

Certificate

Issue Date: March 2, 2021

Ref. Report No. ISL-21LE053CE35-MA

Product Name : TEN 3WIRH/ TEN 6WIRH/ TEN 10WIRH Series
Model(s) : TEN 10-11013WIRH; TEN 10-11022WIRH
TEN 10-11010WIRH; TEN 10-11011WIRH; TEN 10-11012WIRH;
TEN 10-11015WIRH; TEN 10-11021WIRH; TEN 10-11023WIRH;
TEN 6-11010WIRH; TEN 6-11011WIRH; TEN 6-11012WIRH;
TEN 6-11013WIRH; TEN 6-11015WIRH; TEN 6-11021WIRH;
TEN 6-11022WIRH; TEN 6-11023WIRH; TEN 6-11011WIRH-B1;
TEN 3-11010WIRH; TEN 3-11011WIRH; TEN 3-11012WIRH;
TEN 3-11013WIRH; TEN 3-11022WIRH; TEN 3-11015WIRH;
TEN 3-11021WIRH; TEN 3-11023WIRH; TEN 3-11011WIRH-B1
Applicant : TRACO ELECTRONIC AG



Brand : TRACO POWER
Address : Sihlbruggstrasse 111 CH-6340 Baar Switzerland

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

The sample ISL received which 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. And Our laboratories is the accredited laboratories and are approved according to ISO/IEC 17025. The device was passed the test performed according to :



Standards:

EN 55032:2015+AC: 2016, CISPR 32: 2015+COR1:2016: Class A
AS/NZS CISPR 32:2015: Class A
EN 55035: 2017 and CISPR 35: 2016
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+A1:2017 and IEC 61000-4-5: 2014+A1:2017
EN 61000-4-6: 2014+AC: 2015 and IEC 61000-4-6:2013
EN 61000-4-8: 2010 and IEC 61000-4-8: 2009

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.

The determination of the test results is determined by customer agreement, regulations or standard document specifications.

The Laboratory evaluates measurement inaccuracies based on regulatory or standard document specifications and is listed in the report for reference. The quantitative project part judges the conformity of the test results based on the evaluation results of the standard cited uncertainty, and the qualitative project does not temporarily evaluate the measurement uncertainty.

A handwritten signature in black ink, reading 'Angus Chu'.

Angus Chu / Director

International Standards Laboratory Corp. LT Lab.

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CE TEST REPORT

of

EN 55032 / CISPR 32 / AS/NZS CISPR 32

Class A

EN 55035 / CISPR 35 / IMMUNITY

Product : **TEN 3WIRH/ TEN 6WIRH/ TEN 10WIRH Series**
Model(s): **TEN 10-11013WIRH; TEN 10-11022WIRH**
(more serial models listed on 1.3 of this test report)



Brand: **TRACO POWER**
Applicant: **TRACO ELECTRONIC AG**
Address: **Sihlbruggstrasse 111 CH-6340 Baar Switzerland**

Test Performed by:



International Standards Laboratory Corp. LT Lab.

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No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

Report No.: **ISL-21LE053CE35-MA**

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This report totally contains 61 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. The uncertainty of the measurement does not include in consideration of the test result unless the customer required the determination of uncertainty via the agreement, regulation or standard document specification. This test report shall not be reproduced except in full, without the written approval of International Standards Laboratory Corp.

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1. General

1.1 Certification of Accuracy of Test Data

Standards: Please refer to 1.2
Equipment Tested: TEN 3WIRH/ TEN 6WIRH/ TEN 10WIRH Series
Model: TEN 10-11013WIRH; TEN 10-11022WIRH
(more serial models listed on 1.3 of this test report)



Brand: TRACO POWER
Applicant: TRACO ELECTRONIC AG
Sample received Date: December 18, 2020
Final test Date: EMI: refer to the date of test data
EMS: January 14, 2021
Test Site: Chamber 02; Chamber 14
Test Distance: 10m; 3m (above 1GHz) (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: Radiation input power: DC 110 V
Immunity input power: DC 110 V
Test Result: PASS
Report Engineer: Cheryl Tung
Test Engineer: Sawyer Chiang

Sawyer Chiang

Approved By:



Benson Chen / Associate Director

1.2 Test Standards

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

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	N/A	N/A	N/A
Telecommunication Port Conducted Emissions (asymmetric mode)	N/A	N/A	N/A
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

EN 55035:2017 and CISPR 35:2016: 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+A1:2017 IEC 61000-4-5:2014+A1:2017	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

1.2.1 Performance Criteria for Compliance: EN 55035

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment 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 equipment if used as intended.

Performance criterion B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment 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), or recovery time, 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 equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

1.3 Model Number Definition

There is more than one model number for this product, please refer the details listed below:

TEN 10-11013WIRH; TEN 10-11022WIRH

TEN 10-11010WIRH; TEN 10-11011WIRH; TEN 10-11012WIRH; TEN 10-11015WIRH;

TEN 10-11021WIRH; TEN 10-11023WIRH;

TEN 6-11010WIRH; TEN 6-11011WIRH; TEN 6-11012WIRH; TEN 6-11013WIRH;

TEN 6-11015WIRH; TEN 6-11021WIRH; TEN 6-11022WIRH; TEN 6-11023WIRH;

TEN 6-11011WIRH-B1;

TEN 3-11010WIRH; TEN 3-11011WIRH; TEN 3-11012WIRH; TEN 3-11013WIRH;


TEN 3-11022WIRH; TEN 3-11015WIRH; TEN 3-11021WIRH; TEN 3-11023WIRH;

TEN 3-11011WIRH-B1

1.4 Description of EUT

EUT

This report test data using the report number 21LE053CE35

Description	TEN 3WIRH/ TEN 6WIRH/ TEN 10WIRH Series
Condition	Pre-Production
Model	TEN 10-11013WIRH; TEN 10-11022WIRH (more serial models listed on 1.3 of this test report)
Brand	 TRACO POWER
Test Model	TEN 10-11013WIRH; TEN 10-11022WIRH
Serial Number	N/A
Highest working frequency	Less than 108MHz

For EMI test configuration:

Configuration	Model Name	Input VDC	Output Voltage VDC
1	TEN 10-11013WIRH	110	15
2	TEN 10-11022WIRH	110	±12

For EMS (Not Include Electrical Fast transients/burst immunity & Surge Immunity) test mode

Configuration	Model Name	Input VDC	Output Voltage VDC	With an aluminum electrolytic capacitor test board
1	TEN 10-11013WIRH	110	15	No

For Electrical Fast transients/burst immunity & Surge Immunity test mode

Configuration	Model Name	Input VDC	Output Voltage VDC	With an aluminum electrolytic capacitor test board
1	TEN 10-11013WIRH	110	15	Yes

Different Model list:

Model Name	Input Range (VDC)	Output Voltage (VDC)
TEN 3-11010WIRH	36~160	3.3
TEN 3-11011WIRH	36~160	5
TEN 3-11011WIRH-B1	36~160	5.1
TEN 3-11012WIRH	36~160	12
TEN 3-11013WIRH	36~160	15
TEN 3-11015WIRH	36~160	24
TEN 3-11021WIRH	36~160	±5
TEN 3-11022WIRH	36~160	±12
TEN 3-11023WIRH	36~160	±15
TEN 6-11010WIRH	36~160	3.3
TEN 6-11011WIRH	36~160	5
TEN 6-11011WIRH-B1	36~160	5.1
TEN 6-11012WIRH	36~160	12
TEN 6-11013WIRH	36~160	15
TEN 6-11015WIRH	36~160	24
TEN 6-11021WIRH	36~160	±5
TEN 6-11022WIRH	36~160	±12
TEN 6-11023WIRH	36~160	±15
TEN 10-11010WIRH	36~160	3.3
TEN 10-11011WIRH	36~160	5.1
TEN 10-11012WIRH	36~160	12
TEN 10-11013WIRH	36~160	15
TEN 10-11015WIRH	36~160	24
TEN 10-11021WIRH	36~160	±5
TEN 10-11022WIRH	36~160	±12
TEN 10-11023WIRH	36~160	±15

EMI Noise Source:

Please refer to the technical documents.

Solution:

For EMI: N/A

For Electrical Fast transient & Surge Immunity test requirements

TEN 10	With 2 pcs of aluminum electrolytic capacitor (Nippon chemi-con KXJ series, 220μF/200V) and a TVS (SMBJ220A, 220V, 600Watt peak pulse power) in parallel.
TEN 6	
TEN 3	

1.5 Description of Support Equipment

For EMI test Configuration Support unit: 1~2

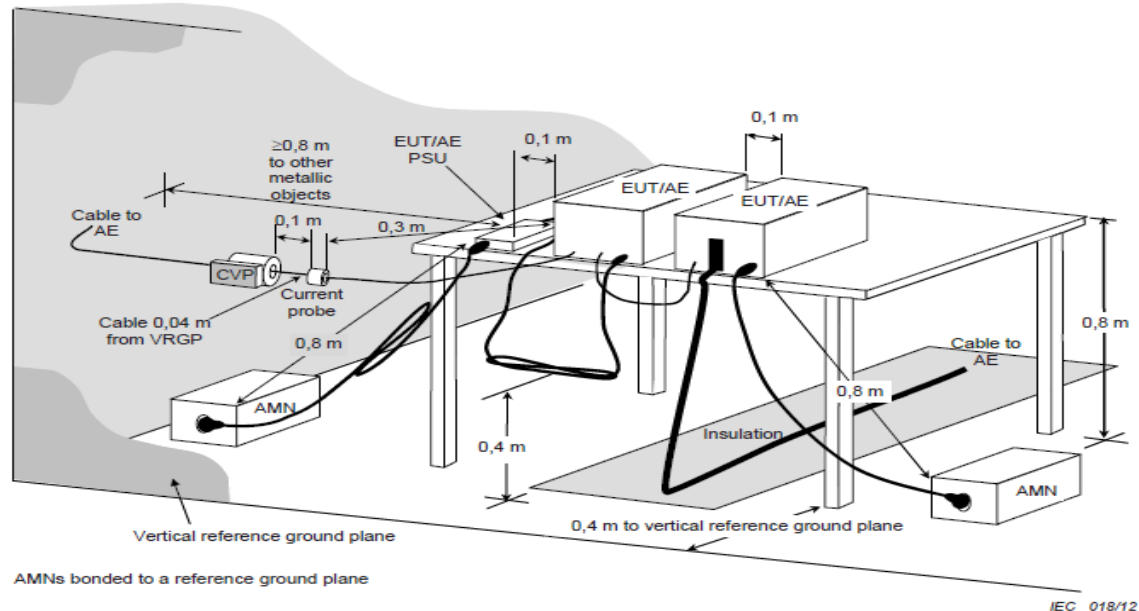
For EMS test Configuration Support unit: 1~3

No	Unit	Model Serial No.	Brand	Power Cord	FCC ID
1	DC Power Source	GPD-4050D S/N: N/A	GW INSTEK	Non-shielded	FCC DOC
2	Dummy Load	N/A S/N: N/A	N/A	N/A	N/A
3	DC Voltage meter	BN-670 S/N: N/A	Bonny	N/A	N/A

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(μ V)	dB(μ V)
0.15-0.50	79	66
0.50-30	73	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(μ V)	dB(μ V)
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		

3.1 Test Setup and Procedure

The diagram illustrates the test setup for measuring the common mode impedance of a power supply unit (PSU) and its associated equipment under test (EUT/AE). The setup is mounted on a table with a vertical reference ground plane. Key components and dimensions include:

- Current probe:** Positioned to measure the common mode current on the cable to the AE. It is connected to a CVP (Current Voltage Probe) and a cable 0.04 m from the VRGP.
- Distances:**
 - ≥ 0.8 m to other metallic objects.
 - 0.1 m between the current probe and the cable to the AE.
 - 0.3 m between the current probe and the PSU.
 - 0.1 m between the PSU and the EUT/AE.
 - 0.1 m between the EUT/AE and the cable to the AE.
 - 0.8 m between the cable to the AE and the AMN (Antenna Measurement Network).
 - 0.4 m between the cable to the AE and the vertical reference ground plane.
 - 0.4 m between the cable to the AE and the insulation.
 - 0.8 m between the cable to the AE and the AMN.
- Components:** EUT/AE, PSU, Cable to AE, CVP, Current probe, AMN, Insulation, Vertical reference ground plane.

AMNs bonded to a reference ground plane

IEC 018/12

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.

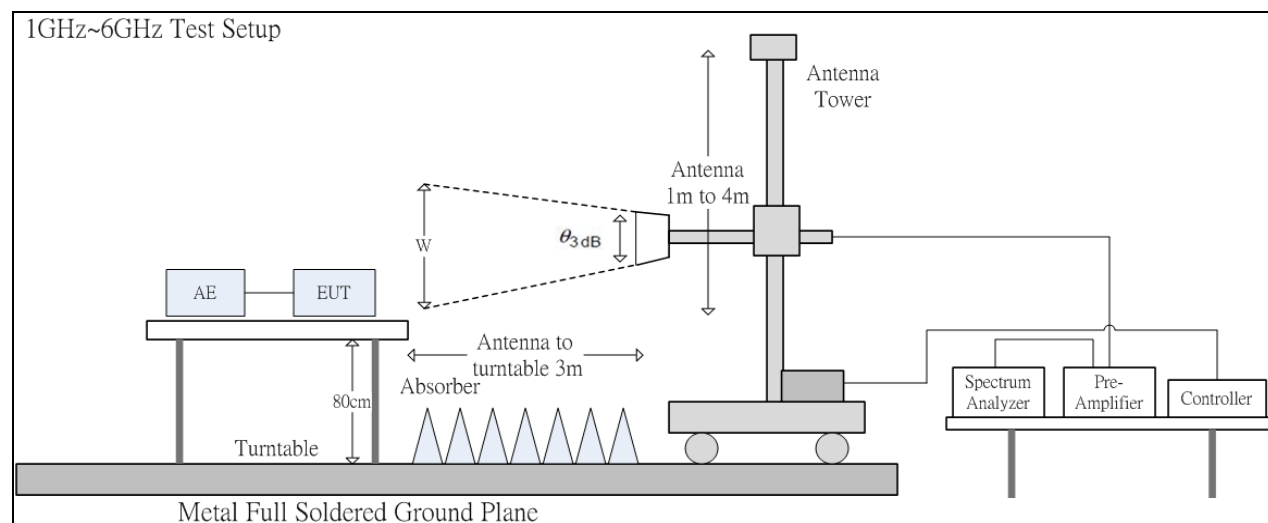
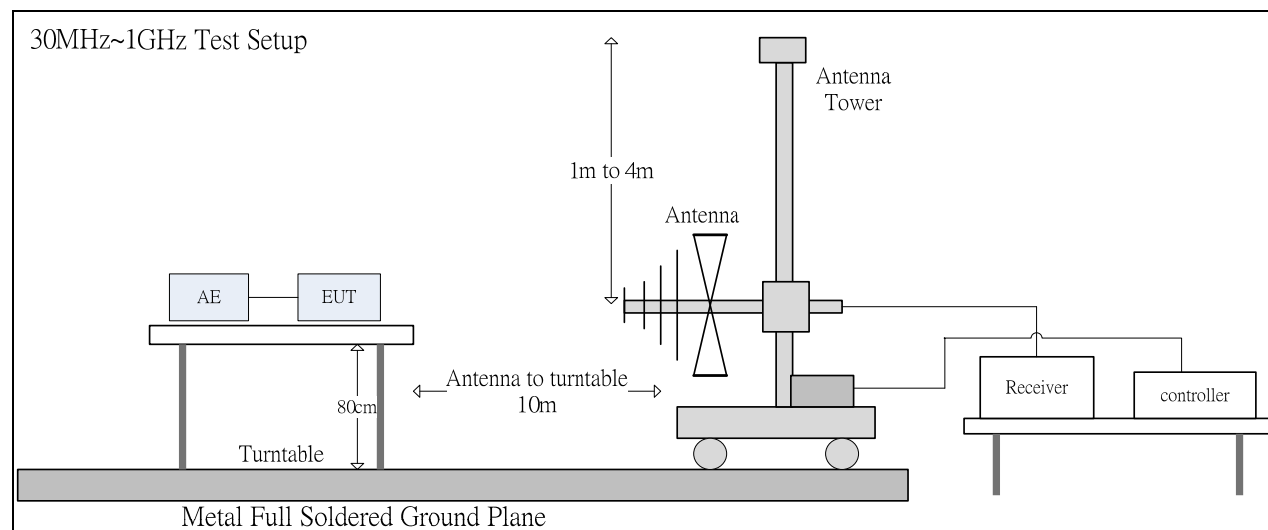
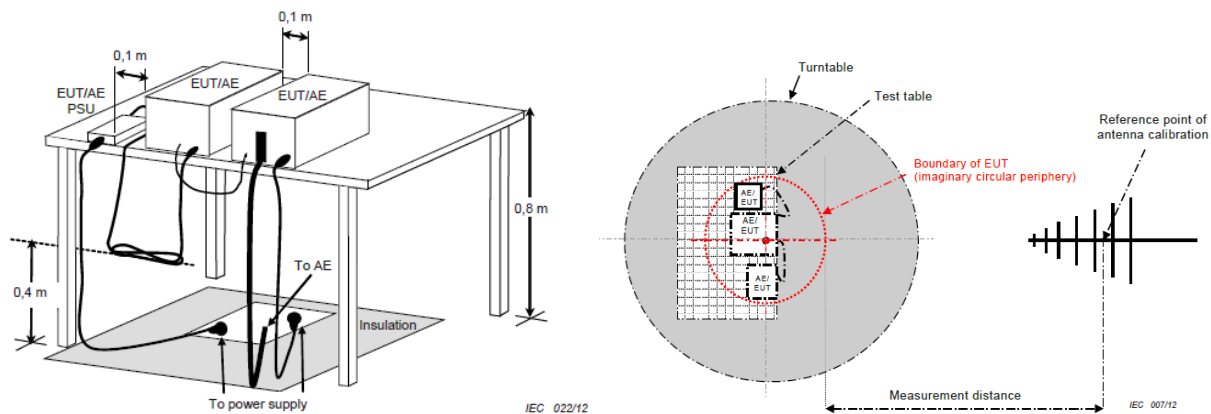
Frequency range MHz	Coupling device	Detector type / bandwidth	Class_B voltage limits dB(μV)	Class_B current limits dB(μA)
0.15-0.5	AAN	Quasi Peak / 9 kHz	84-74	n/a
0.5-30			74	
0.15-0.5	AAN	Average / 9 kHz	74-64	
0.5-30			64	
0.15-0.5	CVP and current probe	Quasi Peak / 9 kHz	84-74	40-30
0.5-30			74	30
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	$\theta_{3\text{dB}}(\text{min})$	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 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 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(μ V/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

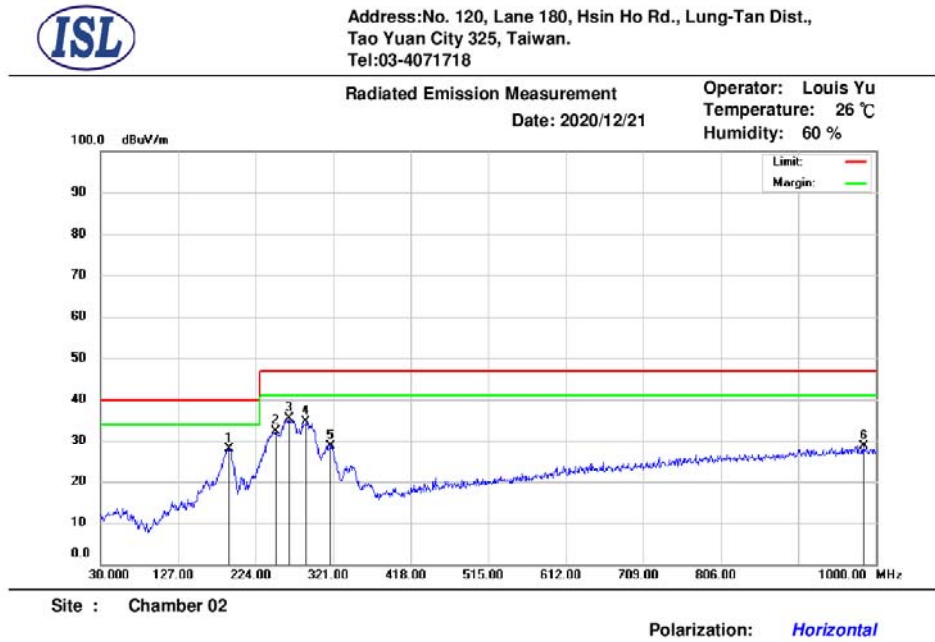
Radiated emissions at frequencies above 1 GHz for Class B equipment:

Frequency range MHz	Measurement		Class_B limits dB(μ V/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	191.02	45.97	-18.12	27.85	40.00	-12.15	399	214	peak
2	249.22	48.61	-16.24	32.37	47.00	-14.63	300	222	peak
3	265.71	51.02	-15.64	35.38	47.00	-11.62	300	222	peak
4	287.05	49.08	-14.52	34.56	47.00	-12.44	399	224	peak
5	318.09	42.23	-13.57	28.66	47.00	-18.34	300	241	peak
6	984.48	29.07	-0.51	28.56	47.00	-18.44	399	159	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

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

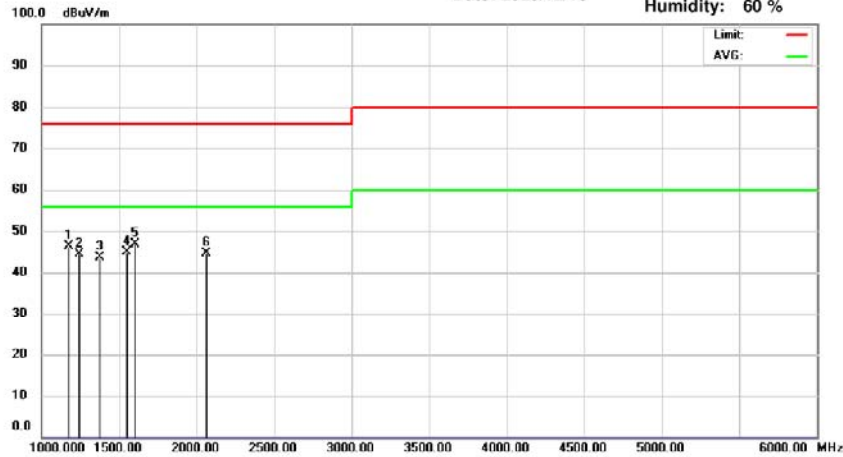
Radiated Emission Measurement

Date: 2020/12/18

Operator: Hasan Yu

Temperature: 26 °C

Humidity: 60 %



Site : Chamber 14

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	1175.00	62.41	-16.07	46.34	76.00	-29.66	200	318	peak
2	1245.00	60.50	-16.20	44.30	76.00	-31.70	200	307	peak
3	1375.00	59.60	-15.96	43.64	76.00	-32.36	200	263	peak
4	1550.00	61.23	-16.36	44.87	76.00	-31.13	200	314	peak
5	1600.00	62.82	-15.92	46.90	76.00	-29.10	200	296	peak
6	2065.00	57.00	-12.31	44.69	76.00	-31.31	200	360	peak

* Note:

Margin = Emission – Limit

Emission = Radiated Amplitude + Correct Factor

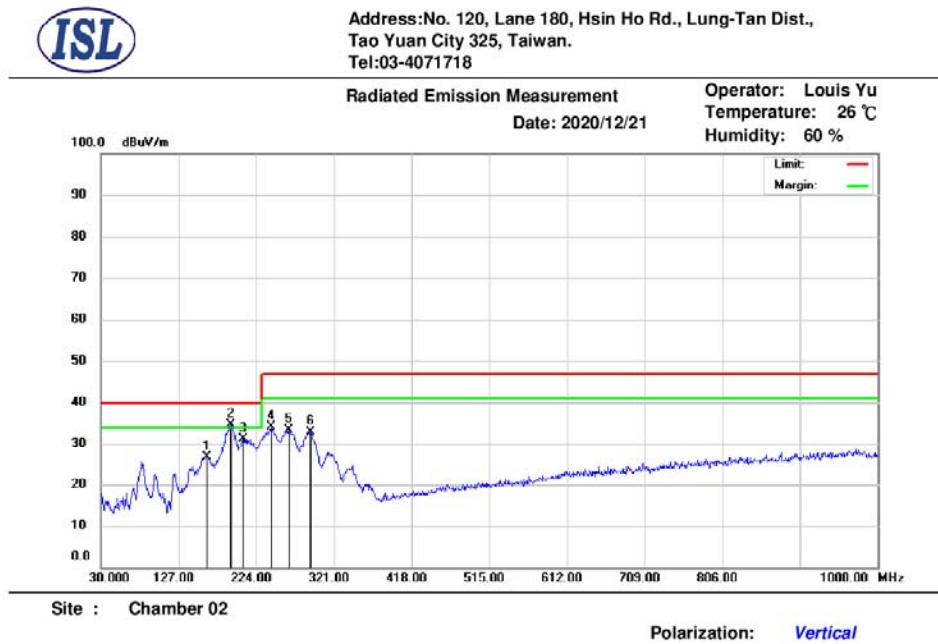
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

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	162.89	42.39	-15.68	26.71	40.00	-13.29	100	38	peak
2	191.99	52.79	-18.20	34.59	40.00	-5.41	100	360	peak
3	207.51	49.52	-18.44	31.08	40.00	-8.92	100	11	peak
4	242.43	50.70	-16.49	34.21	47.00	-12.79	100	183	peak
5	264.74	49.09	-15.70	33.39	47.00	-13.61	100	38	peak
6	291.90	47.35	-14.38	32.97	47.00	-14.03	100	28	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

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

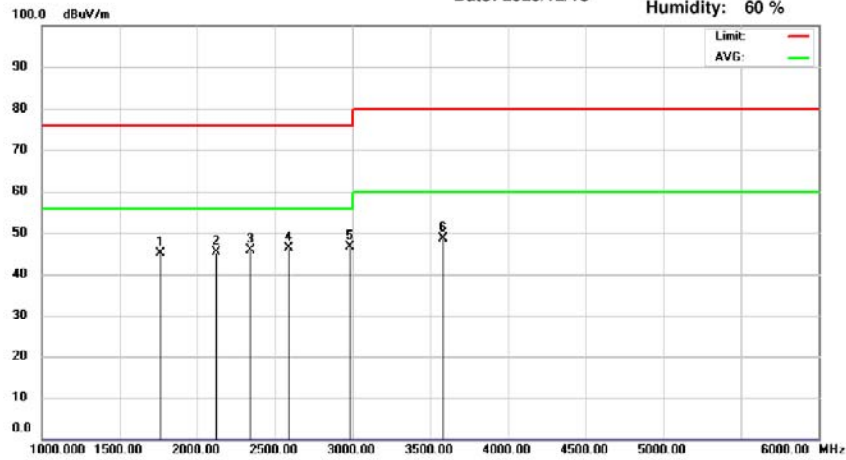
Radiated Emission Measurement

Date: 2020/12/18

Operator: Hasan Yu

Temperature: 26 °C

Humidity: 60 %



Site : Chamber 14

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	1760.00	59.32	-14.23	45.09	76.00	-30.91	200	179	peak
2	2120.00	57.73	-12.28	45.45	76.00	-30.55	150	70	peak
3	2340.00	57.91	-12.09	45.82	76.00	-30.18	100	143	peak
4	2590.00	57.59	-11.23	46.36	76.00	-29.64	150	150	peak
5	2985.00	57.37	-10.68	46.69	76.00	-29.31	100	218	peak
6	3580.00	58.30	-9.66	48.64	80.00	-31.36	200	154	peak

* Note:

Margin = Emission – Limit

Emission = Radiated Amplitude + Correct Factor

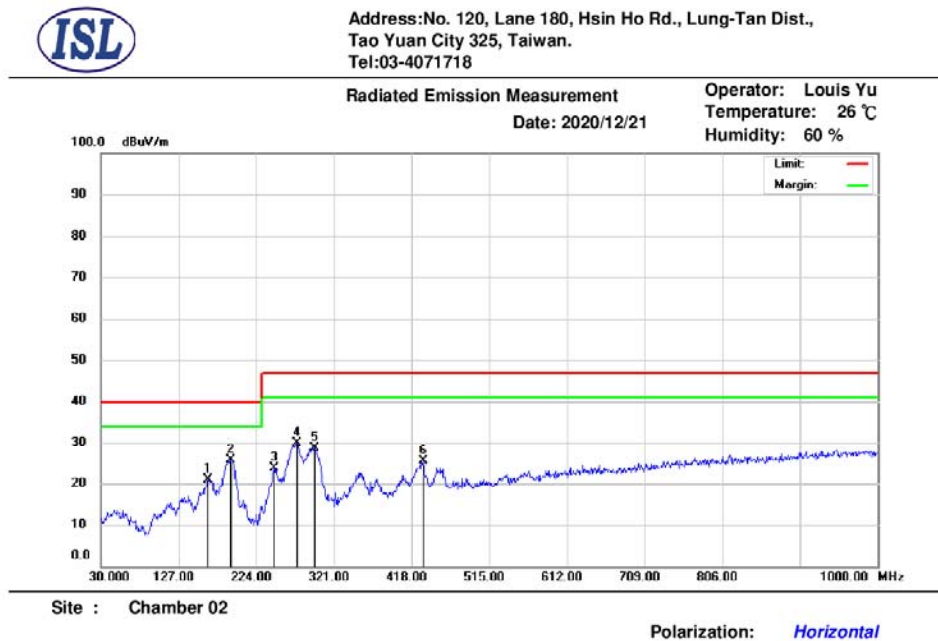
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

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 Radiation Test Data: Configuration 2 - 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	163.86	36.42	-15.66	20.76	40.00	-19.24	400	230	peak
2	191.99	43.80	-18.20	25.60	40.00	-14.40	400	207	peak
3	246.31	40.07	-16.32	23.75	47.00	-23.25	400	236	peak
4	274.44	44.90	-15.02	29.88	47.00	-17.12	300	227	peak
5	296.75	42.95	-14.25	28.70	47.00	-18.30	300	233	peak
6	432.55	35.43	-10.12	25.31	47.00	-21.69	200	203	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

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

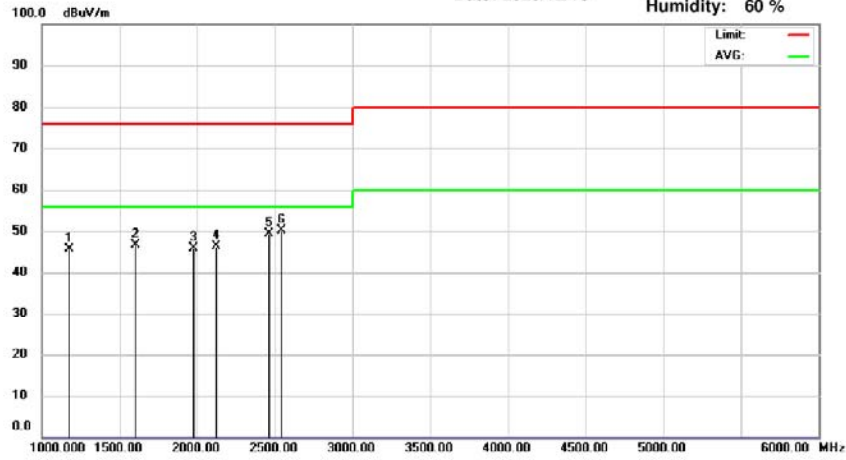
Radiated Emission Measurement

Date: 2020/12/18

Operator: Hasan Yu

Temperature: 26 °C

Humidity: 60 %



Site : Chamber 14

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	1175.00	61.60	-16.07	45.53	76.00	-30.47	250	310	peak
2	1600.00	62.58	-15.92	46.66	76.00	-29.34	200	319	peak
3	1975.00	58.62	-12.85	45.77	76.00	-30.23	200	242	peak
4	2120.00	58.68	-12.28	46.40	76.00	-29.60	250	8	peak
5	2460.00	60.95	-11.54	49.41	76.00	-26.59	100	164	peak
6	2540.00	61.38	-11.32	50.06	76.00	-25.94	300	186	peak

* Note:

Margin = Emission – Limit

Emission = Radiated Amplitude + Correct Factor

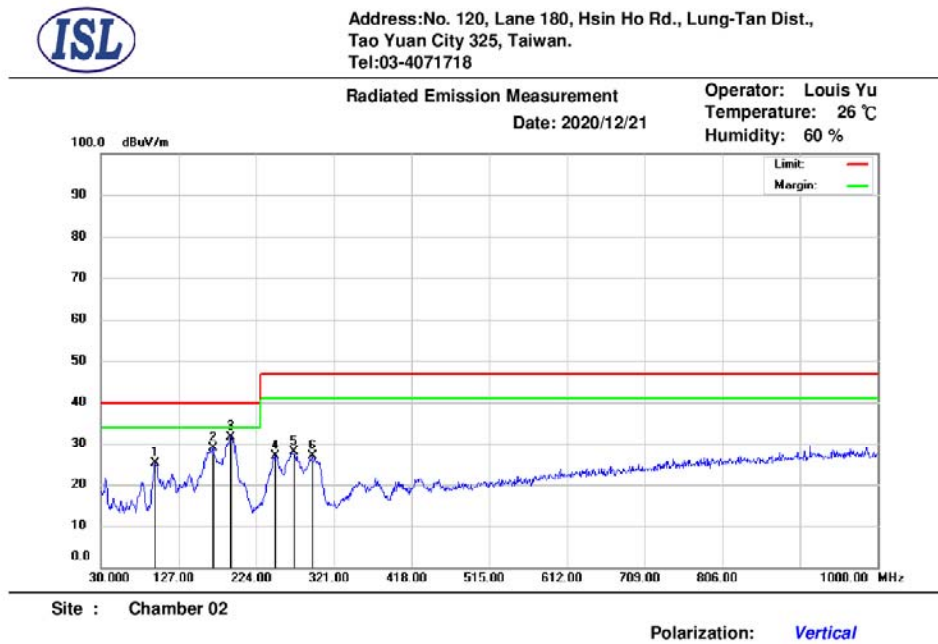
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

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	97.90	46.48	-21.38	25.10	40.00	-14.90	100	79	peak
2	169.68	44.89	-15.94	28.95	40.00	-11.05	100	360	peak
3	191.99	49.82	-18.20	31.62	40.00	-8.38	100	0	peak
4	248.25	43.21	-16.27	26.94	47.00	-20.06	100	358	peak
5	271.53	43.07	-15.24	27.83	47.00	-19.17	100	44	peak
6	293.84	41.27	-14.33	26.94	47.00	-20.06	100	34	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

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

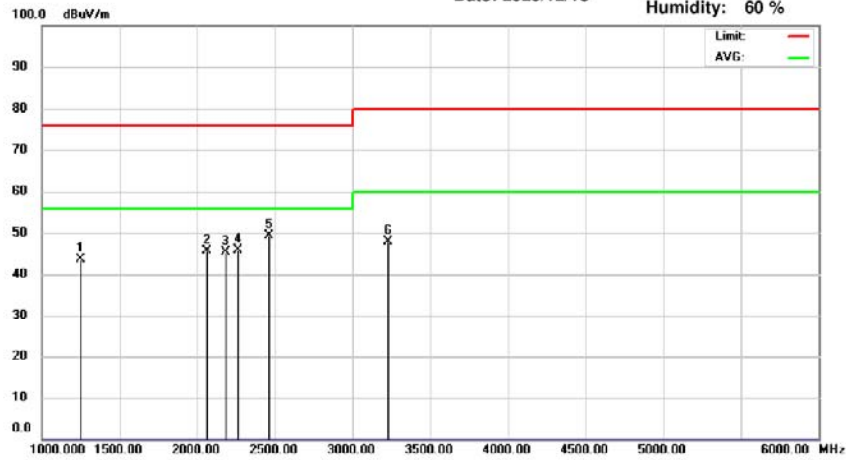
Radiated Emission Measurement

Date: 2020/12/18

Operator: Hasan Yu

Temperature: 26 °C

Humidity: 60 %



Site : Chamber 14

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	1250.00	59.78	-16.24	43.54	76.00	-32.46	250	342	peak
2	2060.00	58.07	-12.32	45.75	76.00	-30.25	150	306	peak
3	2185.00	57.86	-12.50	45.36	76.00	-30.64	150	20	peak
4	2260.00	58.24	-12.38	45.86	76.00	-30.14	100	262	peak
5	2460.00	61.03	-11.54	49.49	76.00	-26.51	159	360	peak
6	3230.00	58.05	-10.28	47.77	80.00	-32.23	250	189	peak

* Note:

Margin = Emission – Limit

Emission = Radiated Amplitude + Correct Factor

Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain

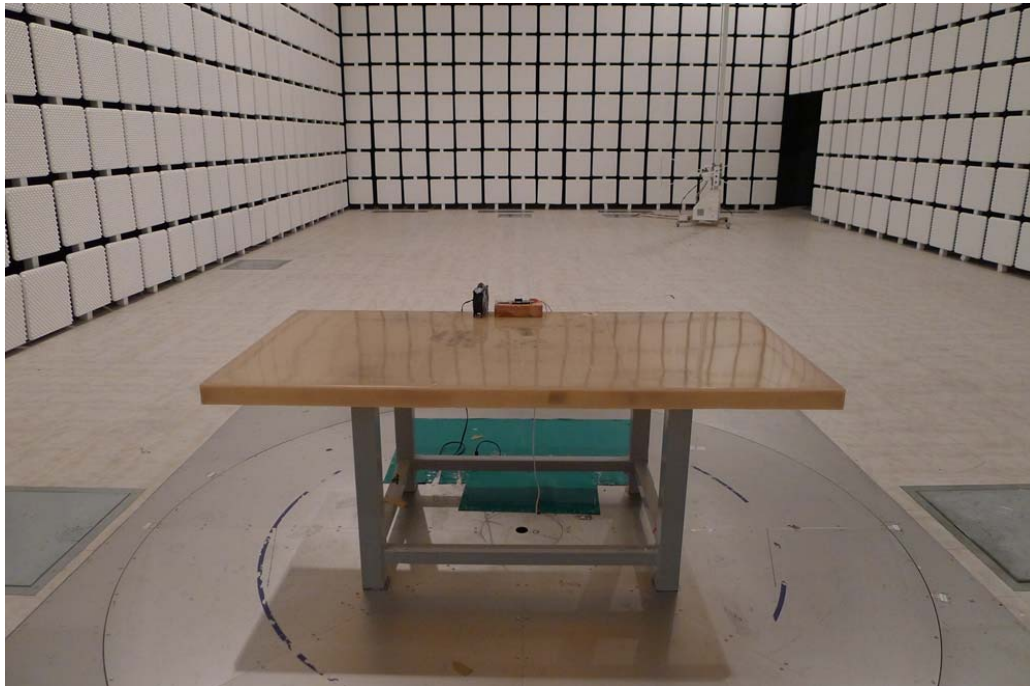
A margin of -8dB means that the emission is 8dB below the limit

Antenna Distance: 3 meters

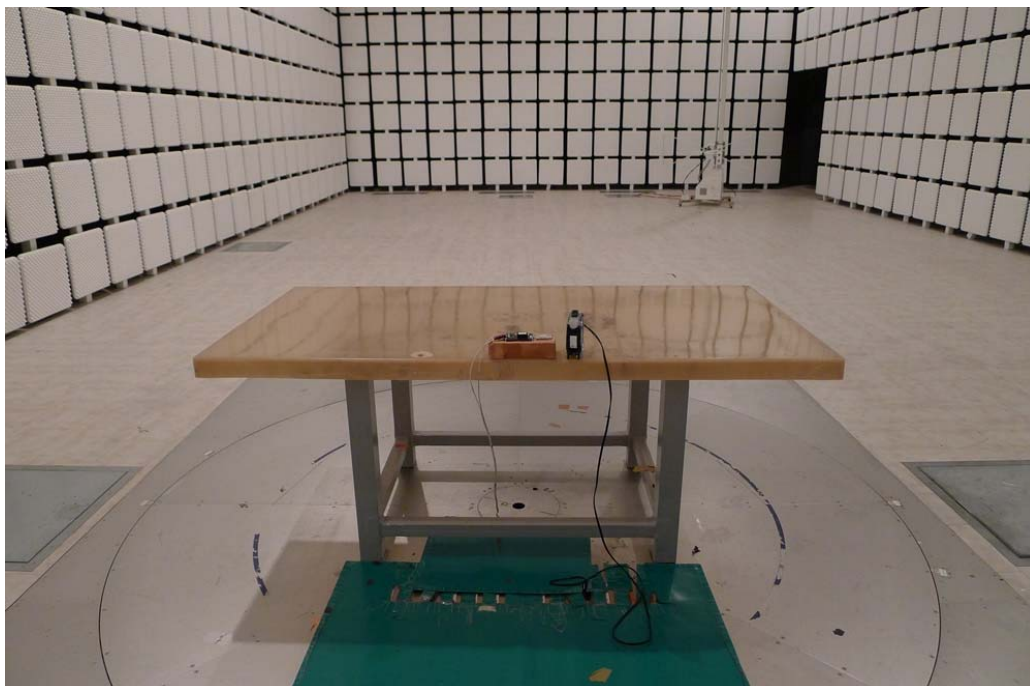
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

4.5 Test Setup Photo: Configuration 1

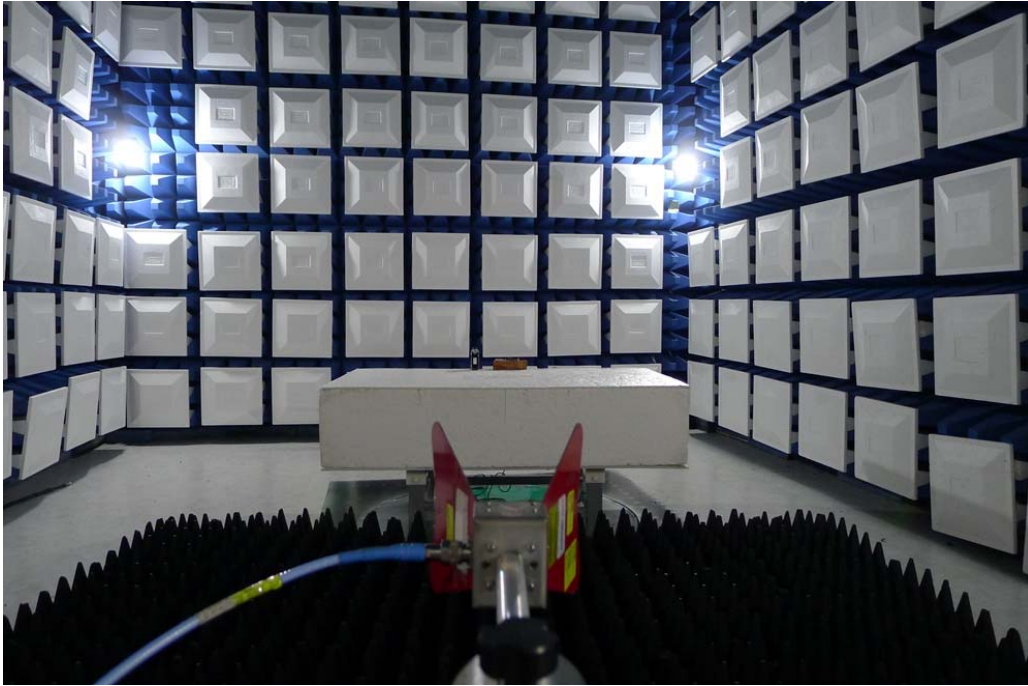
Front View (30MHz~1GHz)



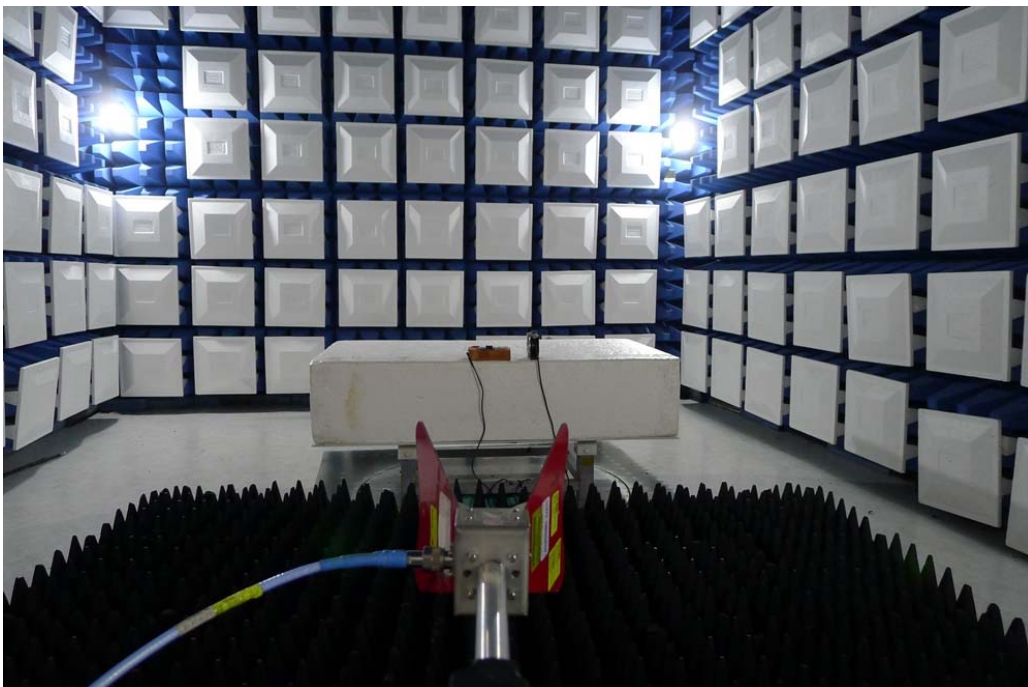
Back View (30MHz~1GHz)



Front View (above 1GHz)



Back View (above 1GHz)

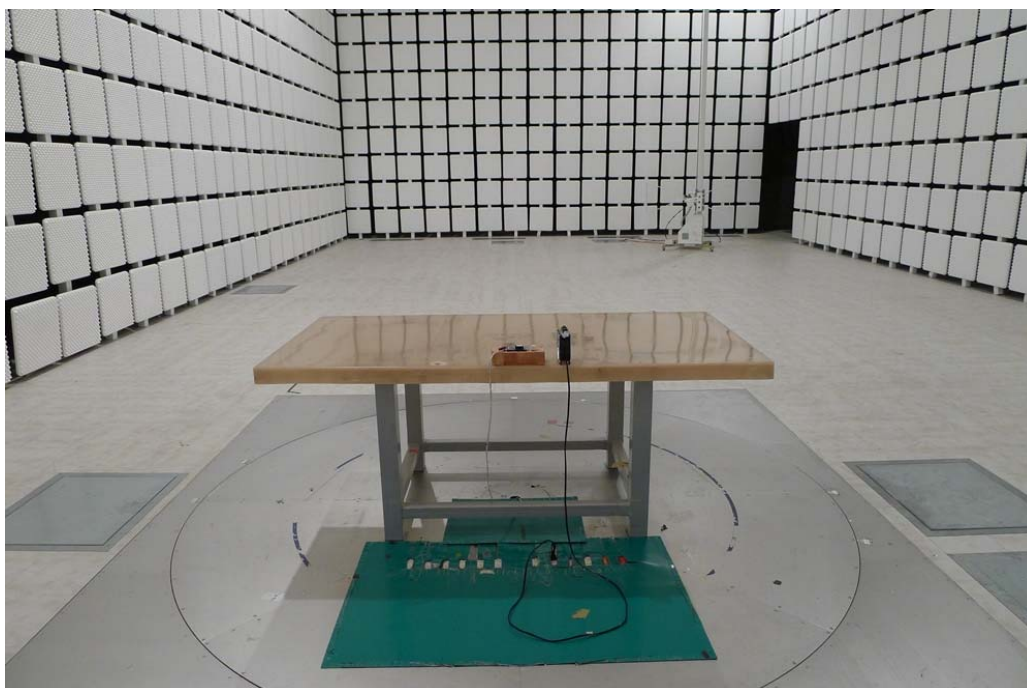


4.6 Test Setup Photo: Configuration 2

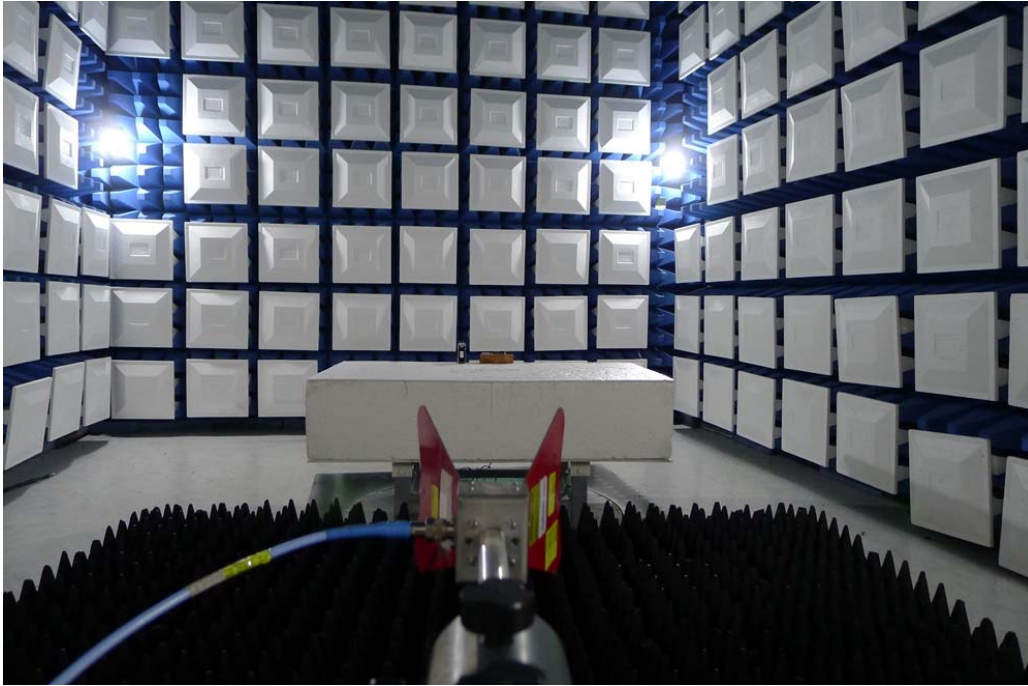
Front View (30MHz~1GHz)



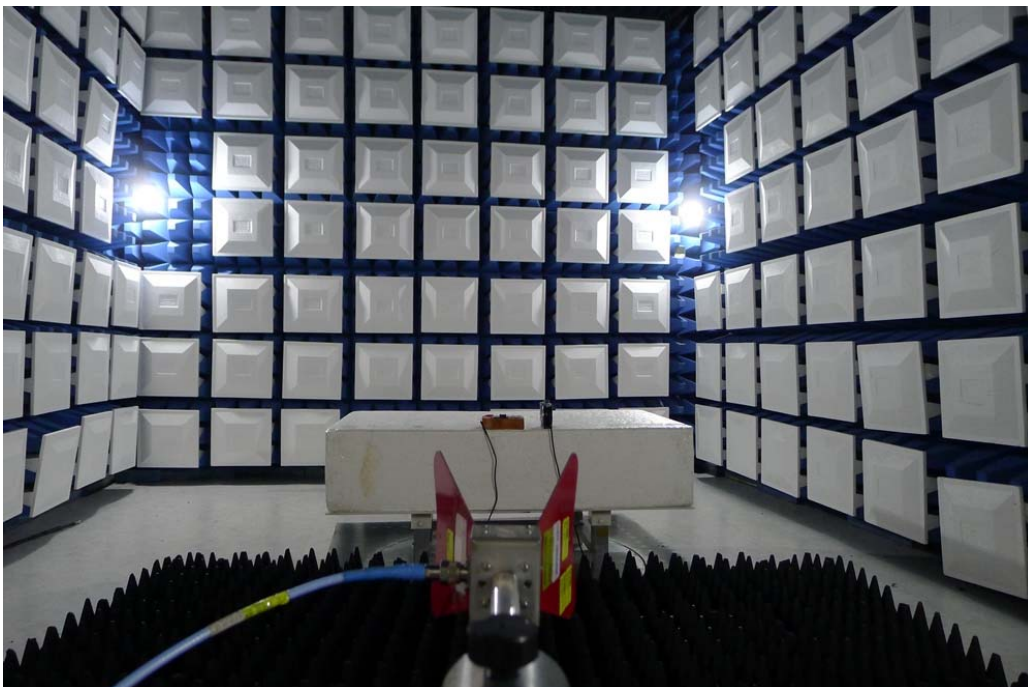
Back View (30MHz~1GHz)



Front View (above 1GHz)



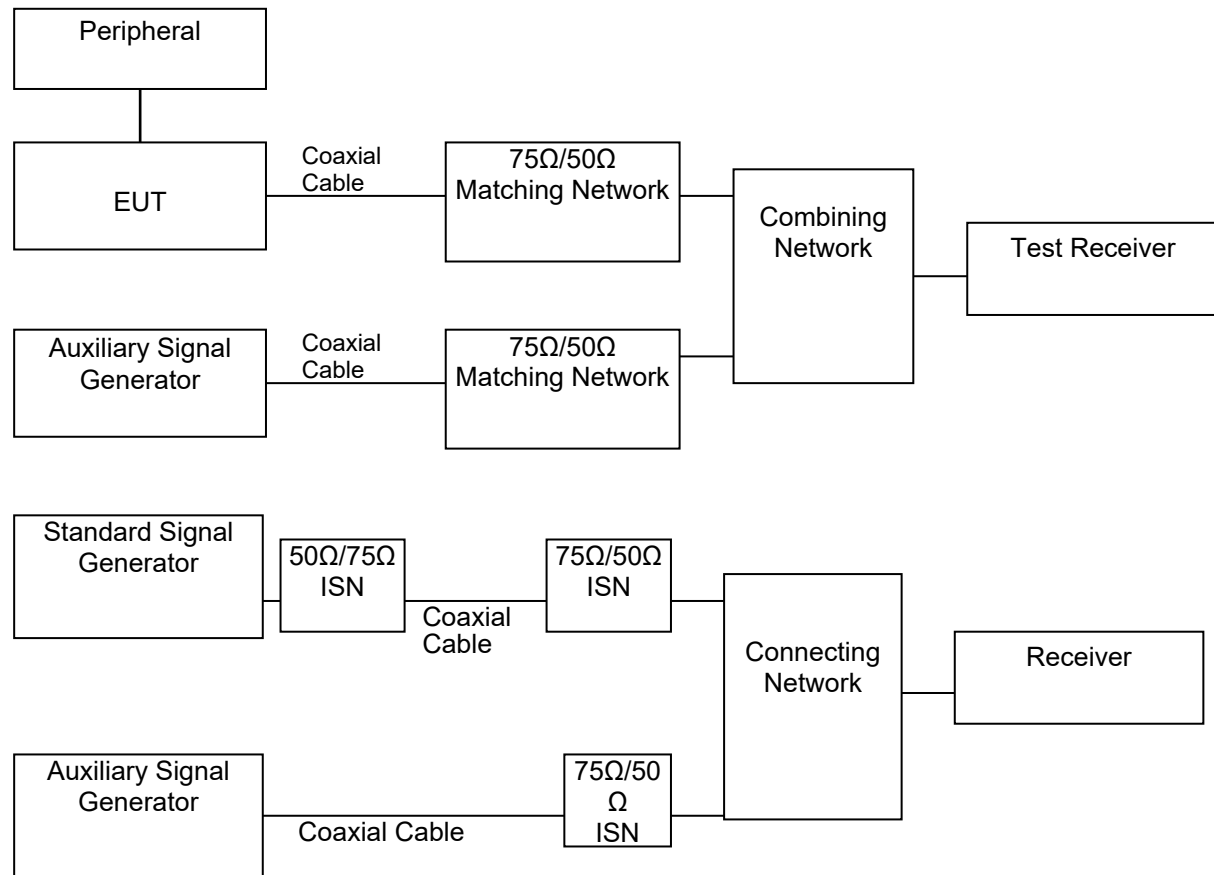
Back View (above 1GHz)



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.

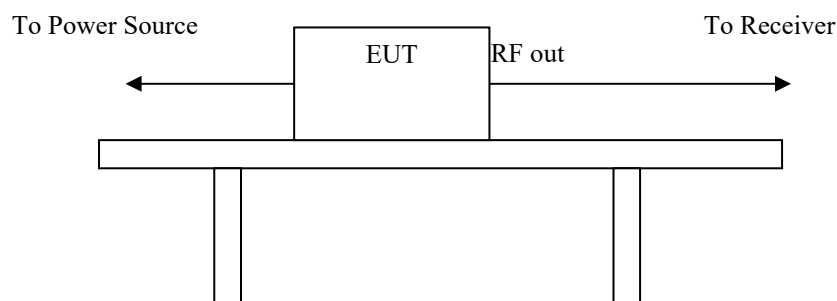
Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB(μV) 75 Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies ≤1 GHz	46	46	46	See a)
	950 – 2 150		46	54	54	
A12.2	950 – 2 150	Quasi Peak/ 120 kHz	46	54	54	See b)
A12.3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

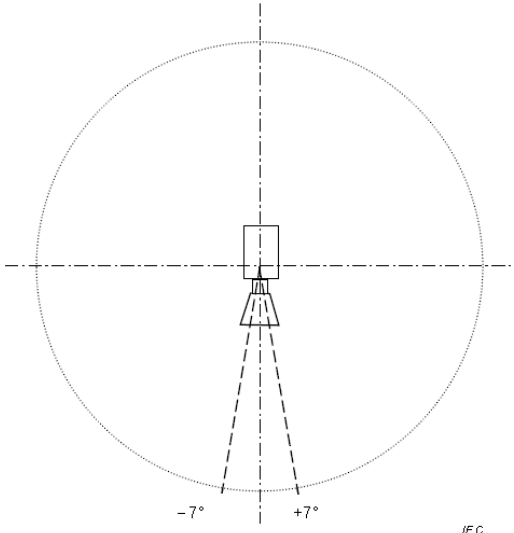
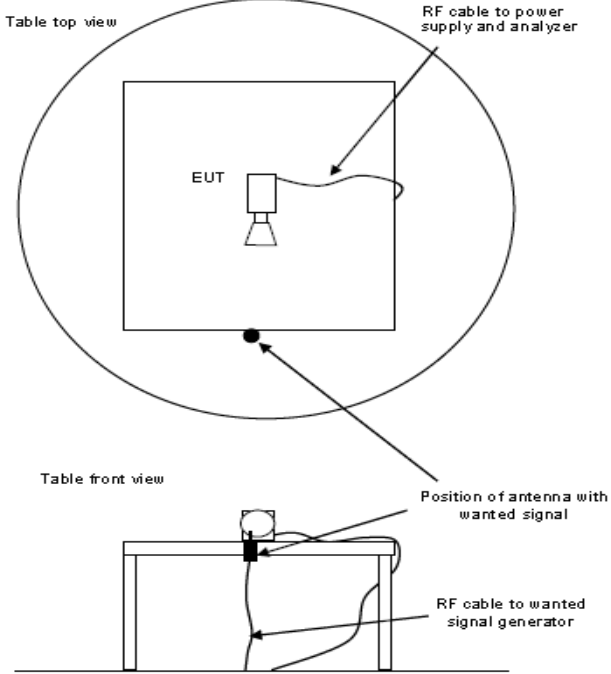
Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB(μV) 75 Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies ≤1 GHz	46	46	46	See a)
	950 – 2 150		46	54	54	
A12.2	950 – 2 150	Quasi Peak/ 120 kHz	46	54	54	See b)
A12.3	30 – 300		46	54	50	See c)
	300 – 1 000	52				
A12.4	30 – 300	For frequencies ≥1 GHz	46	66	59	See d)
	300 – 1 000				52	
A12.5	30 – 950	Peak/ 1 MHz	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 $\pm 7^\circ$ 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: (By manufacture reference)	Air +/- 2 kV, +/- 4 kV, +/- 8 kV Contact +/- 4 kV, +/- 6 kV
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S7

Selected Test Point

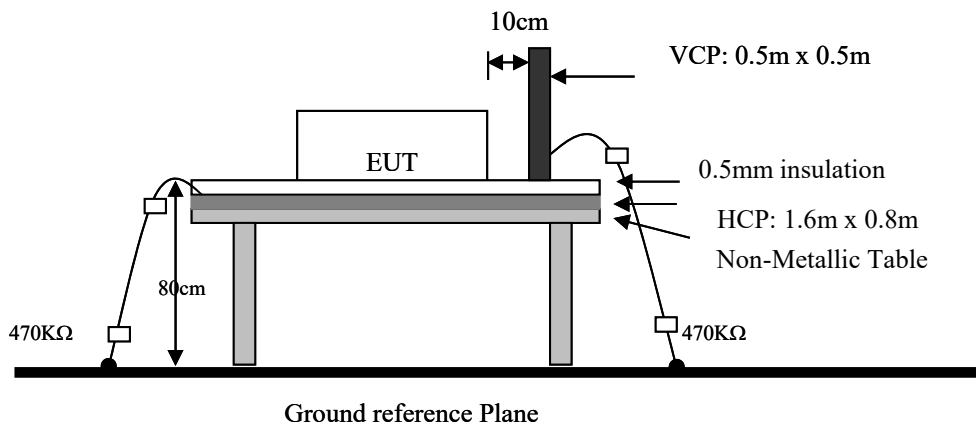
Air: discharges were applied to slots, aperture or insulating surfaces. 10 single air discharges were applied to each selected points.

Contact: 10 discharges minimum were to the selected contact points.

Indirect Contact Points: 10 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 470K Ω resistor 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 Data: Configuration

Basic Standard	EN 61000-4-2										Date		
EUT Model Name	TEN 10-11013WIRH										2021-01-13		
Barometer Pressure	100.8kPa										Engineer	James Kuo	
Temperature	25°C										Equipment & Test Site		
Humidity	40%										EM TEST(Model: Dito)		
Voltage/Freq.	110Vdc												
A=criteria A, B=criteria B, C=criteria C → Blue arrow represent Air discharge point → Red arrow represent Contact discharge point ND=No Discharge, No Arcing; Meets criteria but unable to obtain an electrostatic discharge (ESD) at this test point. X=EUT DOES NOT meet the acceptance criteria A=criteria A, B=criteria B, C=criteria C													
Contact Discharge	Voltage kV 25 Discharge @ 1 PPS												
Test Location	+4	-4	+6	-6								Comments	
1	ND	ND	ND	ND									
2	ND	ND	ND	ND									
3	ND	ND	ND	ND									
4	ND	ND	ND	ND									
5	ND	ND	ND	ND									
Air Discharge	Voltage kV 10 Discharge @ 1 PPS												
Test Location	+2	-2	+4	-4	+8	-8						Comments	
1	ND	ND	ND	ND	ND	ND							
2	ND	ND	ND	ND	ND	ND							
3	ND	ND	ND	ND	ND	ND							
4	ND	ND	ND	ND	ND	ND							
5	ND	ND	ND	ND	ND	ND							
Indirect Discharge	Voltage kV 25 Discharge @ 1 PPS												
Test Location	+4	-4	+6	-6								Comments	
VCP Front	A	A	A	A									
VCP Right	A	A	A	A									
VCP Left	A	A	A	A									
VCP Back	A	A	A	A									
Test Location	+4	-4	+6	-6								Comments	
HCP Front	A	A	A	A									
HCP Right	A	A	A	A									
HCP Left	A	A	A	A									
HCP Back	A	A	A	A									
Additional Notes: A=criteria A, B=criteria B, C=criteria C													

8.3 Test Point

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

Figure 1 : Test Point Assignments Discharge:

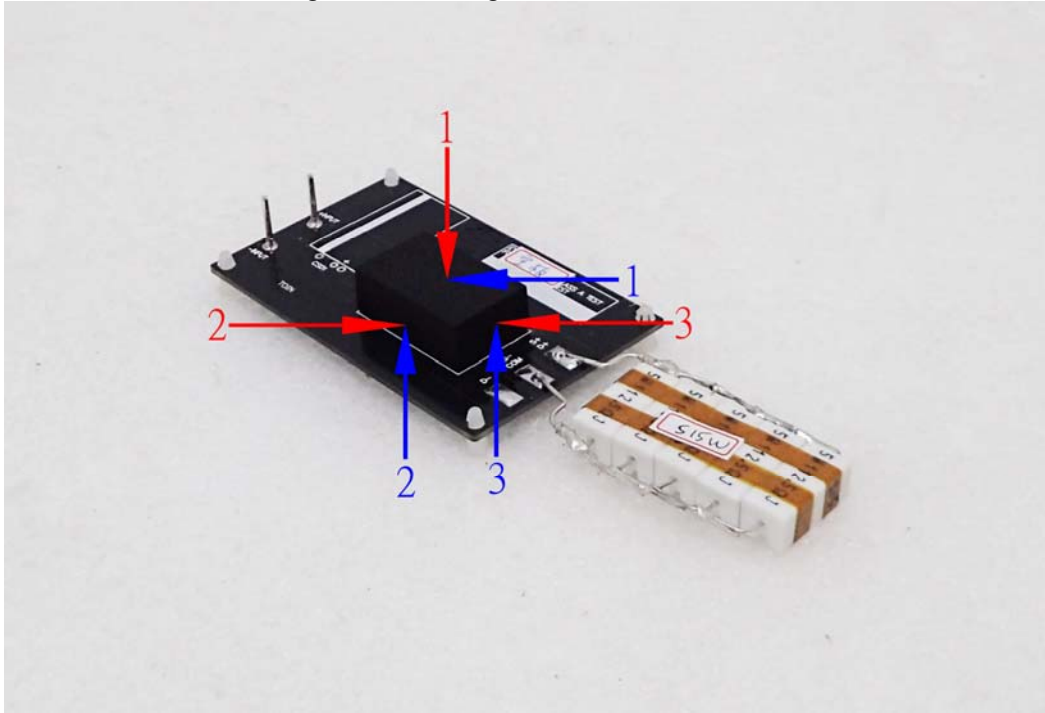
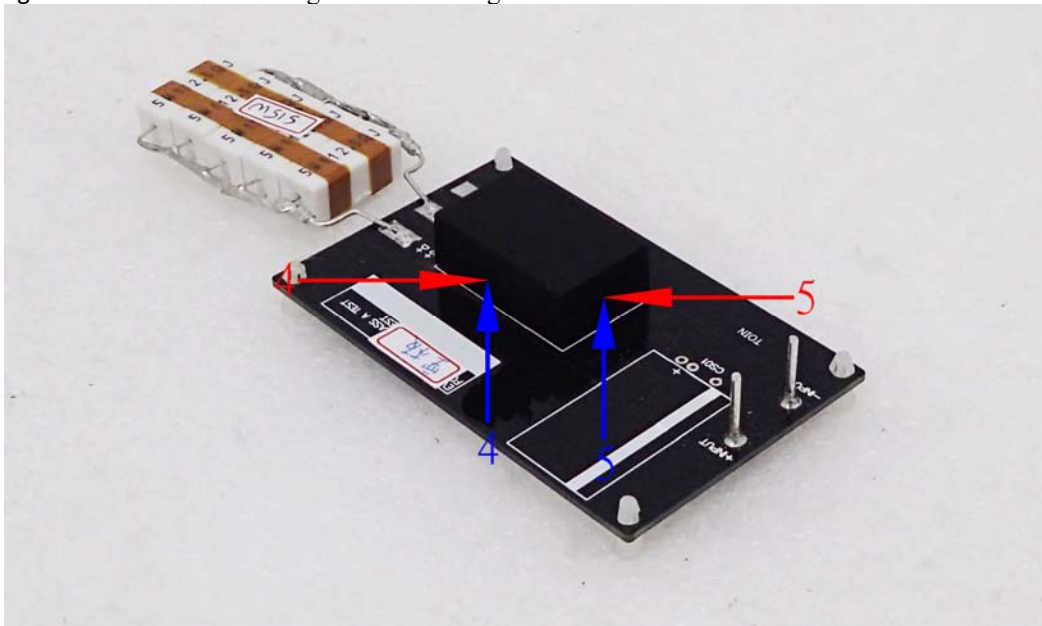


Figure 2 : Test Point Assignments Discharge:



8.4 Test Setup Photo



9. Radio-Frequency, Electromagnetic Field immunity

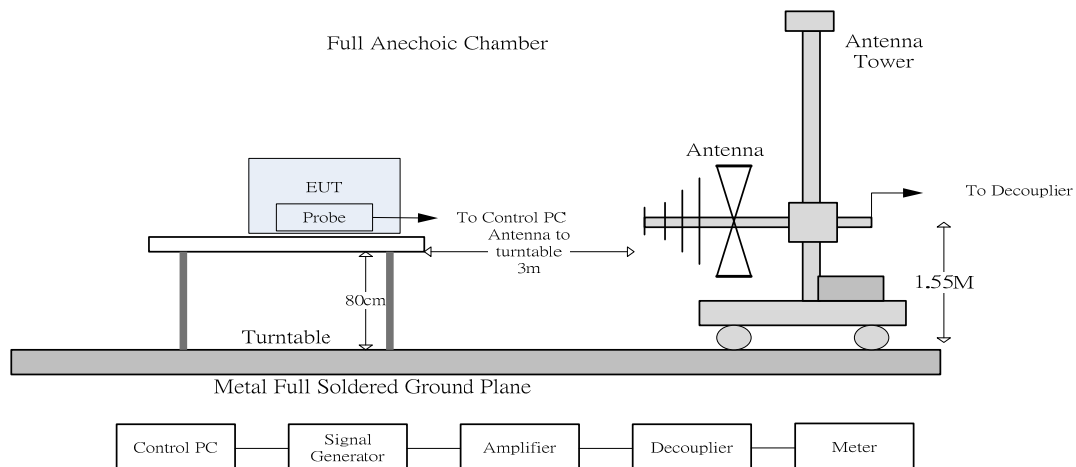
9.1 Test Specification and Setup

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: (By manufacture reference)	20 V/m 10 V/m, 10 V/m, 10 V/m 10 V/m
Modulation:	AM 1kHz 80%
Frequency range:	80 MHz~1 GHz 1800MHz, 2600MHz, 3500MHz, 5000MHz
Frequency Step:	1% of last step frequency
Dwell time:	2s
Polarization:	Vertical and Horizontal
EUT Azimuth Angle	☒0° ☒90° ☒180° ☒270°
Criteria:	A
Test Procedure	refer to ISL QA -T4-E-S8

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

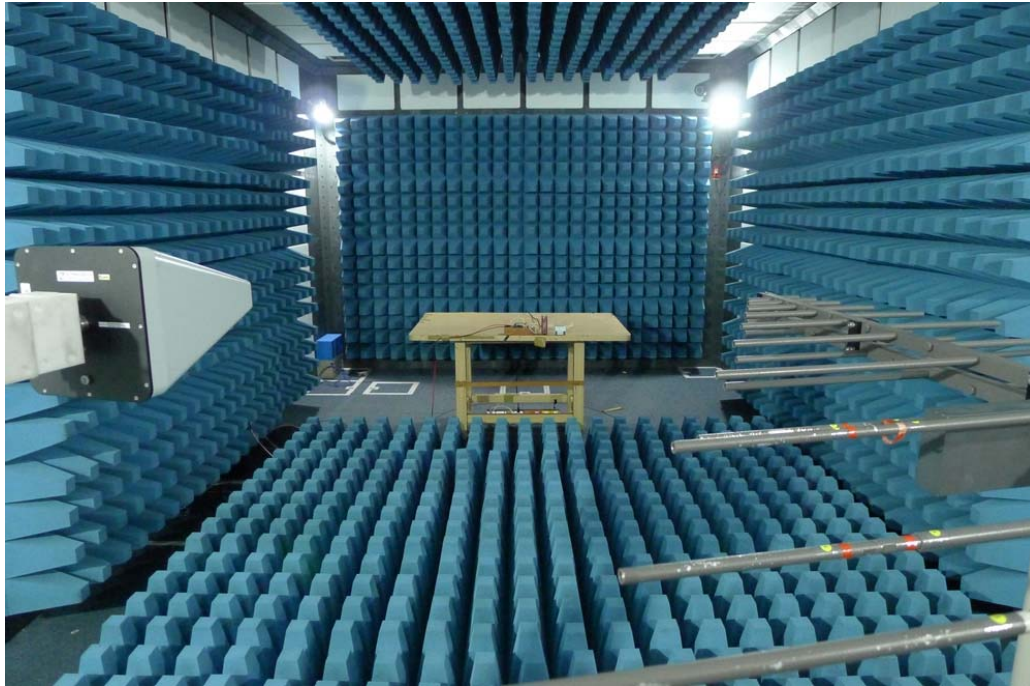
Performance of EUT complies with the given specification

9.2 Test Data: Configuration

Basic Standard	EN 61000-4-3					Date		
EUT Model Name	TEN 10-11013WIRH					2021-01-05		
						Engineer		
Barometer Pressure	102.2kPa					SAWYER		
Temperature	21°C					Equipment & Test Site		
Humidity	55%					Chamber 15		
Voltage/Freq.	110 Vdc							
A=criteria A, B=criteria B, C=criteria C								
EUT Angle	Frequency		Dwell time	Modulation	Level (V/m)	Antenna Polarization	EUT Status	Comments
	Range (MHz)	Steps %						
0°(front)	80-1000	1	2s	80% @ 1kHz	20	Vertical	A	
90°(left)	80-1000	1	2s	80% @ 1kHz	20	Vertical	A	
180°(back)	80-1000	1	2s	80% @ 1kHz	20	Vertical	A	
270°(right)	80-1000	1	2s	80% @ 1kHz	20	Vertical	A	
0°(front)	80-1000	1	2s	80% @ 1kHz	20	Horizontal	A	
90°(left)	80-1000	1	2s	80% @ 1kHz	20	Horizontal	A	
180°(back)	80-1000	1	2s	80% @ 1kHz	20	Horizontal	A	
270°(right)	80-1000	1	2s	80% @ 1kHz	20	Horizontal	A	
0°(front)	1800	1	2s	80% @ 1kHz	10	Vertical	A	
90°(left)	1800	1	2s	80% @ 1kHz	10	Vertical	A	
180°(back)	1800	1	2s	80% @ 1kHz	10	Vertical	A	
270°(right)	1800	1	2s	80% @ 1kHz	10	Vertical	A	
0°(front)	1800	1	2s	80% @ 1kHz	10	Horizontal	A	
90°(left)	1800	1	2s	80% @ 1kHz	10	Horizontal	A	
180°(back)	1800	1	2s	80% @ 1kHz	10	Horizontal	A	
270°(right)	1800	1	2s	80% @ 1kHz	10	Horizontal	A	
0°(front)	2600	1	2s	80% @ 1kHz	10	Vertical	A	
90°(left)	2600	1	2s	80% @ 1kHz	10	Vertical	A	
180°(back)	2600	1	2s	80% @ 1kHz	10	Vertical	A	
270°(right)	2600	1	2s	80% @ 1kHz	10	Vertical	A	
0°(front)	2600	1	2s	80% @ 1kHz	10	Horizontal	A	
90°(left)	2600	1	2s	80% @ 1kHz	10	Horizontal	A	
180°(back)	2600	1	2s	80% @ 1kHz	10	Horizontal	A	

				1kHz				
270°(right)	2600	1	2s	80% @ 1kHz	10	Horizontal	A	
0°(front)	3500	1	2s	80% @ 1kHz	10	Vertical	A	
90°(left)	3500	1	2s	80% @ 1kHz	10	Vertical	A	
180°(back)	3500	1	2s	80% @ 1kHz	10	Vertical	A	
270°(right)	3500	1	2s	80% @ 1kHz	10	Vertical	A	
0°(front)	3500	1	2s	80% @ 1kHz	10	Horizontal	A	
90°(left)	3500	1	2s	80% @ 1kHz	10	Horizontal	A	
180°(back)	3500	1	2s	80% @ 1kHz	10	Horizontal	A	
270°(right)	3500	1	2s	80% @ 1kHz	10	Horizontal	A	
0°(front)	5000	1	2s	80% @ 1kHz	10	Vertical	A	
90°(left)	5000	1	2s	80% @ 1kHz	10	Vertical	A	
180°(back)	5000	1	2s	80% @ 1kHz	10	Vertical	A	
270°(right)	5000	1	2s	80% @ 1kHz	10	Vertical	A	
0°(front)	5000	1	2s	80% @ 1kHz	10	Horizontal	A	
90°(left)	5000	1	2s	80% @ 1kHz	10	Horizontal	A	
180°(back)	5000	1	2s	80% @ 1kHz	10	Horizontal	A	
270°(right)	5000	1	2s	80% @ 1kHz	10	Horizontal	A	
Additional Notes: A=criteria A, B=criteria B, C=criteria C								

9.3 Test Setup Photo



10. Electrical Fast transients/burst immunity

10.1 Test Specification and Setup

10.1.1 Test Specification

Port:	DC mains
Basic Standard:	EN 61000-4-4/ IEC 61000-4-4 (details referred to Sec 1.2)
Test Level: (By manufacture reference)	DC Power Port: +/- 2 kV
Rise Time:	5ns
Hold Time:	50ns
Burst Period:	300ms
Repetition Frequency:	5kHz
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S9

Test Procedure

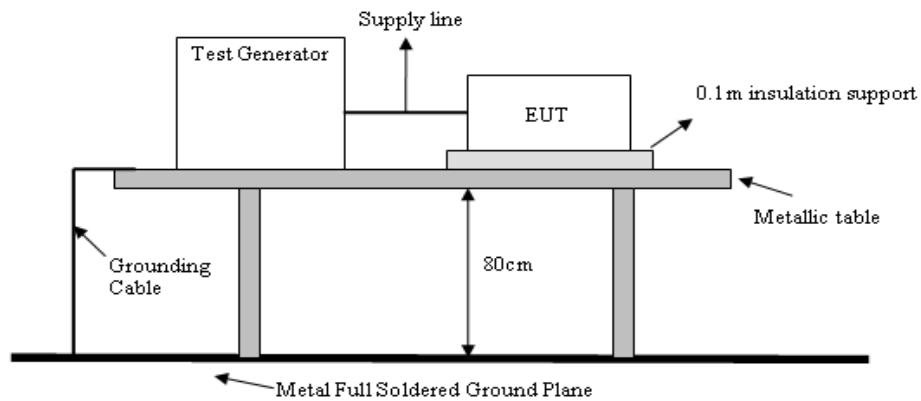
The EUT was setup on a nonconductive table 0.1 m above a reference ground plane.

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.

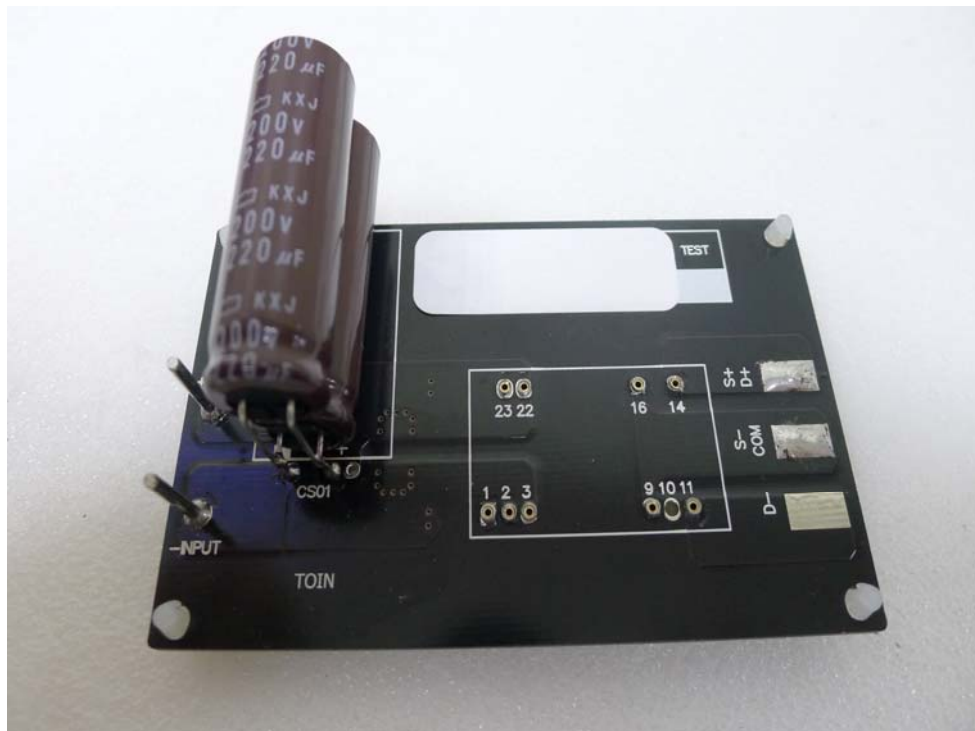


10.1.3 Test Result

Performance of EUT complies with the given specification

10.2 Test Data: Configuration

Basic Standard	EN 61000-4-4		Date	2021-01-14			
EUT Model Name	TEN 10-11013WIRH		Engineer	SAWYER			
Barometer Pressure	101.3kPa		Equipment & Test Site	EMC-PARTNER (Model: IMU3000)			
Temperature	20°C						
Humidity	52%						
Voltage/Freq.	110 Vdc						
A=criteria A, B=criteria B, C=criteria C							
AC Power Port: <input type="checkbox"/>		DC Power Port: <input checked="" type="checkbox"/>		LAN Port: <input type="checkbox"/>		Telephone Port: <input type="checkbox"/>	
DC Power Port							
Line Under Test	Voltage Level	Severity Level	Pulse Polarity	Burst Repetition Rate	Test Duration	EUT Status	Comments
Line	2.0kV	3	+	300ms / 5.0kHz	1 Minutes	A	
Line	2.0kV	3	-	300ms / 5.0kHz	1 Minutes	A	
Neutral	2.0kV	3	+	300ms / 5.0kHz	1 Minutes	A	
Neutral	2.0kV	3	-	300ms / 5.0kHz	1 Minutes	A	
Line- Neutral	2.0kV	3	+	300ms / 5.0kHz	1 Minutes	A	
Line- Neutral	2.0kV	3	-	300ms / 5.0kHz	1 Minutes	A	
Additional Notes: A=criteria A, B=criteria B, C=criteria C							
NOTE: With 2 pcs of aluminum electrolytic capacitor(Nippon chemi-con KXJ series, 220μF/200V) and a TVS (SMBJ220A, 220V, 600Watt peak pulse power) in parallel							



10.3 Test Setup Photo



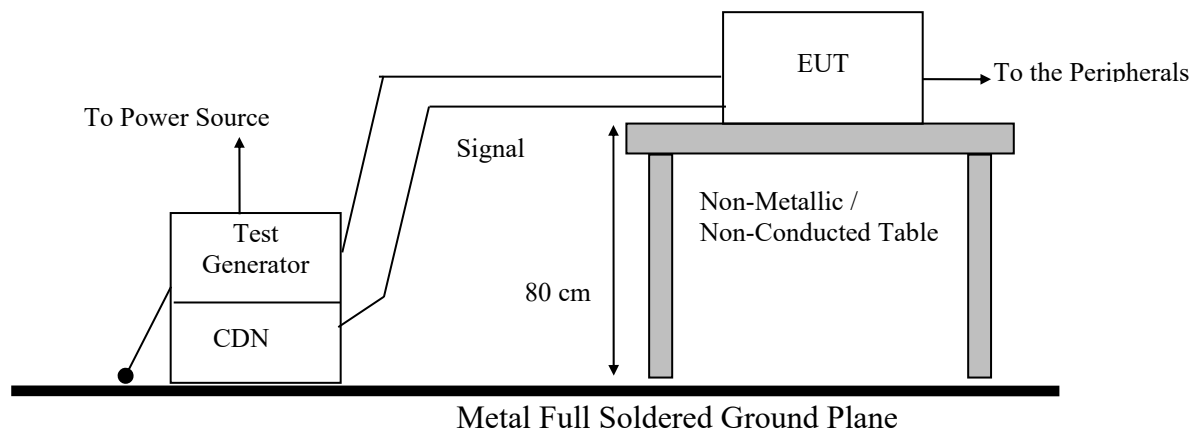
11. Surge Immunity

11.1 Test Specification and Setup

11.1.1 Test Specification

Port:	DC mains
Basic Standard:	EN 61000-4-5/ IEC 61000-4-5 (details referred to Sec 1.2)
Test Level: (By manufacture reference)	Line to Line: +/- 0.5 kV, +/- 1 kV, +/- 2 kV
Rise Time:	1.2us
Hold Time:	50us
Repetition Rate:	60 seconds
Angle:	<input type="checkbox"/> 0° <input type="checkbox"/> 90° <input type="checkbox"/> 180° <input type="checkbox"/> 270°
Criteria:	B
Test Procedure:	refer to ISL QA -T4-E-S10

11.1.2 Test Setup

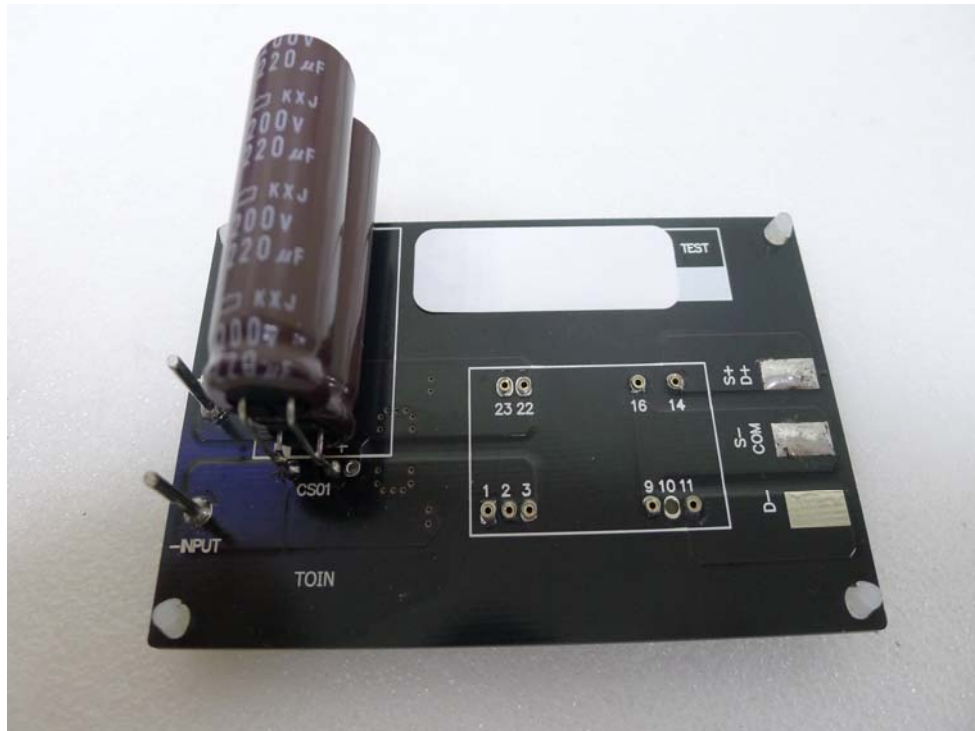


11.1.3 Test Result

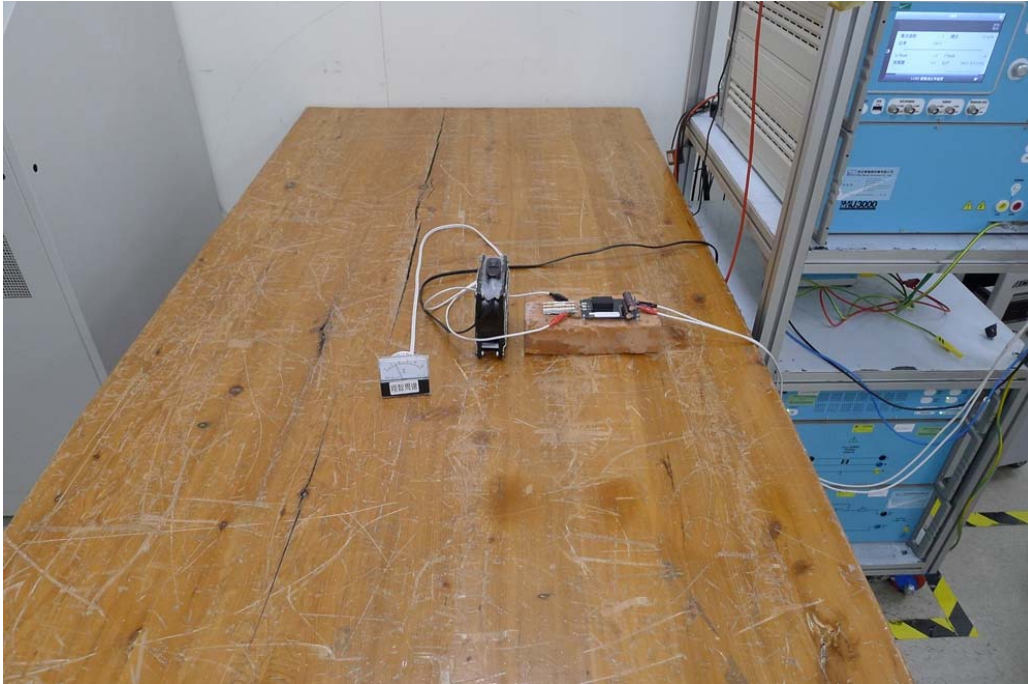
Performance of EUT complies with the given specification

11.2 Test Data: Configuration

Basic Standard	EN 61000-4-5	Date						
EUT Model Name	TEN 10-11013WIRH	2021-01-14						
Barometer Pressure	101.3kPa	Engineer						
Temperature	20°C	SAWYER						
Humidity	52%	Equipment & Test Site						
Voltage/Freq.	110 Vdc	EMC-PARTNER (Model: IMU3000)						
A=criteria A, B=criteria B, C=criteria C								
AC Power Port: <input type="checkbox"/>	DC Power Port: <input checked="" type="checkbox"/>	LAN Port: <input type="checkbox"/>	Telephone Port: <input type="checkbox"/>					
DC Power Port								
Line Under Test	Voltage	Level	Polarity	Repetition Rate	Cycle	Pulse Position	EUT Status	Comments
Line-Neutral	0.5kV	1	+	60 sec	5		A	
Line-Neutral	0.5kV	1	-	60 sec	5		A	
Line- Neutral	1.0kV	2	+	60 sec	5		A	
Line- Neutral	1.0kV	2	-	60 sec	5		A	
Line- Neutral	2.0kV	2	+	60 sec	5		A	
Line- Neutral	2.0kV	2	-	60 sec	5		A	
Additional Notes: A=criteria A, B=criteria B, C=criteria C								
NOTE: With 2 pcs of aluminum electrolytic capacitor(Nippon chemi-con KXJ series, 220μF/200V) and a TVS (SMBJ220A, 220V, 600Watt peak pulse power) in parallel								



11.3 Test Setup Photo



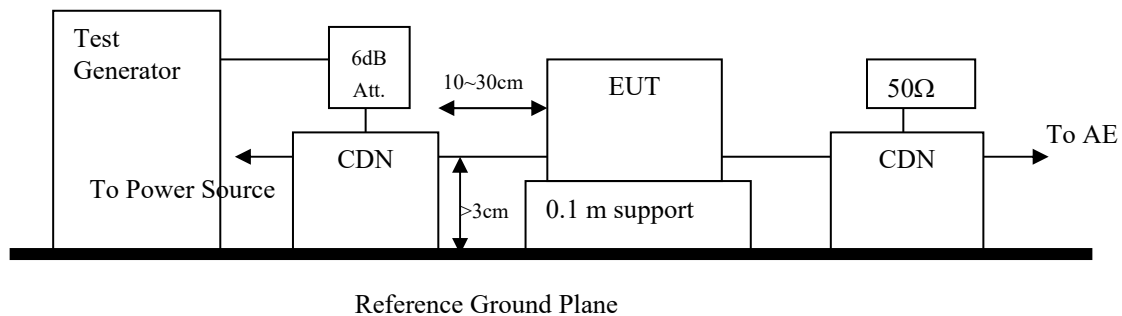
12. Immunity to Conductive Disturbance

12.1 Test Specification and Setup

12.1.1 Test Specification

Port:	DC mains
Basic Standard:	EN 61000-4-6/ IEC 61000-4-6 (details referred to Sec 1.2)
Test Level:	0.15 MHz - 10MHz: 3V rms 10MHz - 30MHz: 3V rms to 1V rms 30MHz - 80MHz: 1V rms
Test Level: (By manufacture reference)	0.15MHz to 80MHz: 10V rms
Modulation:	AM 1kHz 80%
Frequency Step:	1% of last Frequency
Dwell time:	2s
Criteria:	A
CDN Type:	CDN M2+M3
Test Procedure	refer to ISL QA -T4-E-S11

12.1.2 Test Setup



12.1.3 Test Result

Performance of EUT complies with the given specification

12.2 Test Data: Configuration

Basic Standard	EN 61000-4-6	Date					
EUT Model Name	TEN 10-11013WIRH	2021-01-12					
		Engineer					
Barometer Pressure	102.1kPa	SAWYER					
Temperature	20°C	Equipment & Test Site					
Humidity	51%	FRANKONIA (Model: CIT-10/75)					
Voltage/Freq.	110 Vdc						
A=criteria A, B=criteria B, C=criteria C							
DC Power Port							
Line Under Test	Frequency		Level	Modulation	Dwell time	EUT Status	Comments
	Range (MHz)	Steps %					
DC Power Port	0.15 to 80	1	10V	80% @ 1kHz	2s	A	
Additional Notes: A=criteria A, B=criteria B, C=criteria C							

12.3 Test Setup Photo



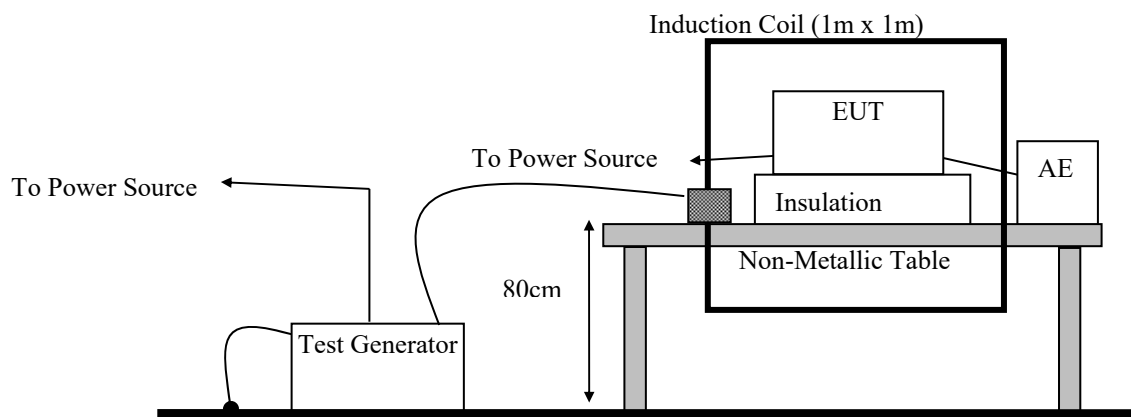
13. Power Frequency Magnetic Field immunity

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: (By manufacture reference)	100 A/m, 1000 A/m
Polarization:	X, Y, Z
Criteria:	A
Test Procedure	refer to ISL QA -T4-E-S12

13.1.2 Test Setup



13.1.3 Test Result

Performance of EUT complies with the given specification

13.2 Test Data: Configuration

Basic Standard	EN 61000-4-8	Date			
EUT Model Name	TEN 10-11013WIRH	2021-01-14			
		Engineer			
Barometer Pressure	102.3kPa	SAWYER			
Temperature	21°C	Equipment & Test Site			
Humidity	55%	Magnetic Field Immunity Loop Brand: Pic Model:PMF1000 & Magnetic Field Test AC Power Source Brand: Pic Model: AC Power Source			
Voltage/Freq.	110Vdc				
A=criteria A, B=criteria B, C=criteria C					
Antenna Polarization	Frequency (Hz)	Test Level	Test Duration	EUT Status	Comment
X	0	100 A/m	1 Minutes	A	
Y	0	100 A/m	1 Minutes	A	
Z	0	100 A/m	1 Minutes	A	
X	0	1000 A/m	1 Second	A	
Y	0	1000 A/m	1 Second	A	
Z	0	1000 A/m	1 Second	A	
Additional Notes: A=criteria A, B=criteria B, C=criteria C					

13.3 Test Setup Photo



14. Appendix

14.1 Appendix A: Test Equipment

14.1.1 Test Equipment List

Location Chamber02	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation (Chamber02)	BILOG Antenna 17	Schwarzbeck	Schwarzbeck VULB 9168+EMCI-N -6-05	645	03/09/2020	03/09/2021
Radiation (Chamber02)	Preamplifier 25	EMCI	EMC9135	980295	03/05/2020	03/05/2021
Radiation (Chamber02)	Coaxial Cable Chmb 02-10M-02	EMC	RG214U	Chmb 02-10M-02	10/14/2020	10/14/2021
Radiation (Chamber02)	EMI Receiver 12	ROHDE & SCHWARZ	ESCI	100804	08/19/2020	08/19/2021

Location Chmb14	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Rad. Above 1GHz	Spectrum Analyzer 25	R&S	FSV 40	101499	11/04/2020	11/04/2021
Rad. Above 1GHz	Horn Antenna 06	ETS-Lindgren	3117	00066665	11/04/2020	11/04/2021
Rad. Above 1GHz	Preamplifier 20	EMC INSTRUMEN T	EMC051845	980084	11/19/2020	11/19/2021
Rad. Above 1GHz	Microwave Cable-11	HUBER SUHNER	SUCOFLEX 106	78034/6	02/03/2020	02/03/2021
Rad. Above 1GHz	Microwave Cable-26	EMCI	EMC104-NM- SM-800	141112	02/26/2020	02/26/2021

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
EN61K-4-2	ESD Gun 9	EM TEST	Dito	V1018106503	04/28/2020	04/28/2021
EN61K-4-3	Broadband Log-Periodic Antenna	AR	AT1080	310698	N/A	N/A
EN61K-4-3	Horn Antenna RF-01	AR	ATS700M11 G	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-4806-23 60-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	11/29/2020	11/29/2021
EN61K-4-4 EN61K-4-5	EFT and SURGE Test System	EMC Partner	IMU3000	1547	09/19/2020	12/19/2021
EN61K-4-6	CDN M2+M3 04	TESEQ	CDN M016	43257	09/03/2020	09/03/2021
EN61K-4-6	Coaxial Cable 4-6 02-1			4-6 02-1	N/A	N/A
EN61K-4-6	Conducted Immunity Test System 03	Frankonia	CIT-10-75	126B1151	01/08/2021	01/08/2022
EN61K-4-8	Magnetic Field Test Generator 02	PIC	PMF-1000	ANT150701	05/08/2019	05/08/2021

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

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

Test Item	Filename	Version
EN61000-4-2	N/A	2.0
EN61000-4-3	i2	529b
EN61000-4-4	EMC Partner	1.69
EN61000-4-5	EMC Partner	1.69
EN61000-4-6	FRANKONIA CD-LAB	V5.221
EN61000-4-8	N/A	

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

14.2 Appendix B: Uncertainty of Measurement

The laboratory measurement uncertainty accordance with refers to CISPR 16-4-2. If U_{lab} is less than or equal to U_{cispr} in Table 1, then the test report may either state the value of U_{lab} or state that U_{lab} is less than U_{cispr} .

The coverage factor $k = 2$ yields approximately a 95 % level of confidence.

<Chamber 02 (10M)>

Horizontal

30MHz~200MHz: $\pm 4.52\text{dB}$

200MHz~1000MHz: $\pm 4.42\text{dB}$

Vertical

30MHz~200MHz: $\pm 4.51\text{dB}$

200MHz~1000MHz: $\pm 4.70\text{dB}$

<Chamber 14 (3M)>

1GHz~6GHz: $\pm 4.93\text{dB}$

<Immunity 02>

Test item	Uncertainty
EN 61000-4-2 (ESD)	
Rise time tr	$\leq 9.81\%$
Peak current Ip	$\leq 5.54\%$
current at 30 ns	$\leq 5.55\%$
current at 60 ns	$\leq 5.55\%$
EN 61000-4-3 (RS)	$\pm 1.89\text{dB}$
EN 61000-4-4 (EFT)	
voltage rise time (tr)	$\pm 5.1\%$
peak voltage value (VP)	$\pm 6.39\%$
voltage pulse width (tw)	$\pm 5.0\%$
EN 61000-4-5 (Surge)	
open-circuit voltage front time	$\pm 13.5\%$
open-circuit voltage peak value	$\pm 6.6\%$
open-circuit voltage duration (Td)	$53.33\mu\text{s}$
EN 61000-4-6 (CS)	
CDN	$\pm 1.74\text{dB}$
EM Clamp	$\pm 3.36\text{dB}$
EN 61000-4-8 (Magnetic)	$\pm 6.53\%$

14.3 Appendix C: Photographs of EUT

Please refer to the File of **ISL-21LE053P-MA**

--- END ---