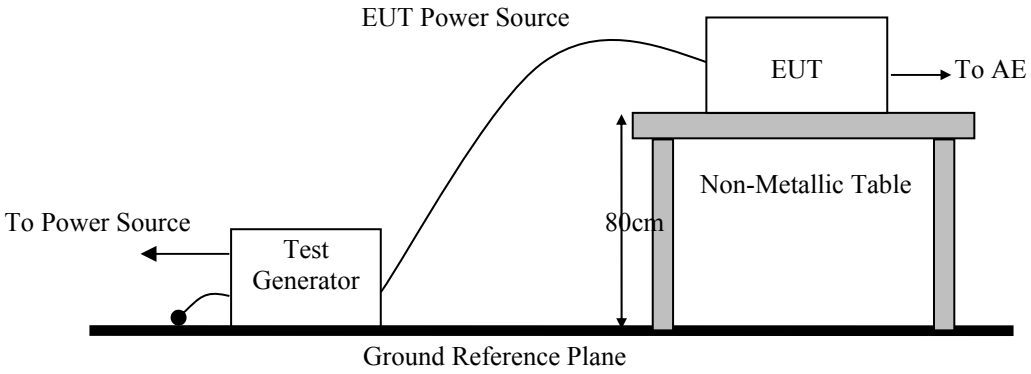
14. Voltage Dips, Short Interruption and Voltage Variation immunity

14.1 Test Specification and Setup

14.1.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-11/ IEC 61000-4-11 (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:	23°C
Humidity:	60%

14.1.2 Test Setup



14.1.3 Test Result

Performance of EUT complies with the given specification

14.2 Test Setup Photo

15. Harmonics

15.1 Test Specification and Setup

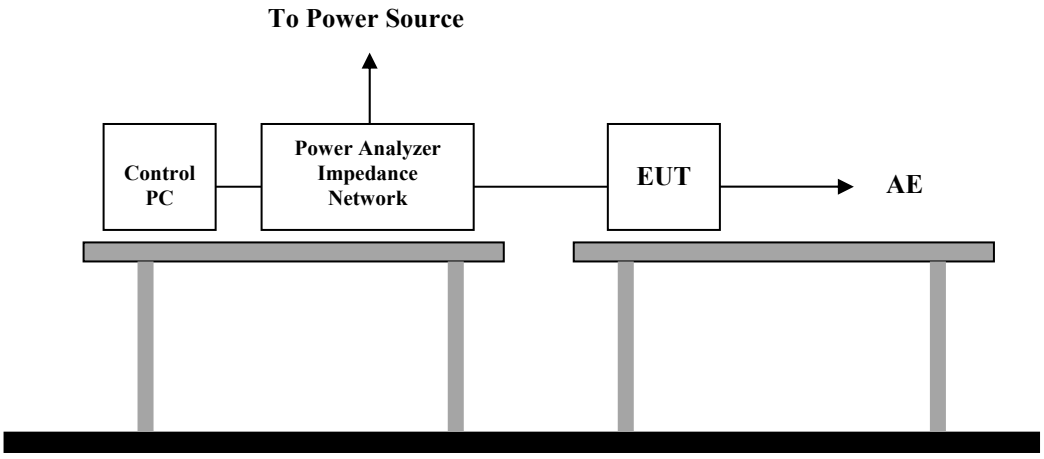
15.1.1 Test Specification

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:	A
Test Procedure	refer to ISL QA -T4-E-S14
Temperature:	23°C
Humidity:	60%

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.

15.1.2 Test Setup



15.1.3 Limit

Limits of Class **D** Harmonics Currents

Harmonics Order N	Maximum Permissible harmonic current per watt mA/W	Maximum Permissible harmonic current A
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$13 \leq n \leq 39$ (odd harmonics only)	3.85/n	See limit of Class A

15.1.4 Test Result

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

16. Voltage Fluctuations

16.1 Test Specification and Setup

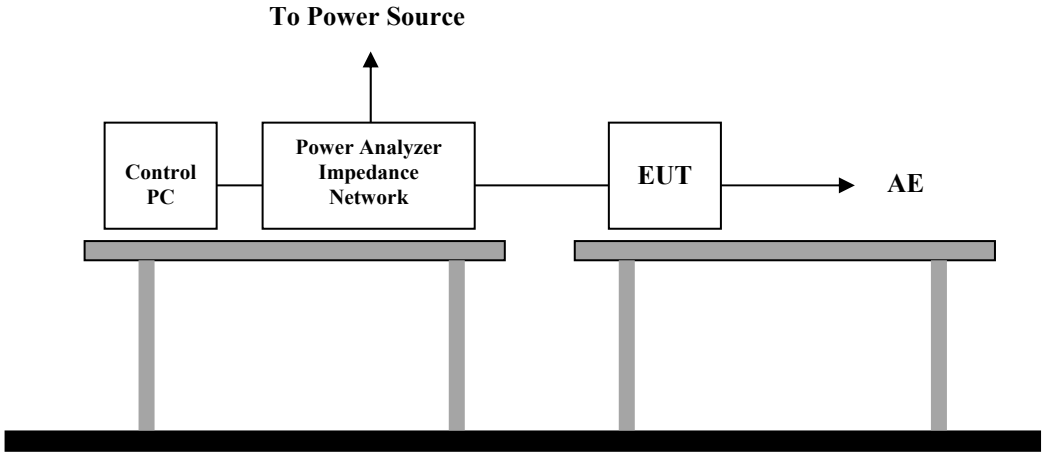
16.1.1 Test Specification

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:	23°C
Humidity:	60%

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.

16.1.2 Test Setup



16.1.3 Test Result

Performance of EUT complies with the given specification.

16.2 Test Data

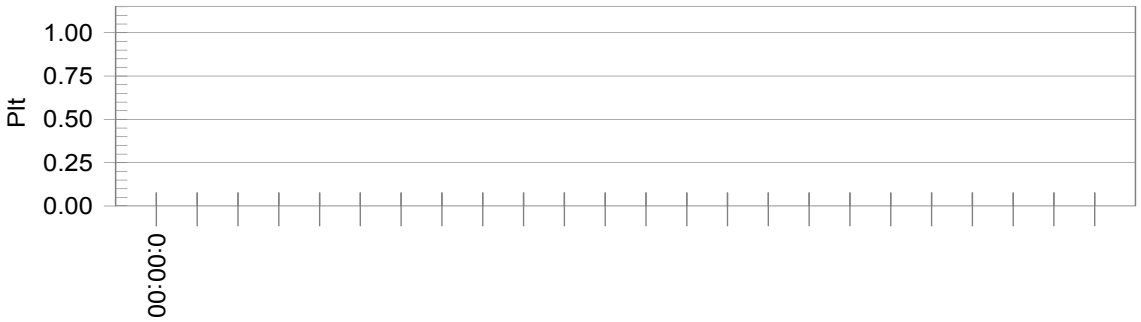
Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

Test duration (min): 10 **Data file name: CTSMXL_F-002958.cts_data**

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**

Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	**229.83**			
Highest dt (%):	**0.00**	**Test limit (%):**	**N/A**	**N/A**
T-max (mS):	**0.0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.06**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.064**	**Test limit:**	**1.000**	**Pass**
Highest Plt (2 hr. period):	**0.028**	**Test limit:**	**0.650**	**Pass**

16.3 Test Setup Photo

17. Appendix

17.1 Appendix A: Test Equipment

17.1.1 Test Equipment List

Location Con02	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction 02	LISN 20	R&S	ENV216	101477	07/15/2017	07/15/2018
Conduction 02	LISN 23	FCC	FCC-LISN-50-25-2-01	07038	12/30/2016	12/30/2017
Conduction 02	Conduction 02-1 Cable	WOKEN	CFD 300-NL	Conduction 02 -1	08/29/2016	08/29/2017
Conduction 02	EMI Receiver 14	ROHDE& SCHWARZ	ESCI	101034	06/06/2017	06/06/2018

Location Chmb12	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation (Chamber12)	BILOG Antenna 18	Schwarzbeck	Schwarzbeck VULB 9168+EMCI-N-6-05	646	01/05/2017	01/05/2018
Radiation (Chamber12)	Preamplifier 26	EMCI	EMC9135	980297	12/27/2016	12/27/2017
Radiation (Chamber12)	Coaxial Cable Chmb 12-10M-01	PEWC	CFD400-NL	Chmb 12-10M-01	10/13/2016	10/13/2017
Radiation (Chamber12)	EMI Receiver 10	ROHDE & SCHWARZ	ESCI	100567	08/11/2016	08/11/2017

Location Chmb14	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Rad. Above 1GHz	Spectrum Analyzer 24 (1G~26.5GHz)	Agilent	N9010A	MY49060537	08/11/2016	08/11/2017
Rad. Above 1GHz	Horn Antenna 06 (1G~18G)	ETS	3117	00066665	11/30/2016	11/30/2017
Rad. Above 1GHz	Preamplifier 13 (1G-18G)	MITEQ	JS44-00101800 -25-10P-44	1329256	08/12/2016	08/12/2017
Rad. Above 1GHz	Microwave Cable 24	HUBER SUHNER	EMC104-NM-SM-800	140905	09/26/2016	09/26/2017
Rad. Above 1GHz	Microwave Cable 29	EMC Instruments	EMC104-NM-SM-6000	170107	02/23/2017	02/23/2018

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
EN61K-4-2	ESD Gun 06	EM TEST	Dito	V0729102699	07/05/2017	07/05/2018
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	10/05/2016	10/05/2017
EN61K-4-4	EFT and SURGE Test System	EM TEST	UCS-500 M6B	V0728102674	02/08/2017	02/08/2018
EN61K-4-4	Capacitive Coupling Clamp	EM TEST	HFK	0907-106	02/08/2017	02/08/2018
EN61K-4-5	CDN-UTP8 ED3	EMC-PARTNER	CDN-UTP8	1509	04/18/2017	04/18/2018
EN61K-4-5	SURGE-TESTER	EMC Partner	MIG0603IN3	523	04/14/2017	03/10/2018
EN61K-4-6	CDN M2+M3 02	Frankonia	CDN M2+M3	A3011024	09/14/2015	09/14/2017
EN61K-4-6	CDN T2 04	FCC Inc.	FCC-801-T2	02067	08/16/2016	08/16/2017
EN61K-4-6	CDN T4 06	FCC Inc.	FCC-801-T4	02017	08/04/2016	08/04/2017
EN61K-4-6	CDN T8-10_1	Teseq GmbH	CDN T8 10	41242	02/22/2017	02/22/2018
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-DC	126B1301/2014	02/23/2017	02/23/2018
EN61K-4-6	EM-Clamp	Schaffner	KEMZ-801	19215	10/11/2016	10/11/2017
EN61K-4-8	Magnetic Field Immunity Loop	FCC	F-1000-4-8-L-1M	01037	06/09/2017	06/09/2018
EN61K-4-8	Magnetic Field Test Generator	FCC	F-1000-4-8-G-125A	01038	06/09/2017	06/09/2018
EN61K-4-11	Voltage Dip and UP Simulator	NoiseKen	VDS-2002	VDS0640162	11/10/2016	11/10/2017
EN61K-3-2/3, EN61K-3-11-12	(Harmonic/Flicker) MX Series CTSH Compliance Test System	California Instruments	MX60T04GH 10400	72793	06/20/2017	06/20/2018

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

****Software for Controlling Spectrum/Receiver and Calculating Test Data**

Test Item	Filename	Version
EN61000-3-2	California Instruments	CTSMXL V2.13.1
EN61000-3-3	California Instruments	CTSMXL V2.13.1
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	FRANKONIA CD-LAB	V5.221
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

17.2 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: ±2.88dB

<Chamber 12 (10M)>
Horizontal
30MHz~200MHz: ±3.93dB
200MHz~1000MHz: ±4.09dB
Vertical
30MHz~200MHz: ±4.58dB
200MHz~1000MHz: ±3.99dB

<Chamber 14 (3M)>
1GHz~6GHz: ±4.94dB

<Immunity 02>

Test item	Uncertainty	Test item	Uncertainty
EN 61000-4-2 (ESD)		EN 61000-4-6 (CS)	
Rise time tr	≦ 15%	CDN	± 1.36dB
Peak current Ip	≦ 6.3%	EM Clamp	± 3.19dB
current at 30 ns	≦ 6.3%	EN 61000-4-8 (Magnetic)	± 5.59%
current at 60 ns	≦ 6.3%	EN 61000-4-11 (Dips)	
EN 61000-4-3 (RS)	± 2.19dB	Time	± 2.80%
EN 61000-4-4 (EFT)		Voltage	± 0.04%
voltage rise time (tr)	± 6.2%	EN 61000-4-34 (Dips)	
peak voltage value (VP)	± 8.6%	Time	± 2.80%
voltage pulse width (tw)	± 5.9%	Voltage	± 1.70%
EN 61000-4-5 (Surge)			
Time	± 3.9%		
Voltage	± 3.9%		
Current	± 2.7%		

Test item	Uncertainty	Test item	Uncertainty
EN 61000-3-2 (Harmonics)	± 3.98 %	EN 61000-3-12 (Harmonics)	Voltage ±0.10% Current ±0.15%
EN 61000-3-3 (Fluctuations and Flicker)	± 3.98 %	EN 61000-3-11 (Fluctuations and Flicker)	Voltage ±0.10% Current ±0.15%

17.3 Appendix C: Photographs of EUT

Please refer to the File of **ISL-*17LE479*P**