CONFORMANCE TEST REPORT
FOR
EN 55032 / EN 55024

Report No.: 18-03-MAT-082

According to:
■ **Electromagnetic Compatibility Directive: 2014/30/EU**
□ **Low Voltage Directive: 2014/35/EU**
□ **Radio Equipment Directive: 2014/53/EU**
□ **Machinery Directives: 2006/42/EC**

Client:	Advantech Co., Ltd.
Product Name:	Main Board
Model:	SQF-S25 630, SQF-S25 630 (S9), SQF-S25XXXXXXXXXXXXXXX (where X may be any alphanumeric character, blank or "-".)
Manufacturer:	Advantech Co., Ltd.
Trade Name:	ADVANTECH
Date test item received:	2018/03/05
Date test campaign completed:	2018/03/08
Date of issue:	2018/03/22

The test result only corresponds to the tested sample. It is not permitted to copy this report, in part or in full, without the permission of the test laboratory.
Total number of pages of this test report: 57 pages
Total number of pages of this test photos: 11 pages

Test Engineer	Checked By	Approved By
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Lab Code 200133-0

Laboratory Introduction: Electronics Testing Center, Taiwan is recognized, filed and mutual recognition arrangement as following:
❶ ISO9001: TüV Product Service
❷ ISO/IEC 17025: BSMI, TAF, NCC, NVLAP, CCIBLAC, UL, Compliance
❸ Filing: FCC, Industry Canada, VCCI
❹ MRA: Australia, Hong Kong, New Zealand, Singapore, USA, Japan, Korea, China, APLAC through TAF
❺ FCC Registration Number: 90588, 91094, 91095

CONTENTS

1 TEST REPORT CERTIFICATION

Applicant	:	Advantech Co., Ltd.
Address	:	No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 11491, Taiwan, R.O.C.
Manufacturer	:	Advantech Co., Ltd.
Address	:	No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 11491, Taiwan, R.O.C.
Product Name	:	Main Board
Model	:	SQF-S25 630, SQF-S25 630 (S9), SQF-S25XXXXXXXXXXXXXXX (where X may be any alphanumeric character, blank or "-".)
Trade Name	:	ADVANTECH
Test Standard	:	

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

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

CE NVLAP Lab Code 200133-0

2 GENERAL INFORMATIONS

2.1 Description of EUT:

Product Name: Main Board

Model: SQF-S25 630, SQF-S25 630 (S9), SQF-S25XXXXXXXXXXXXXXX

(where X may be any alphanumeric character, blank or "-".)

Trade Name: ADVANTECH

2.2 Related Information of Auxiliary Equipment that P.U. for Server :

Power Supply:

Vendor	Item	Technical data
FSP	FSP150-AAAN2	Input: 100-240Vac, 2A, 50-60Hz Output: 24Vdc, 6.25A

* For more detailed features, please refer to *User's Manual*.

2.3 Tested Peripheral:

The EUT connected with the following peripheral devices.

Following peripheral devices and interface cables were connected during the measurement:

The Table of peripheral devices and interface cables

Product	Manufacturer	Model No.	I/O Cable
24"LCD Monitor	DELL	U2410f	1.8m, Unshielded Power Line*2 1.8m, D-Sub Shielded Cable*1
27"LCD Monitor*2	DELL	P2715Qt	1.8m, Unshielded Power Line*2 1.8m, HDMI Shielded Cable*1 1.8m, Display Shielded Cable*1
USB Keyboard	DELL	KB4021	1.8m, Unshielded Cable
USB Mouse	DELL	MS111-P	1.8m, Unshielded Cable
USB3.0 HDD*2	WD	WPBACY50000ABK-00	1.2m, Shielded USB Cable
Headset & Earphone*2	Kolin	K17-7463E	1.5m, Unshielded Audio Cable
Modem	Aceex	1414	1.8m, Unshielded Cable

2.4 Test Methodology

Radiated emissions , conduction emissions , Immunity test were performed according to the procedures in EN55032, EN55024, CISPR 32, CISPR 24, AS/NZS CISPR 32.

2.5 Deviation Record:

(If any deviation from additions to or exclusions from test method must be stated)

N/A

2.6 Modification Record:

No modifications were required. (That is the EUT complied with the requirement as tested.)

2.7 The Worst Case Mode and EUT Components for test:

2.7.1 Operating Conditions of the EUT.

Refer to EN55032 / CISPR 32:

The operational conditions of the EUT shall be determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission. The determined operational mode and the rationale for the conditions shall be stated in the test report.

The EUT shall be operated within the rated (normal) operating voltage range and typical load conditions (mechanical and electrical) for which it is designed. Actual loads should be used whenever possible . If a simulator is used ,it shall represent the actual load with respect to its radio frequency and functional characteristics.

The test programmes or other means of exercising the equipment should ensure that various parts of a system exercised in a manner that permits detection of all system disturbances . For example , in a computer system , tape and disk drivers should be put through a mechanical read-write-erase sequence ; and various portions of memories should be addressed . Any mechanical activities should be performed.

Refer to AS/NZS CISPR 32:

The operational conditions of the EUT shall be determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission. The determined operational mode and the rationale for the conditions shall be stated in the test report.

The EUT shall be operated within the rated (normal) operating voltage range and typical load conditions (mechanical and electrical) for which it is designed. Actual loads should be used whenever possible . If a simulator is used ,it shall represent the actual load with respect to its radio frequency and functional characteristics.

The test programmes or other means of exercising the equipment should ensure that various parts of a system exercised in a manner that permits detection of all system disturbances . For example , in a computer system , tape and disk drivers should be put through a mechanical read-write-erase sequence ; and various portions of memories should be addressed . Any mechanical activities should be performed and visual display units should be operated as in G.1.

Refer to EN55024 / CISPR 24:

The test shall be made exercising all primary functions in the most representative mode consistent with typical applications The test sample shall be configured in a manner consistent with typical installation practice.

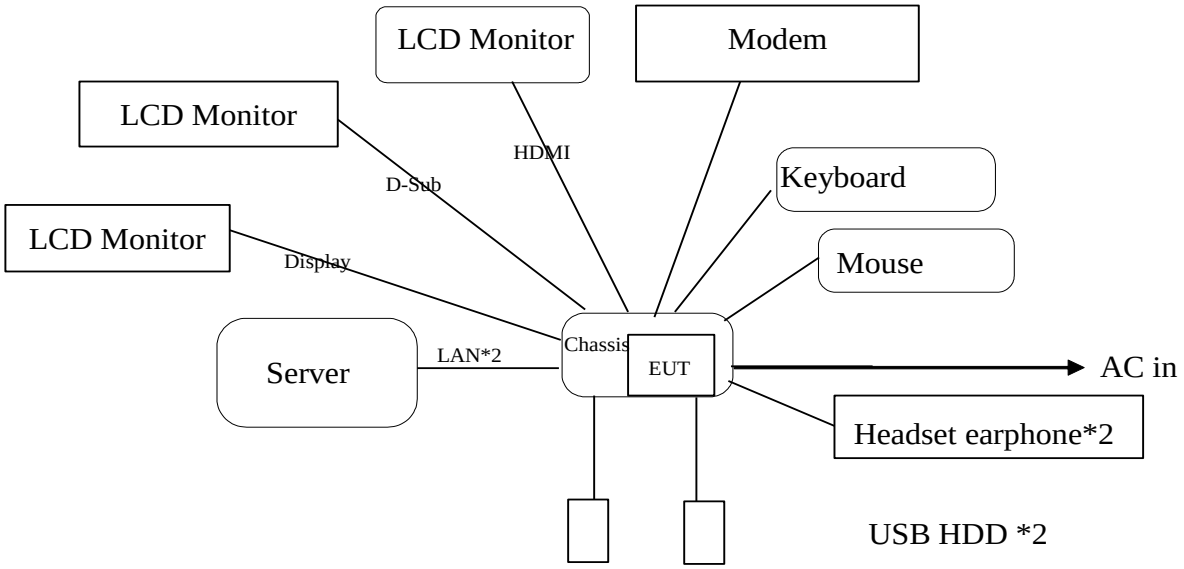
If the equipment is part of a system or can be connected to auxiliary equipment, then the equipment shall be test while connected to the minimum representative configuration of auxiliary equipment necessary to exercise the ports in a similar manner to that described in CISPR22.

The configuration and mode of operating during the tests shall be precisely noted in the test report. It is not always possible to test every function of the apparatus; in such cases , the most critical mode of operation shall be selected.

Operating Conditions of the EUT : Setup Table

1	For test configuration/setup, please see block diagram provided in section 2.6.2
2	Power on EUT and all peripheral/accessory devices
3	Allow EUT system to boot up to normal status
4	Activate/enable EUT functionalities either via user interface or via control from connected PC computer
5	Execute EUT functionalities utilizing either functions provided in user interface or via control of test software/tool from connected PC computer. Test software tools are OS tools custom to the EUT's operation system.
6	Repeat the step1 to step 6.

2.7.2 Testing Setup Block Diagram



3 SUMMARY OF TEST RESULTS

3.1 Emissions:

3.1.1 Conducted Emissions

■**–PASS**

AVG values is preferred to list (worst case)here: -1.17 dB at 0.3480 MHz
(Mains Terminals Port /AC Input) (L1)

AVG values is preferred to list (worst case)here: -3.11 dB at 0.3443 MHz
(Mains Terminals Port /AC Input) (N)

3.1.2 Radiated Emissions

■**-PASS**

QP values is preferred to list (worst case)here: 3.73 dB at 151.2500 MHz
(Horizontal 30MHz~1GHz) (Open Case)

QP values is preferred to list (worst case)here: 4.84 dB at 152.4648 MHz
(Vertical 30MHz~1GHz) (Open Case)

AVG values is preferred to list (worst case)here: -5.61 dB at 5400.862 MHz
(Horizontal 1GHz~6GHz) (Open Case)

AVG values is preferred to list (worst case)here: -3.63 dB at 2225.262 MHz
(Vertical 1GHz~6GHz) (Open Case)

3.1.3 Harmonics Current Emissions

■**-PASS**

The harmonics current values were under the limits of the class D equipment of the EN 61000-3-2.(Class D power rated , between 75W＜Power≦600W)

3.1.4 Voltage Fluctuations and Flicker

■**-PASS**

The voltage fluctuations and flicker values were under the limits of the EN 61000-3-3 requirements.

3.2 Immunity:

3.2.1 Immunity Criteria:

The results of all of the immunity tests performed on the EUT were evaluated according to the following criteria, and according to the manufacturer's specifications for the EUT:

Performance criterion A: The EUT continued to operate as intended. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended.

Performance criterion B: The EUT continued to operate as intended after the test. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended. During the test, degradation of performance was however allowed. No change of actual operating state or stored data was allowed.

Performance criterion C: Temporary loss of function was allowed, provided the function was self recoverable or could be restored by the operation of the controls.

3.2.2 Electrostatic Discharge Immunity:

Requirement: Criterion refer below (xxx)

■ - No Degradation of Function - Satisfies Criterion A
■ - Distortion of Function - Satisfies Criterion B
□ - Error of Function - Satisfies Criterion C

(B for contact 8KV and Air 15KV)

3.2.3 RF Radiated Fields Immunity:

Requirement: Criterion A

■ - No Degradation of Function - Satisfies Criterion A
□ - Distortion of Function - Satisfies Criterion B
□ - Error of Function - Satisfies Criterion C

3.2.4 EFT/Burst Immunity:

Requirement: Criterion B

■ - No Degradation of Function - Satisfies Criterion A
□ - Distortion of Function - Satisfies Criterion B
□ - Error of Function - Satisfies Criterion C

3.2.5 Surge Immunity:

Requirement: Criterion refer below (xxx)

■ - No Degradation of Function	- Satisfies Criterion A
□ - Distortion of Function	- Satisfies Criterion B
□ - Error of Function	- Satisfies Criterion C

3.2.6 RF Common Mode Immunity:

Requirement: Criterion A

■ - No Degradation of Function	- Satisfies Criterion A
□ - Distortion of Function	- Satisfies Criterion B
□ - Error of Function	- Satisfies Criterion C

3.2.7 Power Freqnency Magnetic Field Immunity:

Requirement: Criterion A

■ - No Degradation of Function	- Satisfies Criterion A
□ - Distortion of Function	- Satisfies Criterion B
□ - Error of Function	- Satisfies Criterion C

3.2.8 Voltage Interruptions and Voltage Dips Immunity:

Requirement: Criterion refer below (xxx)

■ – No Degradation of Function	- Satisfies Criterion A
□ – Distortion of Function	- Satisfies Criterion B
■ – Error of Function	- Satisfies Criterion C

(C for variation to 0% and 5s periods duration / A for the other level.)

3.3 Summary of test Results and Applied Level:

Manufacturer level requirements: (Custom's Specification)

Summary of test Results and Applied Level			
Emission			
Emission Test Standard	Test Item	Test Result	Applied Level and M.U.
EN 55032: 2015 / CISPR 32:2015 /AS/NZS CISPR 32:2015,Class B	Radiated Emission	PASS	Class B @30MHz~1GHz, U=±5.16dB @1GHz~6GHz, U=±5.08dB
EN 55032: 2015 / CISPR 32:2015 / AS/NZS CISPR 32:2015,Class B	Conducted Emission	PASS	Class B @AC Port: 0.15MHz~30MHz, U=±2.78dB @ISN: 0.15MHz~30MHz, U=±2.86dB
EN 61000-3-2:2014 / IEC 61000-3-2:2014,Class D	Harmonic Current Emission	PASS	Class D @MU, U=±1.283%
EN 61000-3-3:2013 / IEC 61000-3-3:2013	Voltage Fluctuation and Flicker Test	PASS	All parameter @MU, U=±1.283%
Immunity [EN 55024:2010 / CISPR 24:2010]			
Immunity Test Standard	Test Item	Test Result	Applied Level and M.U.
EN 61000-4-2:2009 / IEC 61000-4-2:2008	Electrostatic Discharge Test (ESD)	PASS	@Contact Discharge up to ±4KV @Air Discharge up to ±8KV @measurement uncertainty U=±56V
EN 61000-4-3:2006+A1:2008+ A2:2010 / IEC 61000-4-3:2006+A1:2007+A2:2010	Radiated , RF Immunity (RS)	PASS	@Frequency: 80MHz-1000MHz @3V/m (Unmodulated) , 1KHz Amplitude Modulated with modulation depth 80% @measurement uncertainty U=±1.37
EN 61000-4-4:2012 / IEC 61000-4-4:2012	Electrical Fast Transient/burst Test (EFT)	PASS	@Power port : ±1KV @I/O Port : ±0.5KV @measurement uncertainty U=±2.95V
EN 61000-4-5:2014 / IEC 61000-4-5:2014	Surge Immunity	PASS	@Power port : ±0.5KV / ±1KV / ±2KV @I/O Port : ±0.5KV @measurement uncertainty U=±3.55V
EN 61000-4-6:2014 / IEC 61000-4-6:2013	Conducted , RF Immunity (CS)	PASS	@Frequency: 0.15MHz-80MHz @3V/m (Unmodulated) , 1KHz Amplitude Modulated with modulation depth 80% @measurement uncertainty U=±2.3
EN 61000-4-8:2010 / IEC 61000-4-8:2009	Power Frequency Magnetic Field (MS)	PASS	1A/m , 50Hz
EN 61000-4-11:2004 / IEC 61000-4-11:2004	Voltage dips,short interruptions and voltage variations on power supply input lines	PASS	>95% Voltage variation , 5s >95% Voltage DIP , 10ms 30% Voltage DIP , 500ms @measurement uncertainty U=±3.55

Note : Measurement uncertainty U=±X . Means the expanded measure uncertainty U=±X , the coverage factor k=2, approximately a 95% level of confidence.

4 PROVISIONS APPLICABLE

For the purposes of this standard the following definitions apply:

4.1 Information Technology Equipment (ITE)

Any equipment:

a) Which has a primary function of either (or a combination of) entry, storage, display, retrieval, transmission, processing, switching, or control, of data and of telecommuication messages and which may be equipped with one or more terminal ports typically operated for information transfer;

b) With a rated supply voltage not exceeding 600V.

It includes, for example, data processing equipment, office machines, electronic business equipment, and telecommunication equipment.

Any equipment (or part of this ITE equipment) which has a primary function of radio transmission and/or reception according to the ITU Radio Regulations are excluded from the scope of this standard.

4.2 Class Definition

Class A equipment

Class A ITE is a category of all other ITE which satisifies the class A ITE limits but not the class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use:

Warning This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to make adequate measures.

Class B equipment

Class B ITE is a category of apparatus which satisfies the class B ITE disturbance limits.
Class B ITE is intended primarily for use in the domestic environment and may include:
--equipment with no fixed place of use , for example portable equipment powered by built-in batteries;
--telecommunication terminal equipment powered by a telecommunication network;
--Personal computers and auxiliary connected equipment;
Note The domestic environment is an environment where the use of broadcast radio and television receivers may be expected within a distance of 10m of the apparatus concerned.

4.3 Labeling of CE Marking (EC Conformity Marking)

CE

4.4 Labeling Requirement

Labeling:

While the label can be affixed to the product at any time prior to its being offered for sale on the Australian market, the device cannot be offered for sale unless it is properly labeled the compliance folder is complete.

Single compliance mark—the RCM.

RCM Mark: (Regulatory Compliance Mark)

Suppliers of devices (other than compliance level one devices) covered by the EMC Labelling Notice must affix a compliance label to their device before it can be supplied. Labelling is optional for compliance level one devices.

The RCM compliance label consists of the RCM

(1)

The Regulatory Compliance Mark (RCM) is a trademark owned by Australian and New Zealand regulators. The RCM may be used as an alternative mark to the C-Tick, but is not an alternative to the A-Tick. The RCM alone cannot be used as a compliance mark for telecommunications devices but may be used in conjunction with the A-Tick mark if desired.

If the RCM is used as an alternative to the C-Tick, the device must comply with all other applicable regulations, such as electrical safety, that are covered by the RCM standard AS/NZS 4417. There are various parts of this standard that specify the conditions for use of the RCM. Suppliers who intend to use the RCM must register with Standards Australia. They must also notify the ACMA of their intention to use this trademark. The notification forms are available in the standard, More information about the RCM is available on the Standards Australia website.

(2)

In the example, the supplier identification depicted is the SCN issued by the ACMA. (Supplier code numbers issued by Standards Australia do not use an N prefix and will therefore be just numbers.)

Web Site: http://www.acma.gov.au/

5 TEST DATA & RELATED INFORMATIONS

5.1 Emissions:

5.1.1 Conducted Emissions Test:

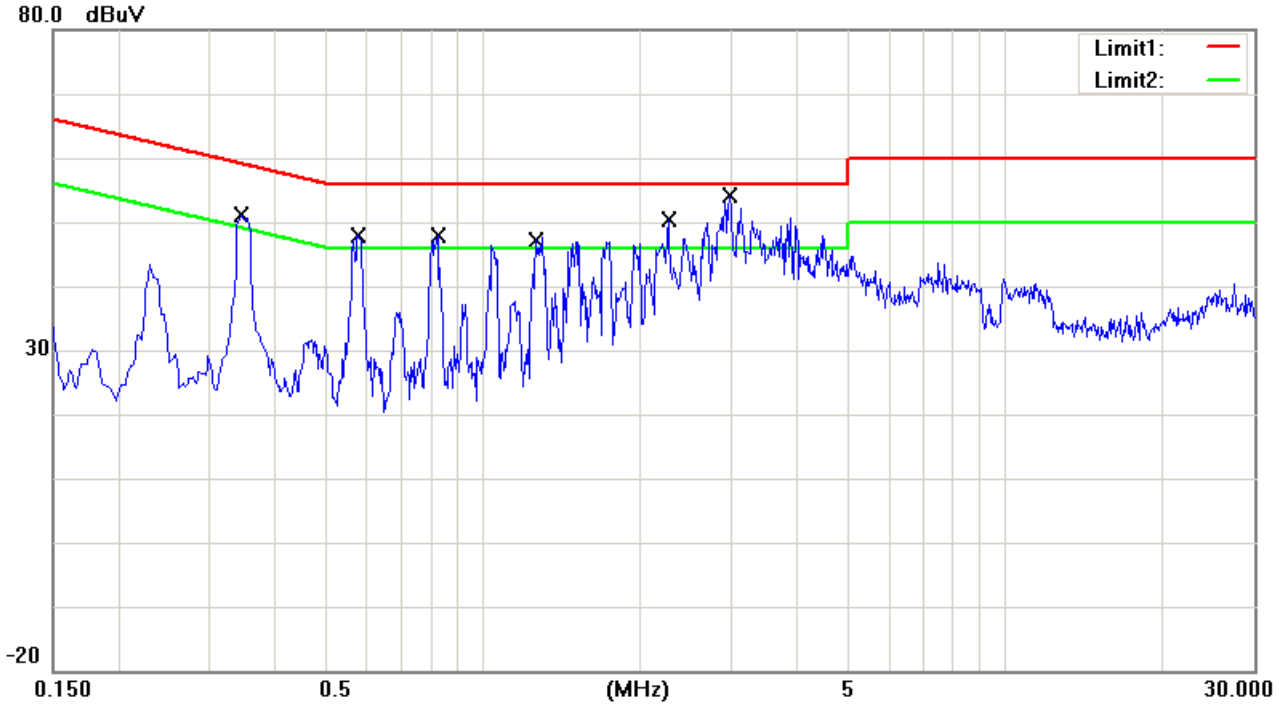
5.1.1.1 Conducted Emissions Test Data:

A. Mains Terminals Port (AC Input)

Test Date	Feb. 22, 2018	
Test Specification	EN 55032: 2015 CISPR 32:2015 AS/NZS CISPR 32:2015, Class B	
Climatic Condition	Ambient Temperature: 20 °C	Relative Humidity: 58 % RH
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

Test data see the next page.

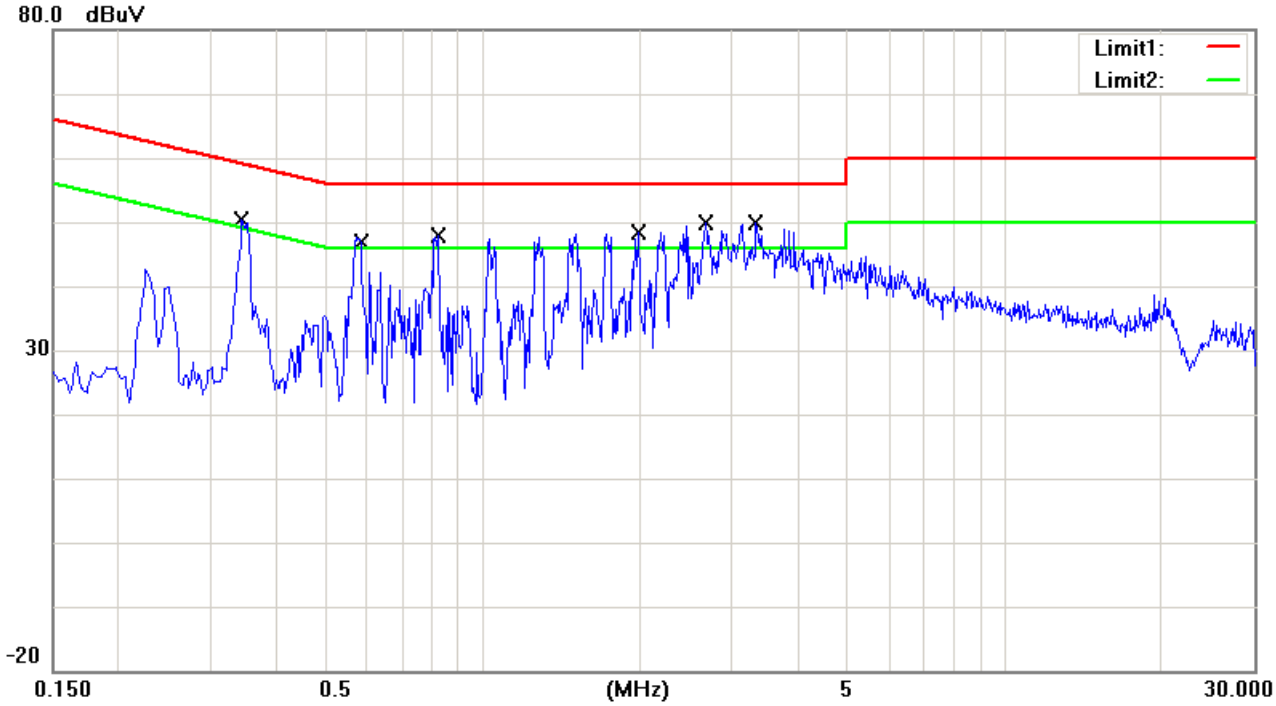
L1



No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
1	0.3480	40.46	QP	9.68	50.14	59.01	-8.87	
2	0.3480	38.16	AVG	9.68	47.84	49.01	-1.17	
3	0.5740	37.39	QP	9.69	47.08	56.00	-8.92	
4	0.5740	33.08	AVG	9.69	42.77	46.00	-3.23	
5	0.8155	36.15	QP	9.71	45.86	56.00	-10.14	
6	0.8155	29.53	AVG	9.71	39.24	46.00	-6.76	
7	1.2621	35.03	QP	9.72	44.75	56.00	-11.25	
8	1.2621	27.71	AVG	9.72	37.43	46.00	-8.57	
9	2.2638	34.28	QP	9.74	44.02	56.00	-11.98	
10	2.2638	25.93	AVG	9.74	35.67	46.00	-10.33	
11	2.9773	34.65	QP	9.75	44.40	56.00	-11.60	
12	2.9773	25.63	AVG	9.75	35.38	46.00	-10.62	

Notes: 1) Place of measurement: EMC LAB. of the ETC (CE-04)
2) The EUT was placed 0.8m above reference ground plane.
3) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
±2.78dB(0.15MHz~30MHz)

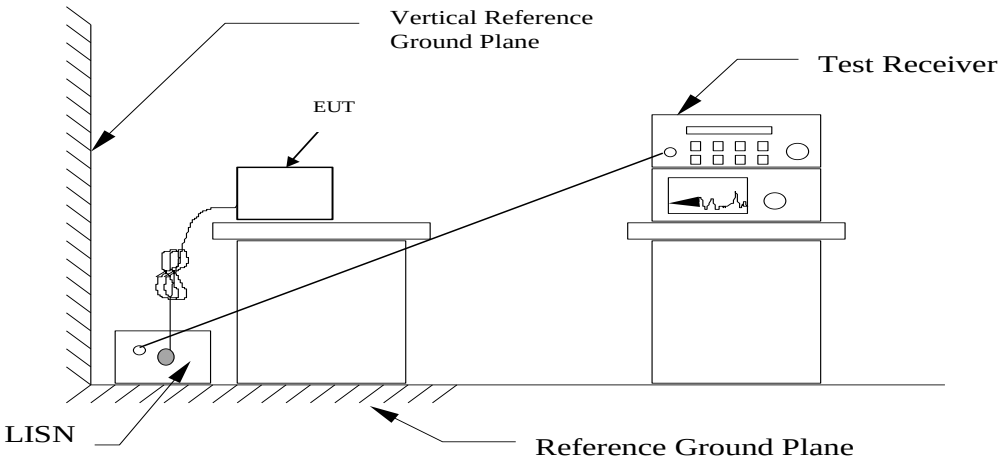
N



No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
1	0.3443	39.36	QP	9.68	49.04	59.10	-10.06	
2	0.3443	36.31	AVG	9.68	45.99	49.10	-3.11	
3	0.5904	35.46	QP	9.69	45.15	56.00	-10.85	
4	0.5904	27.10	AVG	9.69	36.79	46.00	-9.21	
5	0.8137	36.40	QP	9.70	46.10	56.00	-9.90	
6	0.8137	30.70	AVG	9.70	40.40	46.00	-5.60	
7	1.9813	34.66	QP	9.73	44.39	56.00	-11.61	
8	1.9813	27.52	AVG	9.73	37.25	46.00	-8.75	
9	2.6721	35.69	QP	9.75	45.44	56.00	-10.56	
10	2.6721	28.59	AVG	9.75	38.34	46.00	-7.66	
11	3.3340	34.88	QP	9.75	44.63	56.00	-11.37	
12	3.3340	27.66	AVG	9.75	37.41	46.00	-8.59	

Notes: 1) Place of measurement: EMC LAB. of the ETC (CE-04)
2) The EUT was placed 0.8m above reference ground plane.
3) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
±2.78dB(0.15MHz~30MHz)

5.1.1.2 Conducted Emissions Test Block Diagram



5.1.2 Radiated Emissions Test:

5.1.2.1 Radiated Emissions Test Data:

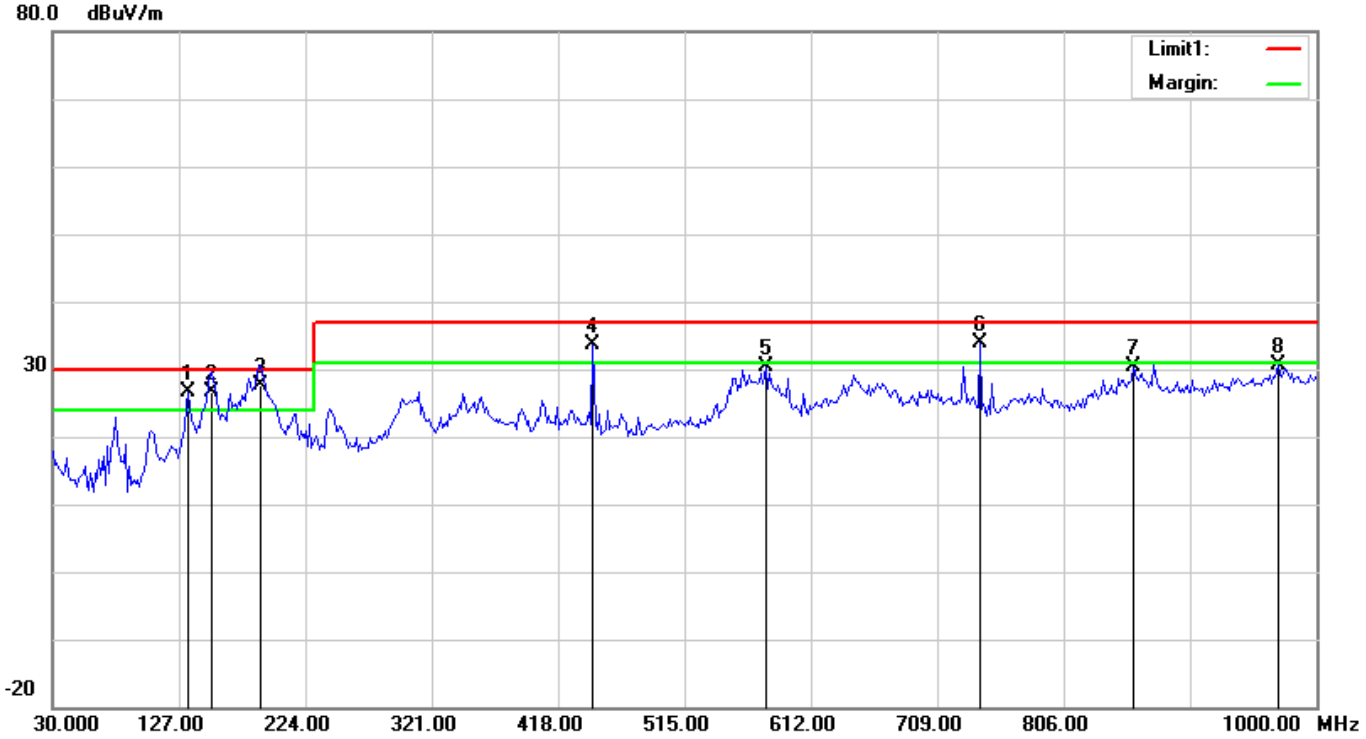
A. Operating Conditions of The EUT: (Close case)

Test Date	Feb. 21, 2018	
Test Specification	EN 55032: 2015 CISPR 32:2015 AS/NZS CISPR 32:2015, Class B	
Climatic Condition	Ambient Temperature: 26 °C	Relative Humidity: 60 % RH
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

Test data see the next page.

Horizontal

Measurement Distance: 10 m (30MHz~1GHz)

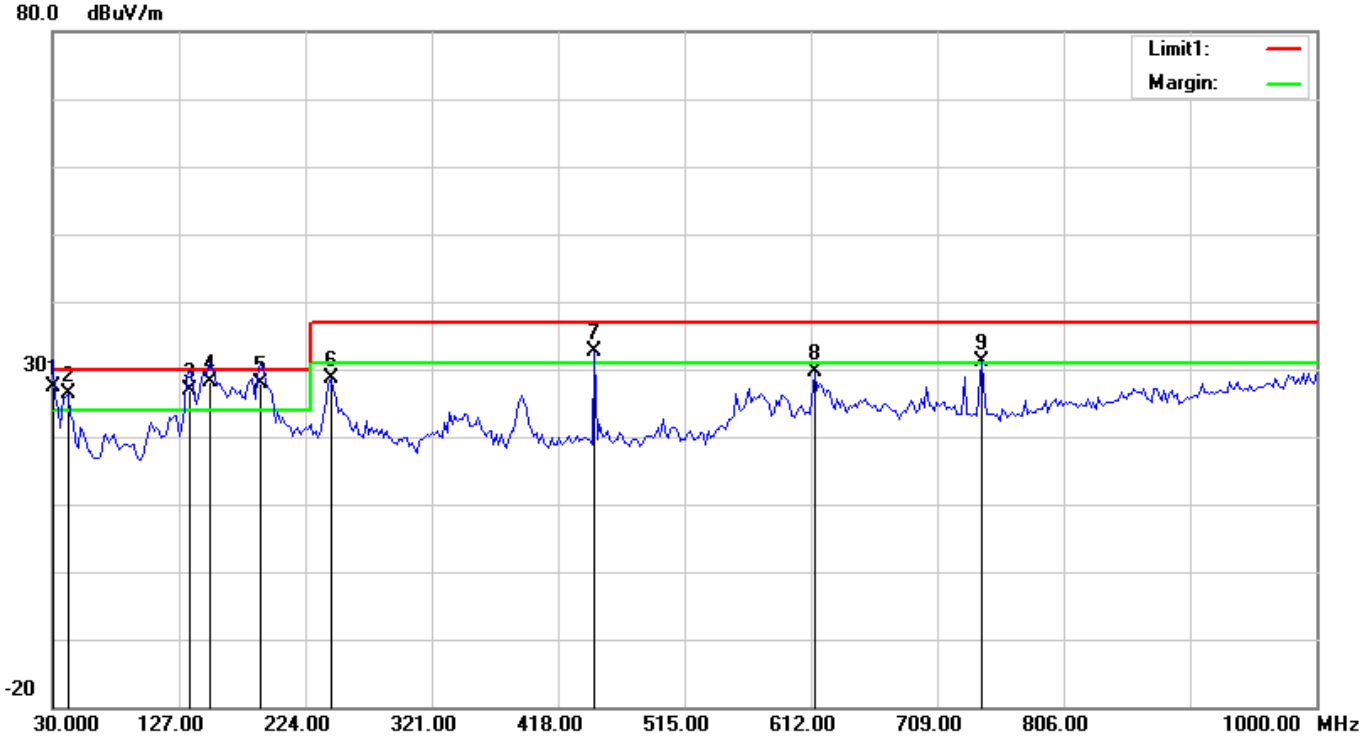


No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	134.1505	42.51	QP	-15.90	26.61	30.00	-3.39	399	244	
2	152.8044	43.85	QP	-17.23	26.62	30.00	-3.38	399	61	
3	190.1121	47.38	QP	-19.65	27.73	30.00	-2.27	299	0	
4	445.0480	43.87	QP	-10.31	33.56	37.00	-3.44	201	220	
5	577.1794	39.46	QP	-9.02	30.44	37.00	-6.56	102	349	
6	741.9551	40.13	QP	-6.29	33.84	37.00	-3.16	102	211	
7	860.0961	34.73	QP	-4.39	30.34	37.00	-6.66	102	39	
8	970.4646	32.04	QP	-1.51	30.53	37.00	-6.47	301	225	

Notes: 1) Place of Measurement: Measuring site of the ETC (1F)
2) Measurement Distance: 10 m
3) Height of table on which the EUT was placed: 0.8 m
4) Height of Receiving Antenna: 1 - 4 m
5) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
+ 4.64dB / - 4.64dB (30MHz $\leqq f \leqq$ 200MHz)
+ 5.10dB / - 5.10dB (200MHz $\leqq f \leqq$ 1GHz)
+ 5.08dB / - 5.08dB (1GHz $\leqq f \leqq$ 6GHz)
+ 4.92dB / - 4.92dB (6GHz $\leqq f \leqq$ 18GHz)

Vertical

Measurement Distance: 10 m (30MHz~1GHz)



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	30.0956	43.15	QP	-15.82	27.33	30.00	-2.67	399	249	
2	41.6632	45.12	QP	-18.69	26.43	30.00	-3.57	110	360	
3	134.9698	42.82	QP	-15.96	26.86	30.00	-3.14	100	186	
4	150.5210	45.08	QP	-16.97	28.11	30.00	-1.89	100	221	
5	189.3987	47.33	QP	-19.39	27.94	30.00	-2.06	100	217	
6	243.8276	44.55	QP	-16.01	28.54	37.00	-8.46	100	180	
7	445.9920	42.33	QP	-9.73	32.60	37.00	-4.40	100	27	
8	615.1100	37.09	QP	-7.40	29.69	37.00	-7.31	199	1	
9	743.4067	36.41	QP	-5.19	31.22	37.00	-5.78	300	42	

Notes: 1) Place of Measurement: Measuring site of the ETC (1F)
2) Measurement Distance: 10 m
3) Height of table on which the EUT was placed: 0.8 m
4) Height of Receiving Antenna: 1 - 4 m
5) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
+ 4.68dB / - 4.68dB (30MHz $\leqq f \leqq$ 200MHz)
+ 5.16dB / - 5.16dB (200MHz $\leqq f \leqq$ 1GHz)
+ 5.08dB / - 5.08dB (1GHz $\leqq f \leqq$ 6GHz)
+ 4.88dB / - 4.88dB (6GHz $\leqq f \leqq$ 18GHz)

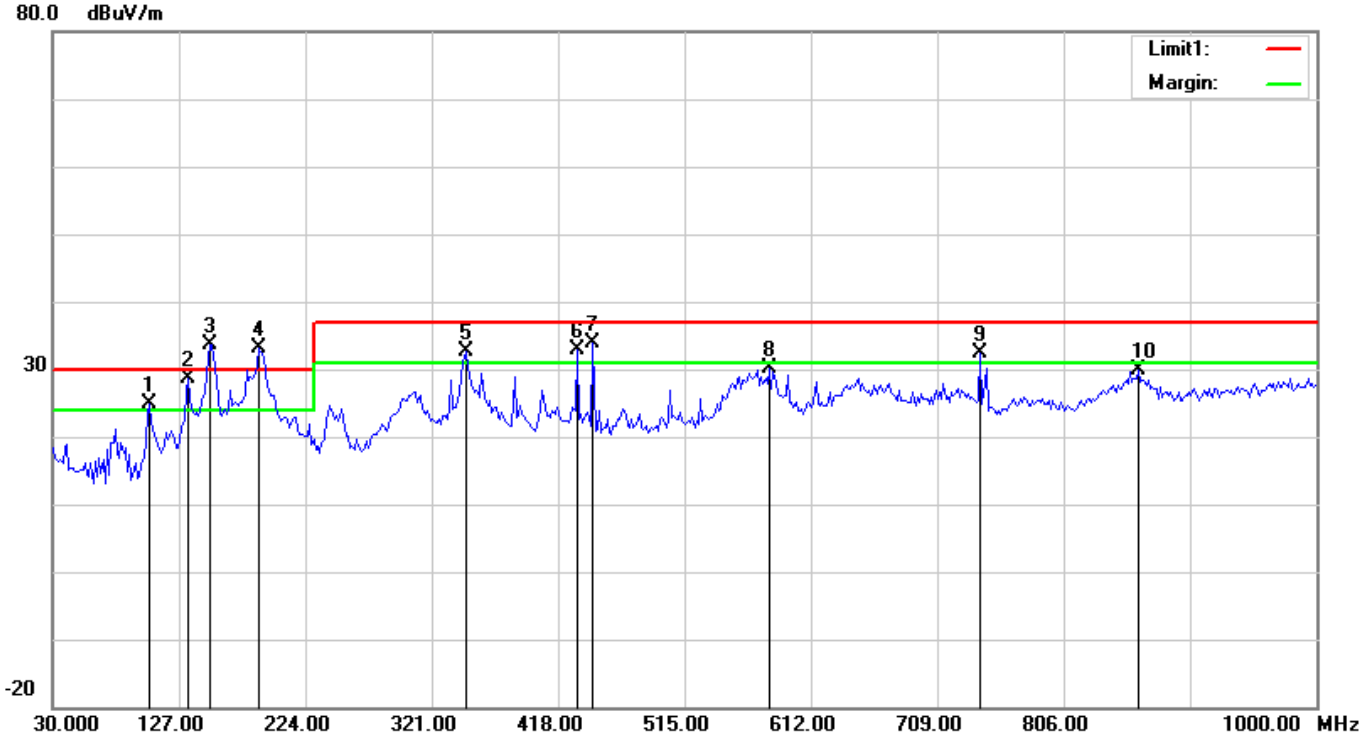
B. Operating Conditions of The EUT: (Open case)

Test Date	Feb. 21, 2018	
Test Specification	EN 55032: 2015 CISPR 32:2015 AS/NZS CISPR 32:2015, Class B	
Climatic Condition	Ambient Temperature: 26 °C	Relative Humidity: 60 % RH
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

Test data see the next page.

Horizontal

Measurement Distance: 10 m (30MHz~1GHz)

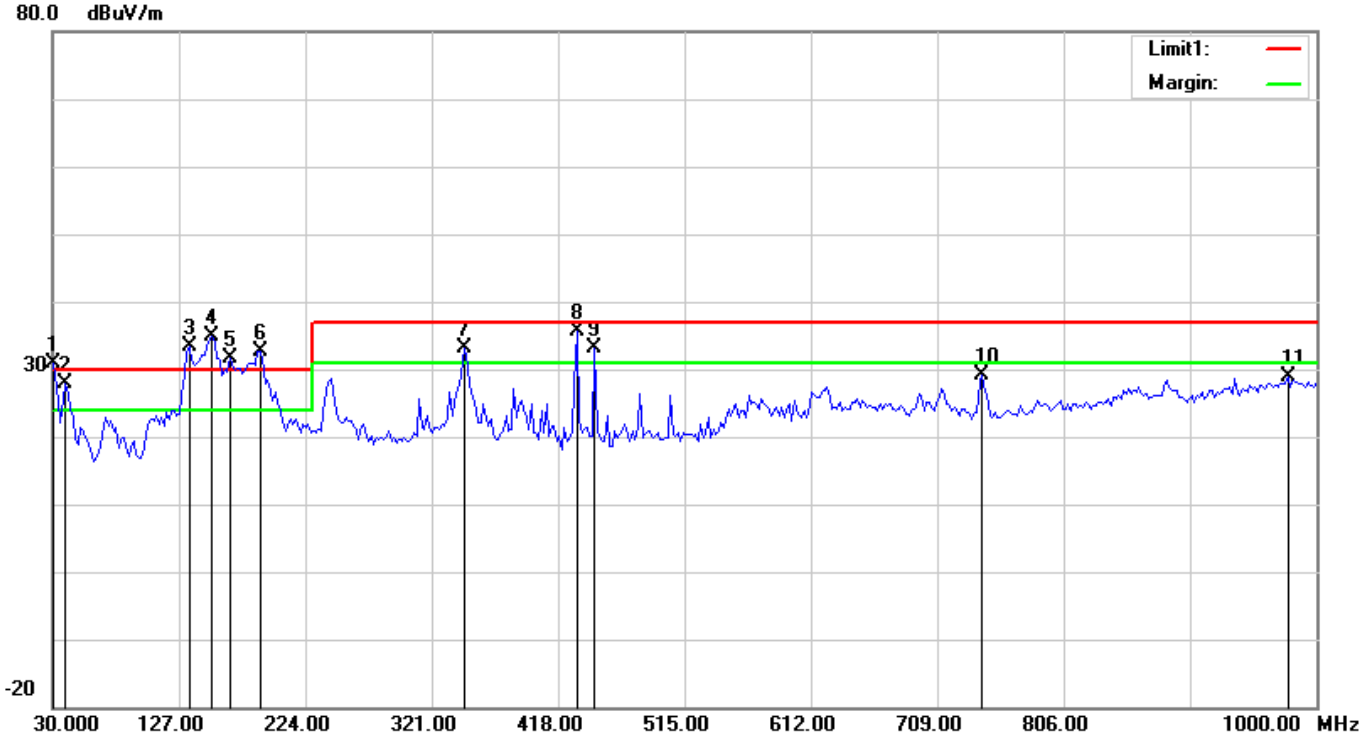


No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	104.6154	40.82	QP	-15.83	24.99	30.00	-5.01	398	272	
2	134.1506	42.90	QP	-14.36	28.54	30.00	-1.46	299	230	
3	151.2500	49.73	QP	-16.00	33.73	30.00	3.73	299	57	
4	188.5577	52.37	QP	-19.31	33.06	30.00	3.06	398	359	
5	347.1154	44.91	QP	-12.37	32.54	37.00	-4.46	289	0	
6	432.6122	43.15	QP	-10.27	32.88	37.00	-4.12	199	22	
7	445.0481	43.90	QP	-10.09	33.81	37.00	-3.19	299	216	
8	580.2885	38.76	QP	-8.64	30.12	37.00	-6.88	101	360	
9	741.9551	38.44	QP	-5.98	32.46	37.00	-4.54	101	214	
10	863.2051	34.45	QP	-4.65	29.80	37.00	-7.20	101	350	

Notes: 1) Place of Measurement: Measuring site of the ETC (1F)
2) Measurement Distance: 10 m
3) Height of table on which the EUT was placed: 0.8 m
4) Height of Receiving Antenna: 1 - 4 m
5) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
+ 4.64dB / - 4.64dB (30MHz $\leqq$ f $\leqq$ 200MHz)
+ 5.10dB / - 5.10dB (200MHz $\leqq$ f $\leqq$ 1GHz)
+ 5.08dB / - 5.08dB (1GHz $\leqq$ f $\leqq$ 6GHz)
+ 4.92dB / - 4.92dB (6GHz $\leqq$ f $\leqq$ 18GHz)
6) The DUT under the “Open Case” is allowed to have the 6dB over limit line than the regular “Close Case”.All of items in these two pages are not over 6dB on the limit – in EMI terms they are all “Passed”.

Vertical

Measurement Distance: 10 m (30MHz~1GHz)



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	30.0000	46.67	QP	-15.78	30.89	30.00	0.89	300	0	
2	39.7194	46.46	QP	-18.50	27.96	30.00	-2.04	201	208	
3	134.9700	49.27	QP	-15.96	33.31	30.00	3.31	101	145	
4	152.4648	51.99	QP	-17.15	34.84	30.00	4.84	101	229	
5	166.0721	50.06	QP	-18.36	31.70	30.00	1.70	101	198	
6	189.3988	52.11	QP	-19.39	32.72	30.00	2.72	101	220	
7	346.8536	45.41	QP	-12.26	33.15	37.00	-3.85	101	20	
8	432.3848	45.61	QP	-10.00	35.61	37.00	-1.39	399	186	
9	445.9920	42.79	QP	-9.73	33.06	37.00	-3.94	101	16	
10	743.4068	34.26	QP	-5.19	29.07	37.00	-7.93	201	195	
11	978.6172	29.32	QP	-0.52	28.80	37.00	-8.20	300	0	

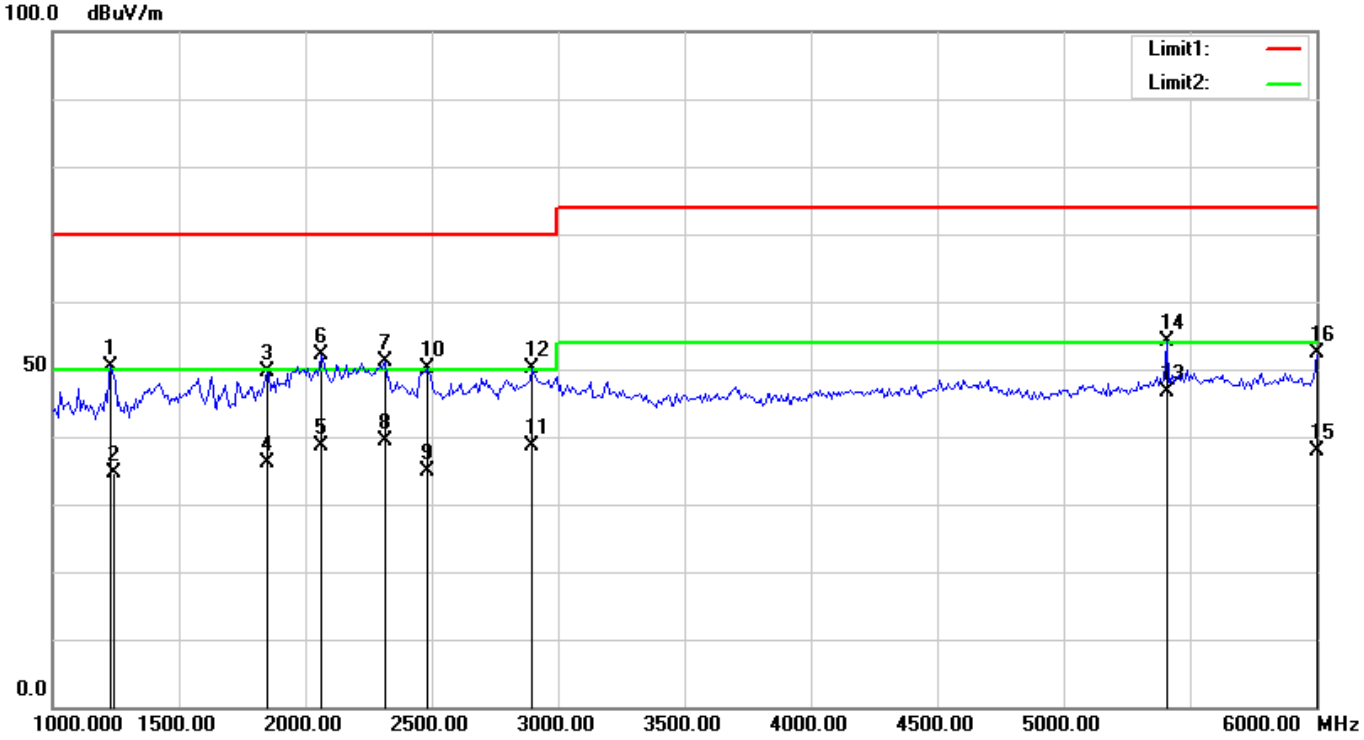
Notes: 1) Place of Measurement: Measuring site of the ETC (1F)
2) Measurement Distance: 10 m
3) Height of table on which the EUT was placed: 0.8 m
4) Height of Receiving Antenna: 1 - 4 m
5) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
+ 4.68dB / - 4.68dB (30MHz $\leqq$ f $\leqq$ 200MHz)
+ 5.16dB / - 5.16dB (200MHz $\leqq$ f $\leqq$ 1GHz)
+ 5.08dB / - 5.08dB (1GHz $\leqq$ f $\leqq$ 6GHz)
+ 4.88dB / - 4.88dB (6GHz $\leqq$ f $\leqq$ 18GHz)
6) The DUT under the "Open Case" is allowed to have the 6dB over limit line than the regular "Close Case".All of items in these two pages are not over 6dB on the limit – in EMI terms they are all "Passed".

C. Operating Conditions of The EUT: (Close case)

Test Date	Feb. 26, 2018	
Test Specification	EN 55032: 2015 CISPR 32:2015 AS/NZS CISPR 32:2015, Class B	
Climatic Condition	Ambient Temperature: 26 °C Relative Humidity: 60 % RH	
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

Test data see the next page.

Horizontal,
Measurement Distance: 3m (1GHz~6GHz)

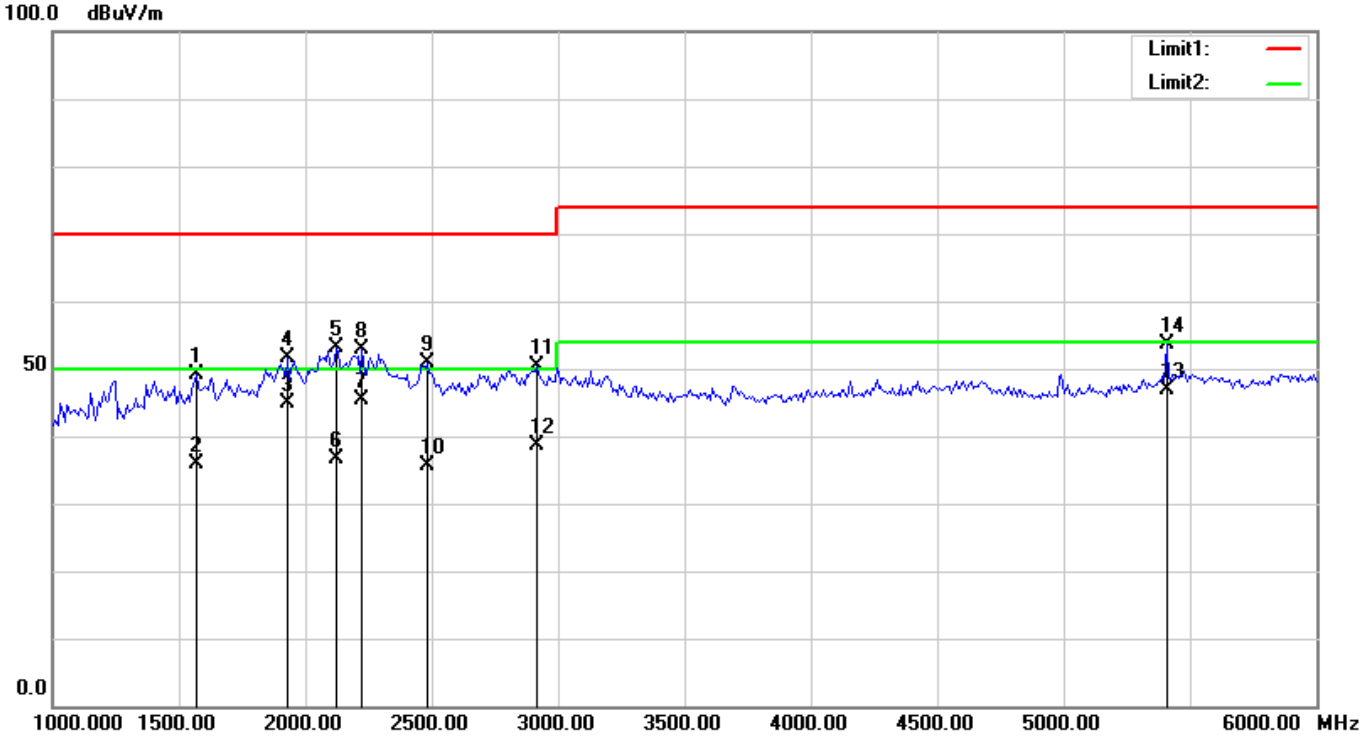


No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	1232.372	56.44	peak	-6.09	50.35	70.00	-19.65	100	58	
2	1241.346	40.70	AVG	-6.08	34.62	50.00	-15.38	100	58	
3	1849.359	52.11	peak	-2.45	49.66	70.00	-20.34	100	68	
4	1850.385	38.52	AVG	-2.45	36.07	50.00	-13.93	100	68	
5	2064.327	39.56	AVG	-0.98	38.58	50.00	-11.42	100	63	
6	2065.705	53.03	peak	-0.98	52.05	70.00	-17.95	100	63	
7	2314.103	51.57	peak	-0.51	51.06	70.00	-18.94	100	69	
8	2314.424	39.80	AVG	-0.51	39.29	50.00	-10.71	100	69	
9	2480.321	35.06	AVG	-0.19	34.87	50.00	-15.13	100	55	
10	2482.372	50.24	peak	-0.18	50.06	70.00	-19.94	100	55	
11	2892.501	37.44	AVG	1.10	38.54	50.00	-11.46	100	41	
12	2899.039	48.92	peak	1.13	50.05	70.00	-19.95	100	50	
13	5400.849	42.30	AVG	4.21	46.51	54.00	-7.49	100	67	
14	5407.051	49.80	peak	4.21	54.01	74.00	-19.99	100	67	
15	5999.803	32.76	AVG	5.00	37.76	54.00	-16.24	100	295	
16	6000.000	47.27	peak	5.00	52.27	74.00	-21.73	100	295	

Notes: 1) Place of Measurement: Measuring site of the ETC (1F)
2) Measurement Distance: 3 m
3) Height of table on which the EUT was placed: 0.8 m
4) Height of Receiving Antenna: 1 - 4 m
5) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
+ 4.64dB / - 4.64dB (30MHz $\leqq$ f $\leqq$ 200MHz)
+ 5.10dB / - 5.10dB (200MHz $\leqq$ f $\leqq$ 1GHz)
+ 5.08dB / - 5.08dB (1GHz $\leqq$ f $\leqq$ 6GHz)
+ 4.92dB / - 4.92dB (6GHz $\leqq$ f $\leqq$ 18GHz)

Vertical,

Measurement Distance: 3m (1GHz~6GHz)



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	1568.910	54.04	peak	-4.98	49.06	70.00	-20.94	101	35	
2	1569.583	40.89	AVG	-4.97	35.92	50.00	-14.08	101	35	
3	1928.541	46.66	AVG	-1.74	44.92	50.00	-5.08	101	337	
4	1929.487	53.41	peak	-1.74	51.67	70.00	-18.33	101	335	
5	2121.795	54.08	peak	-0.87	53.21	70.00	-16.79	101	209	
6	2129.391	37.52	AVG	-0.85	36.67	50.00	-13.33	101	209	
7	2225.272	46.12	AVG	-0.67	45.45	50.00	-4.55	101	30	
8	2225.961	53.43	peak	-0.67	52.76	70.00	-17.24	101	30	
9	2482.372	51.01	peak	-0.18	50.83	70.00	-19.17	101	45	
10	2484.423	35.78	AVG	-0.18	35.60	50.00	-14.40	101	57	
11	2915.064	49.12	peak	1.17	50.29	70.00	-19.71	101	341	
12	2917.147	37.55	AVG	1.18	38.73	50.00	-11.27	101	341	
13	5400.884	42.69	AVG	4.21	46.90	54.00	-7.10	101	0	
14	5407.051	49.45	peak	4.21	53.66	74.00	-20.34	101	1	

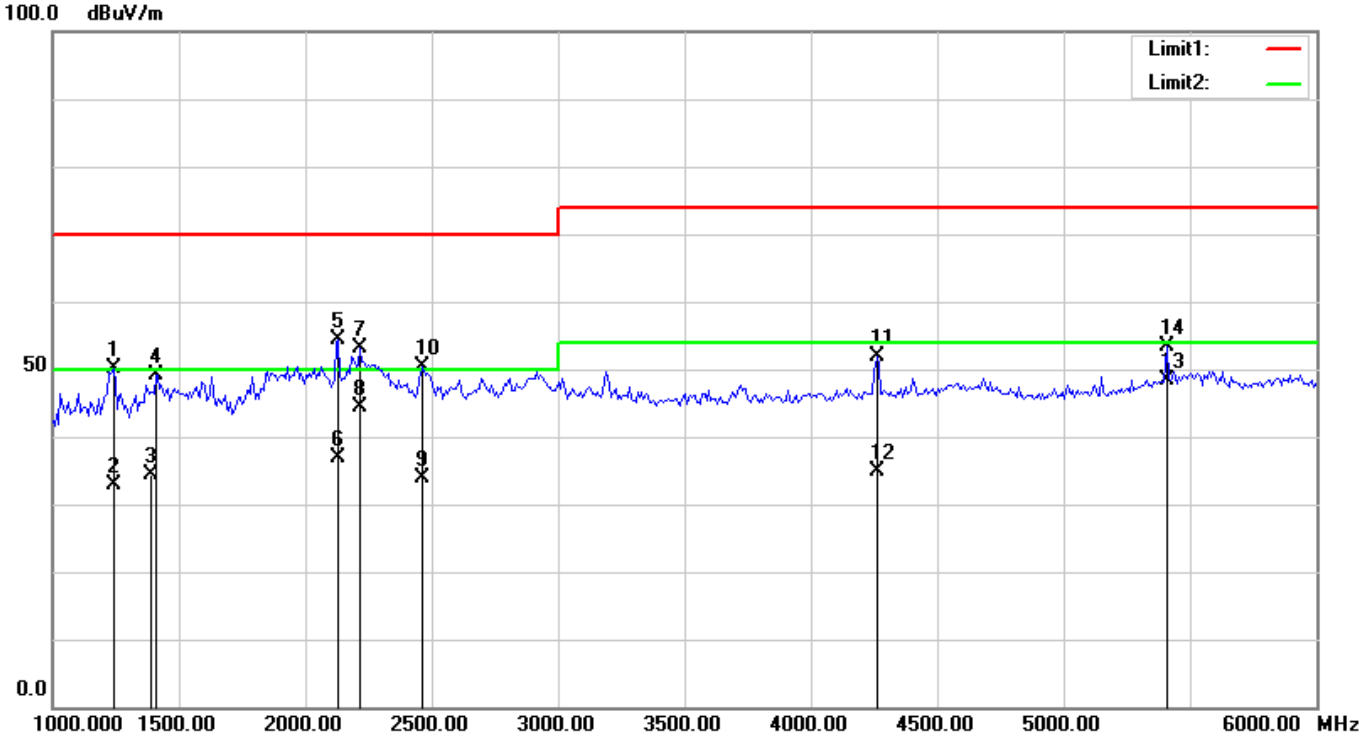
Notes: 1) Place of Measurement: Measuring site of the ETC (1F)
2) Measurement Distance: 3 m
3) Height of table on which the EUT was placed: 0.8 m
4) Height of Receiving Antenna: 1 - 4 m
5) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
+ 4.68dB / - 4.68dB (30MHz $\leqq f \leqq$ 200MHz)
+ 5.16dB / - 5.16dB (200MHz $\leqq f \leqq$ 1GHz)
+ 5.08dB / - 5.08dB (1GHz $\leqq f \leqq$ 6GHz)
+ 4.88dB / - 4.88dB (6GHz $\leqq f \leqq$ 18GHz)

D. Operating Conditions of The EUT: (Open case)

Test Date	Feb. 26, 2018	
Test Specification	EN 55032: 2015 CISPR 32:2015 AS/NZS CISPR 32:2015, Class B	
Climatic Condition	Ambient Temperature: 26 °C	Relative Humidity: 60 % RH
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

Test data see the next page.

Horizontal,
Measurement Distance: 3m (1GHz~6GHz)

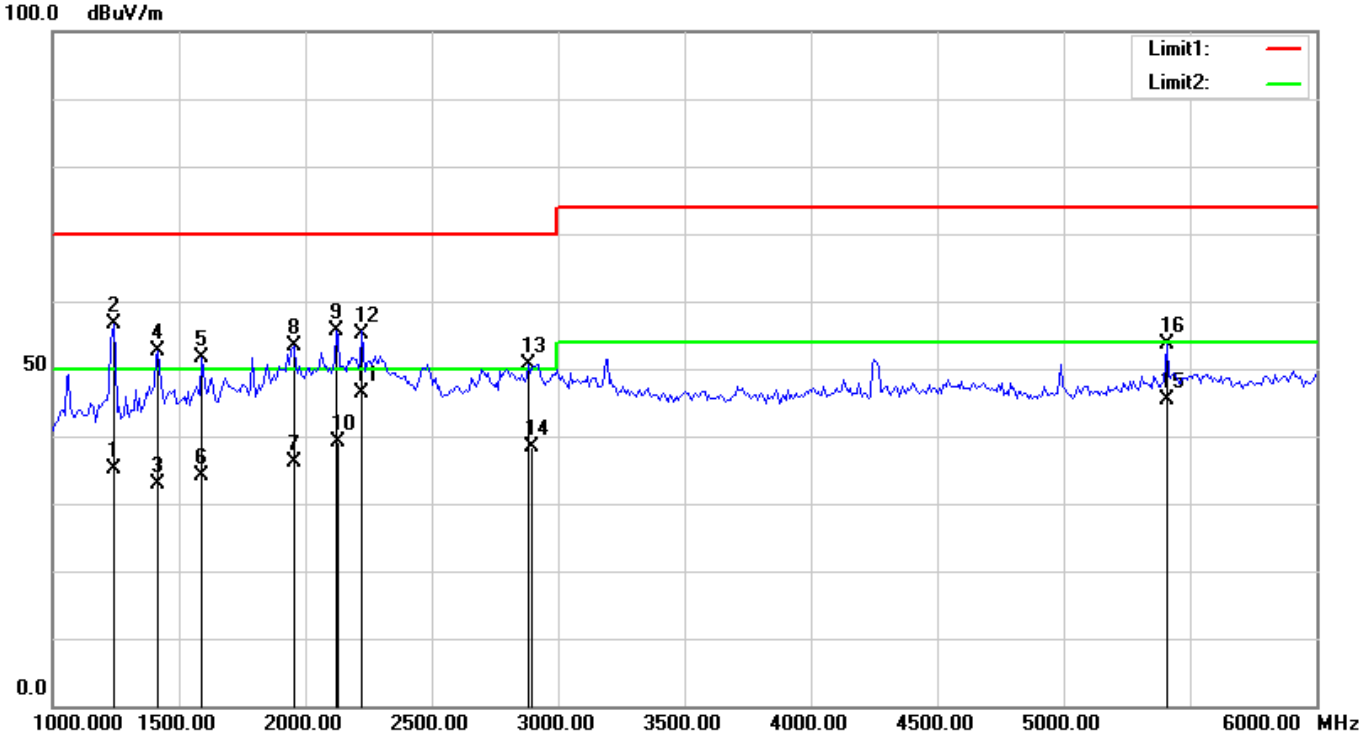


No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	1240.385	56.29	peak	-6.08	50.21	70.00	-19.79	101	341	
2	1241.411	38.93	AVG	-6.08	32.85	50.00	-17.15	101	334	
3	1400.064	40.12	AVG	-5.79	34.33	50.00	-15.67	101	113	
4	1408.654	54.84	peak	-5.77	49.07	70.00	-20.93	101	113	
5	2129.808	55.29	peak	-0.85	54.44	70.00	-15.56	101	352	
6	2131.250	37.82	AVG	-0.85	36.97	50.00	-13.03	101	358	
7	2217.949	53.79	peak	-0.68	53.11	70.00	-16.89	101	65	
8	2225.286	44.99	AVG	-0.67	44.32	50.00	-5.68	101	72	
9	2465.641	34.16	AVG	-0.22	33.94	50.00	-16.06	101	70	
10	2466.346	50.66	peak	-0.22	50.44	70.00	-19.56	101	70	
11	4261.218	49.04	peak	2.82	51.86	74.00	-22.14	101	330	
12	4264.295	32.00	AVG	2.82	34.82	54.00	-19.18	101	330	
13	5400.862	44.18	AVG	4.21	48.39	54.00	-5.61	101	66	
14	5407.051	49.19	peak	4.21	53.40	74.00	-20.60	101	73	

Notes: 1) Place of Measurement: Measuring site of the ETC (1F)
2) Measurement Distance: 3 m
3) Height of table on which the EUT was placed: 0.8 m
4) Height of Receiving Antenna: 1 - 4 m
5) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
+ 4.64dB / - 4.64dB (30MHz $\leqq$ f $\leqq$ 200MHz)
+ 5.10dB / - 5.10dB (200MHz $\leqq$ f $\leqq$ 1GHz)
+ 5.08dB / - 5.08dB (1GHz $\leqq$ f $\leqq$ 6GHz)
+ 4.92dB / - 4.92dB (6GHz $\leqq$ f $\leqq$ 18GHz)
6) The DUT under the "Open Case" is allowed to have the 6dB over limit line than the regular "Close Case".All of items in these two pages are not over 6dB on the limit – in EMI terms they are all "Passed".

Vertical,

Measurement Distance: 3m (1GHz~6GHz)

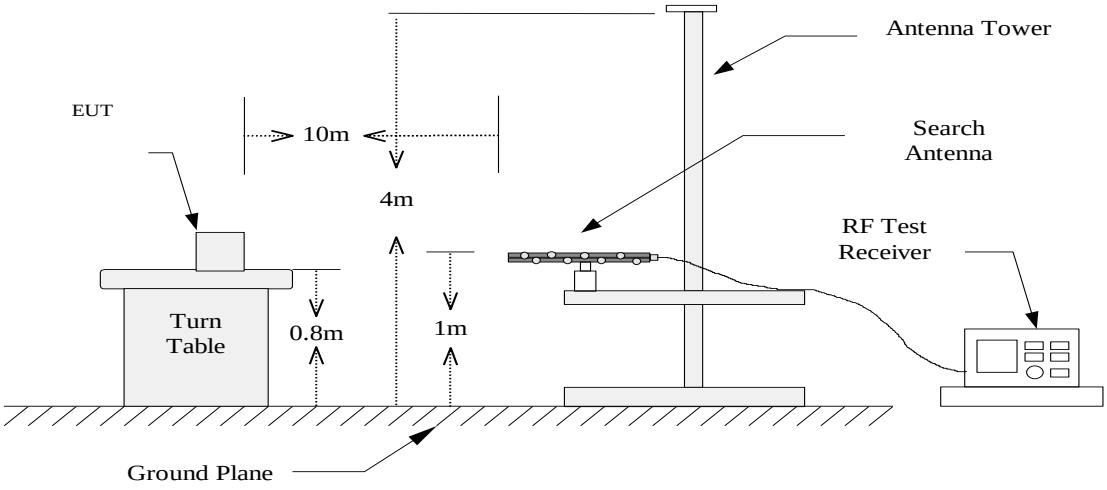


No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Comment
1	1239.359	41.16	AVG	-6.08	35.08	50.00	-14.92	101	316	
2	1240.385	62.67	peak	-6.08	56.59	70.00	-13.41	101	316	
3	1416.346	38.52	AVG	-5.75	32.77	50.00	-17.23	101	248	
4	1416.667	58.46	peak	-5.74	52.72	70.00	-17.28	101	248	
5	1592.949	56.43	peak	-4.76	51.67	70.00	-18.33	101	49	
6	1595.705	38.94	AVG	-4.73	34.21	50.00	-15.79	101	49	
7	1951.443	37.60	AVG	-1.53	36.07	50.00	-13.93	101	301	
8	1953.526	54.93	peak	-1.51	53.42	70.00	-16.58	101	301	
9	2121.795	56.43	peak	-0.87	55.56	70.00	-14.44	101	350	
10	2130.769	39.95	AVG	-0.85	39.10	50.00	-10.90	101	350	
11	2225.262	47.04	AVG	-0.67	46.37	50.00	-3.63	101	19	
12	2225.272	55.79	peak	-0.67	55.12	70.00	-14.88	101	19	
13	2883.013	49.60	peak	1.08	50.68	70.00	-19.32	101	346	
14	2893.686	37.34	AVG	1.10	38.44	50.00	-11.56	101	346	
15	5400.849	41.21	AVG	4.21	45.42	54.00	-8.58	101	1	
16	5407.051	49.42	peak	4.21	53.63	74.00	-20.37	101	1	

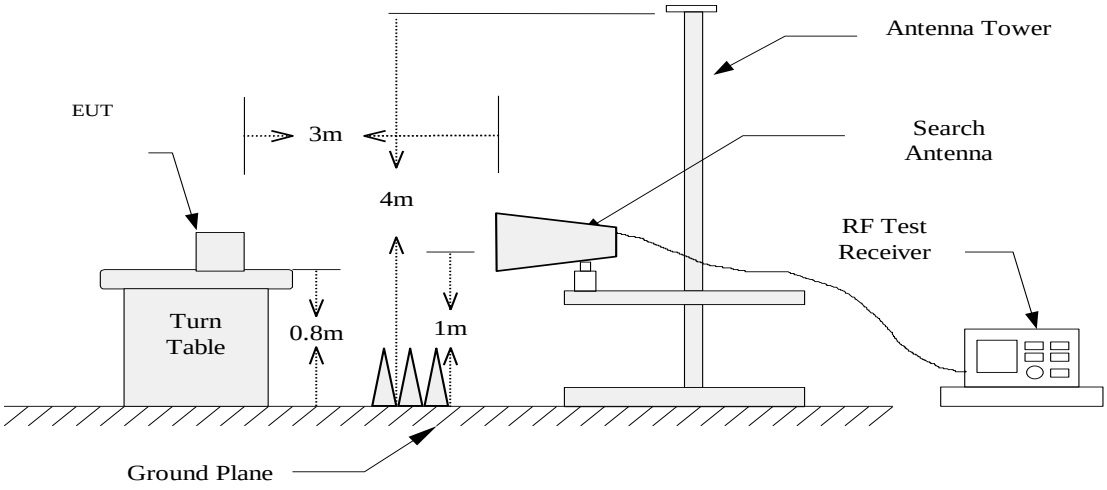
Notes: 1) Place of Measurement: Measuring site of the ETC (1F)
2) Measurement Distance: 3 m
3) Height of table on which the EUT was placed: 0.8 m
4) Height of Receiving Antenna: 1 - 4 m
5) The expanded measure uncertainty, mean the coverage factor k=2, approximately a 95% level of confidence.
+ 4.68dB / - 4.68dB (30MHz $\leqq f \leqq$ 200MHz)
+ 5.16dB / - 5.16dB (200MHz $\leqq f \leqq$ 1GHz)
+ 5.08dB / - 5.08dB (1GHz $\leqq f \leqq$ 6GHz)
+ 4.88dB / - 4.88dB (6GHz $\leqq f \leqq$ 18GHz)
6) The DUT under the "Open Case" is allowed to have the 6dB over limit line than the regular "Close Case".All of items in these two pages are not over 6dB on the limit – in EMI terms they are all "Passed".

5.1.2.2 Radiated Emissions Test Block Diagram

Test distance =10m.



Test distance =3m.



5.1.3 Harmonics Current Emissions Test:

5.1.3.1 Harmonics Current Emissions Test Data:

A. Operating Conditions of the EUT:

Test Date	Feb. 22, 2018	
Test Specification	EN 61000-3-2:2014, Class D IEC 61000-3-2:2014, Class D	
Climatic Condition	Ambient Temperature: 21 °C	Relative Humidity: 58 % RH
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

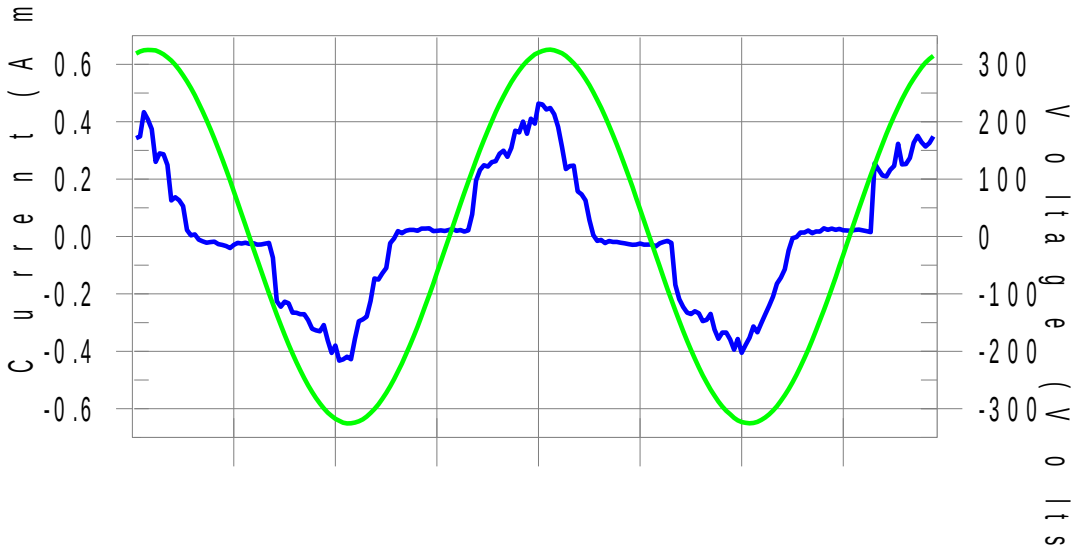
Test data see the next page.

Harmonics – Class-D per Ed. 4.0 (2014)(Run time)

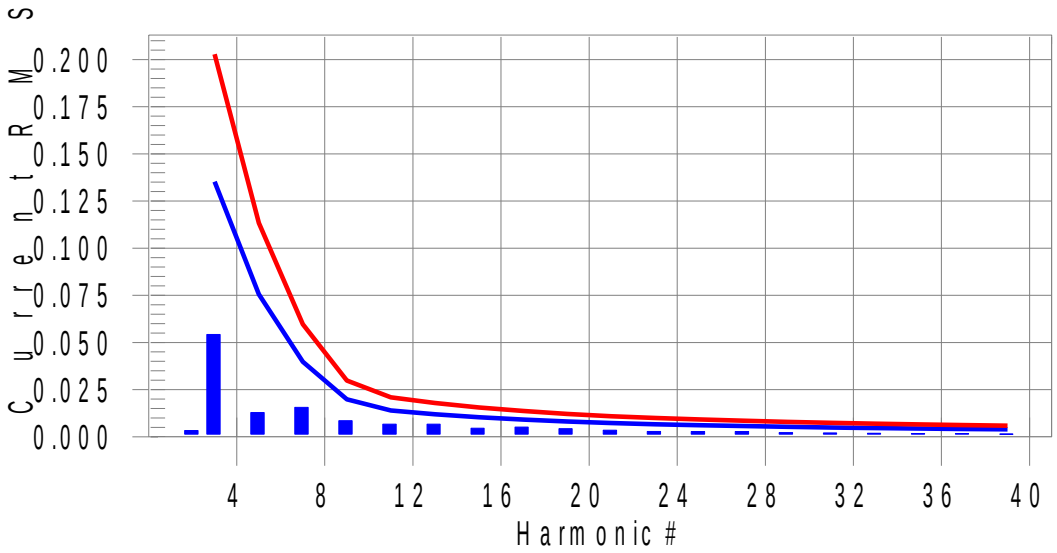
EUT: Equipment under test **Tested by: Tested by**
Test category: Class-D per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 2/22/2018 **Start time: 6:46:29 PM** **End time: 6:49:51 PM**
Test duration (min): 3 **Data file name: CTSMXL_H-000859.cts_data**
Comment: Comment
Customer: Customer information

Test Result: N/L **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class D limit line **European Limits**



Test result: N/L **Worst harmonic was #13 with 42.4% of the limit.**

Current Test Result Summary (Run time)

EUT: Equipment under test **Tested by: Tested by**
Test category: Class-D per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 2/22/2018 **Start time: 6:46:29 PM** **End time: 6:49:51 PM**
Test duration (min): 3 **Data file name: CTSMXL_H-000859.cts_data**
Comment: Comment
Customer: Customer information

Test Result: N/L **Source qualification: Normal**
THC(A): 0.000 **I-THD(%): 0.0** **POHC(A): 0.000** **POHC Limit(A): 0.000**

Highest parameter values during test:

V_RMS (Volts):	**230.216**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.503**	**I_RMS (Amps):**	**0.202**
I_Fund (Amps):	**0.167**	**Crest Factor:**	**3.052**
Power (Watts):	**39.8**	**Power Factor:**	**0.857**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.003	0.000	N/A	0.005	0.000	N/A	Pass
3	0.054	0.135	N/A	0.061	0.203	N/A	Pass
4	0.001	0.000	N/A	0.002	0.000	N/A	Pass
5	0.013	0.076	N/A	0.017	0.113	N/A	Pass
6	0.001	0.000	N/A	0.001	0.000	N/A	Pass
7	0.016	0.040	N/A	0.016	0.060	N/A	Pass
8	0.000	0.000	N/A	0.001	0.000	N/A	Pass
9	0.009	0.020	N/A	0.010	0.030	N/A	Pass
10	0.000	0.000	N/A	0.001	0.000	N/A	Pass
11	0.007	0.014	N/A	0.007	0.021	N/A	Pass
12	0.000	0.000	N/A	0.001	0.000	N/A	Pass
13	0.007	0.012	N/A	0.008	0.018	N/A	Pass
14	0.000	0.000	N/A	0.001	0.000	N/A	Pass
15	0.005	0.010	N/A	0.005	0.016	N/A	Pass
16	0.000	0.000	N/A	0.001	0.000	N/A	Pass
17	0.005	0.009	N/A	0.006	0.014	N/A	Pass
18	0.000	0.000	N/A	0.001	0.000	N/A	Pass
19	0.004	0.008	N/A	0.005	0.012	N/A	Pass
20	0.000	0.000	N/A	0.001	0.000	N/A	Pass
21	0.003	0.007	N/A	0.005	0.011	N/A	Pass
22	0.000	0.000	N/A	0.001	0.000	N/A	Pass
23	0.003	0.007	N/A	0.003	0.010	N/A	Pass
24	0.000	0.000	N/A	0.001	0.000	N/A	Pass
25	0.003	0.006	N/A	0.004	0.009	N/A	Pass
26	0.000	0.000	N/A	0.001	0.000	N/A	Pass
27	0.003	0.006	N/A	0.004	0.009	N/A	Pass
28	0.000	0.000	N/A	0.001	0.000	N/A	Pass
29	0.002	0.005	N/A	0.004	0.008	N/A	Pass
30	0.000	0.000	N/A	0.001	0.000	N/A	Pass
31	0.002	0.005	N/A	0.002	0.007	N/A	Pass
32	0.000	0.000	N/A	0.001	0.000	N/A	Pass
33	0.002	0.005	N/A	0.003	0.007	N/A	Pass
34	0.000	0.000	N/A	0.001	0.000	N/A	Pass
35	0.002	0.004	N/A	0.002	0.007	N/A	Pass
36	0.000	0.000	N/A	0.001	0.000	N/A	Pass
37	0.002	0.004	N/A	0.002	0.006	N/A	Pass
38	0.000	0.000	N/A	0.000	0.000	N/A	Pass
39	0.001	0.004	N/A	0.002	0.006	N/A	Pass
40	0.000	0.000	N/A	0.001	0.000	N/A	Pass

Note: The EUT power level is below 75.0 Watts and therefore has no defined limits

Voltage Source Verification Data (Run time)

EUT: Equipment under test **Tested by: Tested by**
Test category: Class-D per Ed. 4.0 (2014) (European limits) **Test Margin: 100**
Test date: 2/22/2018 **Start time: 6:46:29 PM** **End time: 6:49:51 PM**
Test duration (min): 3 **Data file name: CTSMXL_H-000859.cts_data**
Comment: Comment
Customer: Customer information

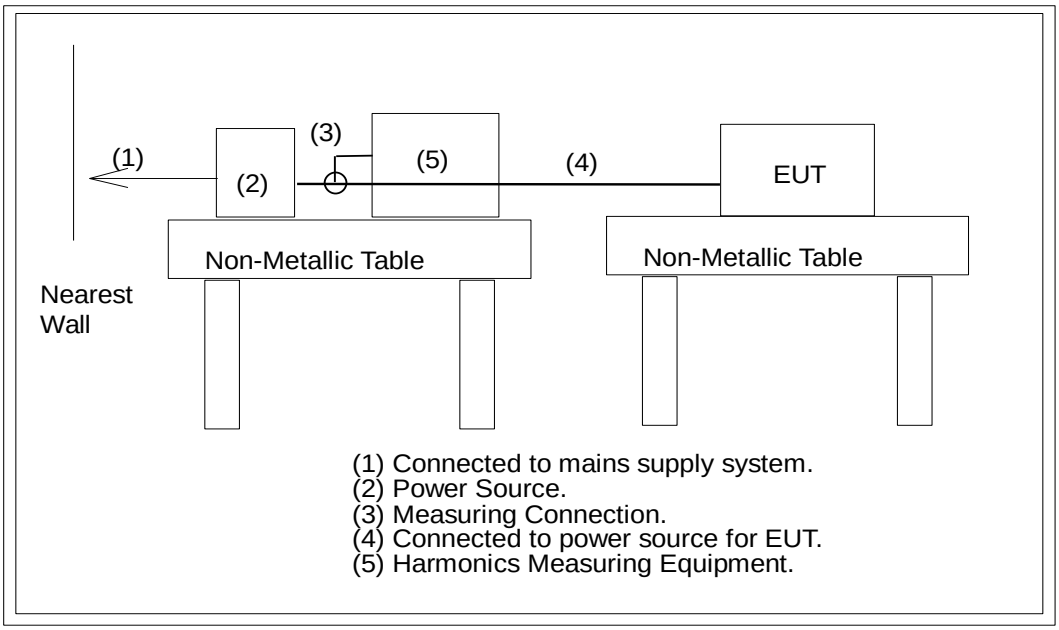
Test Result: N/L **Source qualification: Normal**
Measured source distortion is within the requirements of the standards
Measurements are compliant with IEC/EN61000-3-2 Ed. 4 & IEC/EN61000-4-7 Ed. 2.1

Highest parameter values during test:

Voltage (Vrms):	**230.216**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.503**	**I_RMS (Amps):**	**0.202**
I_Fund (Amps):	**0.167**	**Crest Factor:**	**3.052**
Power (Watts):	**39.8**	**Power Factor:**	**0.857**

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.051	0.460	11.12	OK
3	0.103	2.072	4.98	OK
4	0.012	0.460	2.55	OK
5	0.045	0.921	4.84	OK
6	0.029	0.460	6.24	OK
7	0.027	0.691	3.96	OK
8	0.009	0.460	1.99	OK
9	0.019	0.460	4.02	OK
10	0.008	0.460	1.72	OK
11	0.021	0.230	9.16	OK
12	0.011	0.230	4.90	OK
13	0.014	0.230	6.10	OK
14	0.009	0.230	3.86	OK
15	0.015	0.230	6.65	OK
16	0.008	0.230	3.29	OK
17	0.014	0.230	5.89	OK
18	0.011	0.230	4.88	OK
19	0.016	0.230	7.10	OK
20	0.013	0.230	5.55	OK
21	0.013	0.230	5.55	OK
22	0.008	0.230	3.32	OK
23	0.008	0.230	3.67	OK
24	0.009	0.230	3.82	OK
25	0.011	0.230	4.78	OK
26	0.010	0.230	4.31	OK
27	0.012	0.230	5.06	OK
28	0.008	0.230	3.30	OK
29	0.012	0.230	5.29	OK
30	0.011	0.230	4.99	OK
31	0.013	0.230	5.52	OK
32	0.008	0.230	3.39	OK
33	0.011	0.230	4.91	OK
34	0.006	0.230	2.74	OK
35	0.011	0.230	4.96	OK
36	0.007	0.230	3.14	OK
37	0.012	0.230	5.19	OK
38	0.009	0.230	3.72	OK
39	0.010	0.230	4.25	OK
40	0.010	0.230	4.56	OK

5.1.3.2 Harmonics Current Emissions Test Block Diagram



5.1.4 Voltage Fluctuations and Flicker Test:

5.1.4.1 Voltage Fluctuations and Flicker Test Data:

A. Operating Conditions of the EUT:

Test Date	Feb. 22, 2018	
Test Specificatio	EN 61000-3-3:2013 IEC 61000-3-3:2013	
Climatic Condition	Ambient Temperature: 21 °C	Relative Humidity: 58 % RH
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

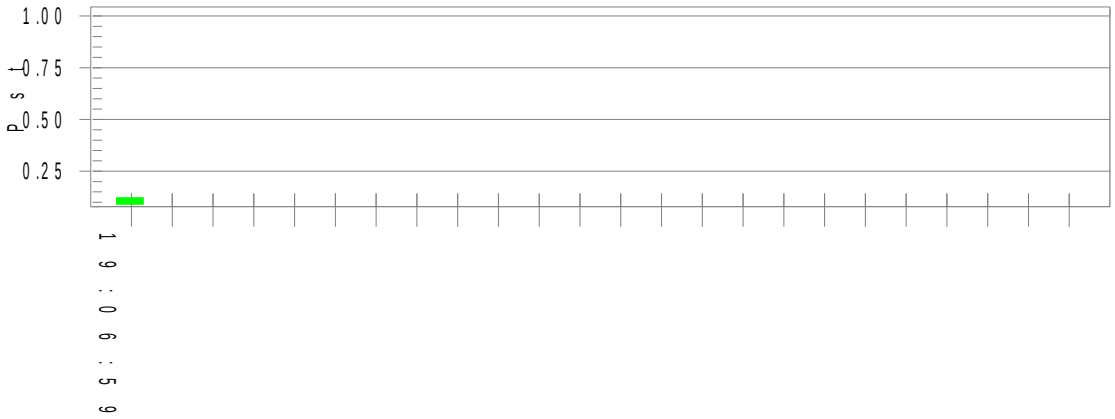
Test data see the next page.

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

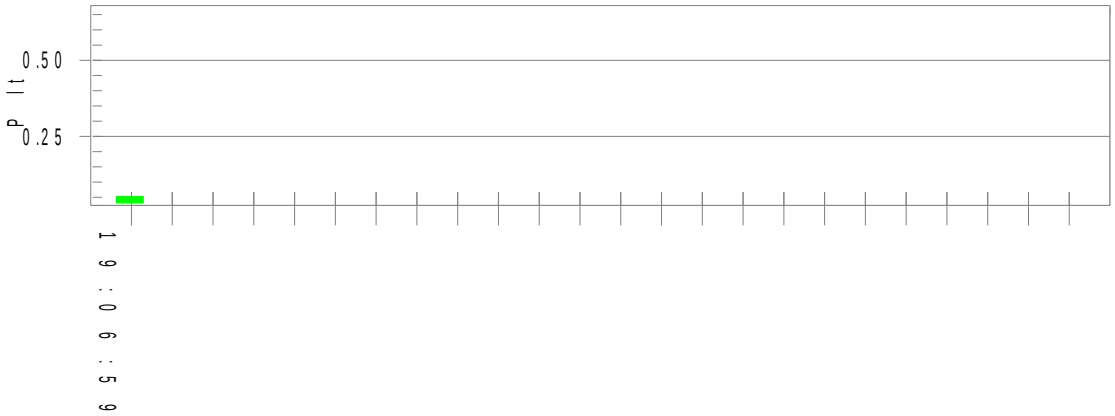
EUT: Equipment Under Test **Tested by: Test Operator**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 2/22/2018 **Start time: 6:56:29 PM** **End time: 7:07:00 PM**
Test duration (min): 10 **Data file name: CTSMXL_F-000861.cts_data**
Comment: Comments
Customer: Customer

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

Pst_i and limit line **European Limits**



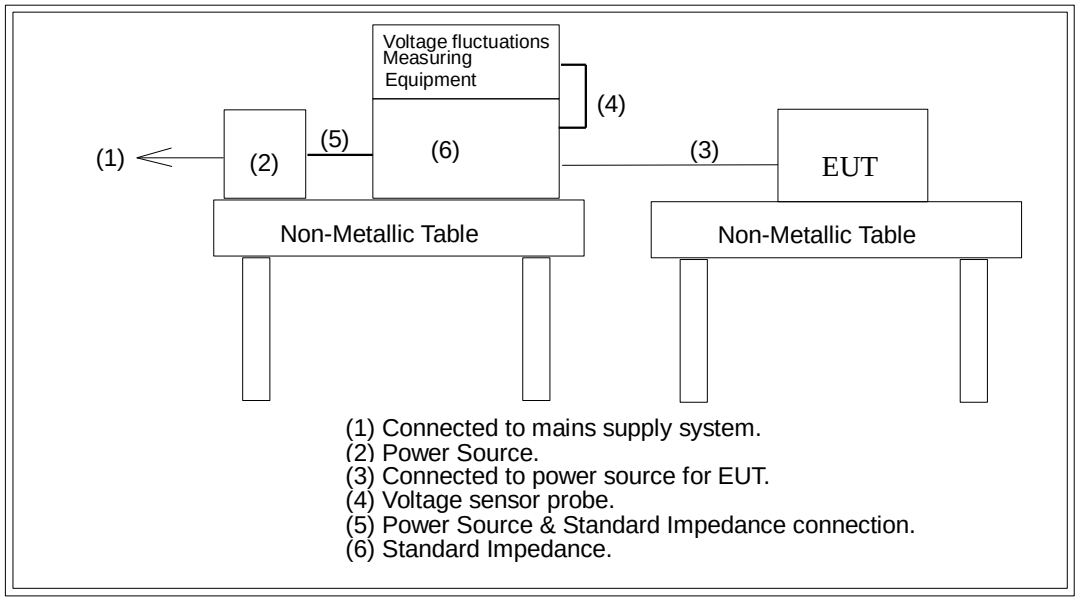
Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	**230.19**			
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 (%):	**0.09**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.122**	**Test limit:**	**1.000**	**Pass**
Highest Plt (2 hr. period):	**0.053**	**Test limit:**	**0.650**	**Pass**

5.1.4.2 Voltage Fluctuations and Flicker Test Block Diagram



5.2 Immunity:

5.2.1 Electrostatic Discharge Immunity Test:

5.2.1.1 Electrostatic Discharge Immunity Test Data:

A. Operating Conditions of the EUT: (The worst case mode):

Test Date	Mar .8, 2018	
Test Specification	EN 61000-4-2:2009 IEC 61000-4-2:2008	
Model Number	SQF-S25M4-256G-S9C	Series:N/A
Climatic Condition	Ambient Temperature: 20 °C Atmospheric Pressure: 996 mbar	Relative Humidity: 37 % RH
Power Supply System	AC Power: 230 Vac 50 Hz	

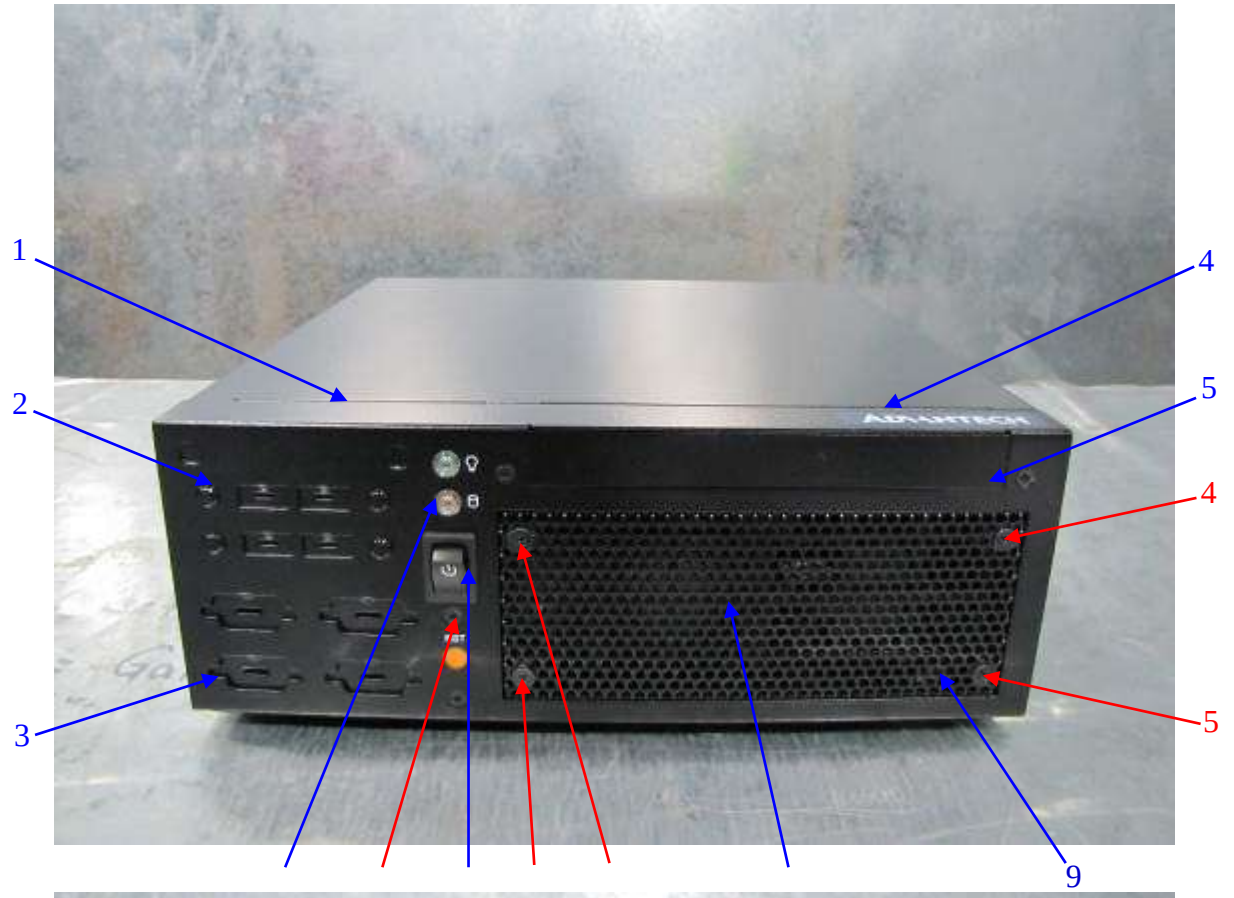
Test Points	Contact Discharge (kv) : Criterion					Air Discharge (kv) : Criterion					Test times and voltage at each condition	
1.EUT-VCP	**2 : A**	**4 : A**	**6 :**	**8 :**	**___:**	**2 :**	**4 :**	**8 :**	**12 :**	____: ____	■25..neg	■25..pos
2. EUT-HCP	**2 : A**	**4 : A**	**6 :**	**8 :**	**___:**	**2 :**	**4 :**	**8 :**	**12 :**	**____:** **____**	■25..neg	■25..pos
3. 1~26 (Blue)	**2 :**	**4 :**	**6 :**	**8 :**	**___:**	**2 :**	**4 : A**	**8: A**	**15:**	____: ____	■25..neg	■25..pos
4. 15, 16, 17 (Blue)	**2 :**	**4 :**	**6 :**	**8 :**	**___:**	**2 :**	**4 : A**	**8: B**	**15:**	____: ____	■10..neg	■10..pos
5. 1~9 (Red)	**2 : A**	**4 : A**	**6 :**	**8 :**	**___:**	**2 :**	**4 :**	**8:**	**15:**	____: ____	■10..neg	■10..pos

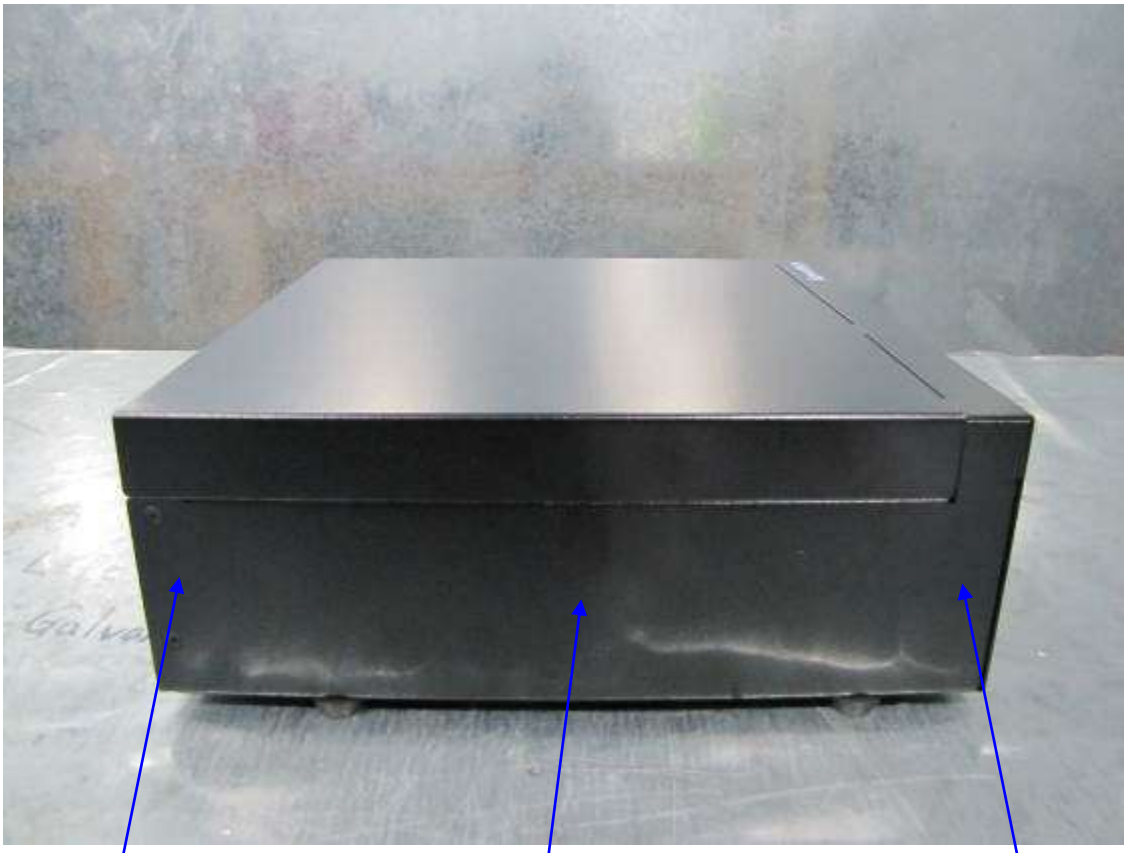
*The test point of esd . Blue color mean test point apply air discharge , red color mean test point apply contact discharge.

Result:	■ Complied	□ Does not comply	
Criterion Required:	B	Criterion Met:	B

(1)Note: ” A ”means the EUT continued to operate as intended. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended.
(2)Note: ” B ”means the EUT continued to operate as intended after the test. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended. During the test, degradation of performance was however allowed. No change of actual operating state or stored data was allowed.
(3)Note: ” C ”means the EUT temporary loss of function was allowed, provided the function was self recoverable or could be restored by the operation of the controls.
(4)Additional Information :

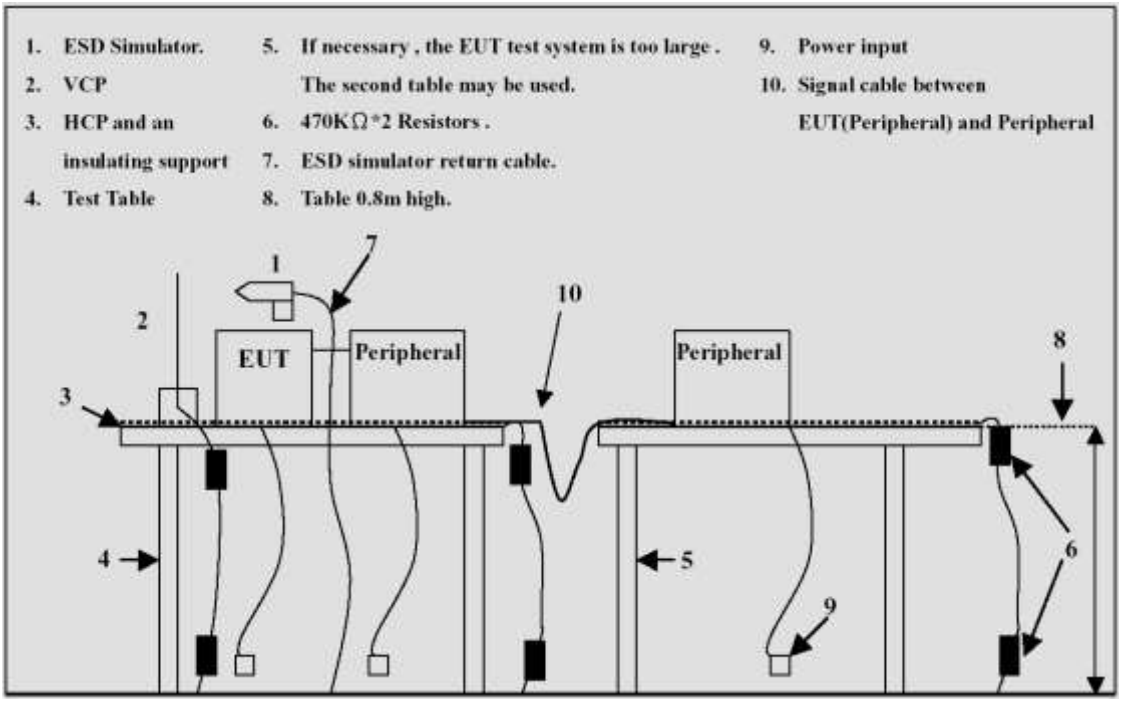
TEST POINTS




21
22
23


ADVANTECH
24
25
26

5.2.1.2 Electrostatic Discharge Immunity Test Block Diagram



5.2.2 RF Radiated Fields Immunity Test:

5.2.2.1 RF Radiated Fields Immunity Test Data:

A. Operating Conditions of the EUT: (The worst case mode)

Test Date	Mar. 5, 2018	
Test Specification	EN 61000-4-3:2006 +A1:2008 + A2:2010 IEC 61000-4-3:2006 +A1:2007 +A2:2010	
Model Number	SQF-S25M4-256G-S9C	Series:N/A
Climatic Condition	Ambient Temperature: 22 °C Relative Humidity: 54 % RH Atmospheric Pressure: 996 mbar	
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

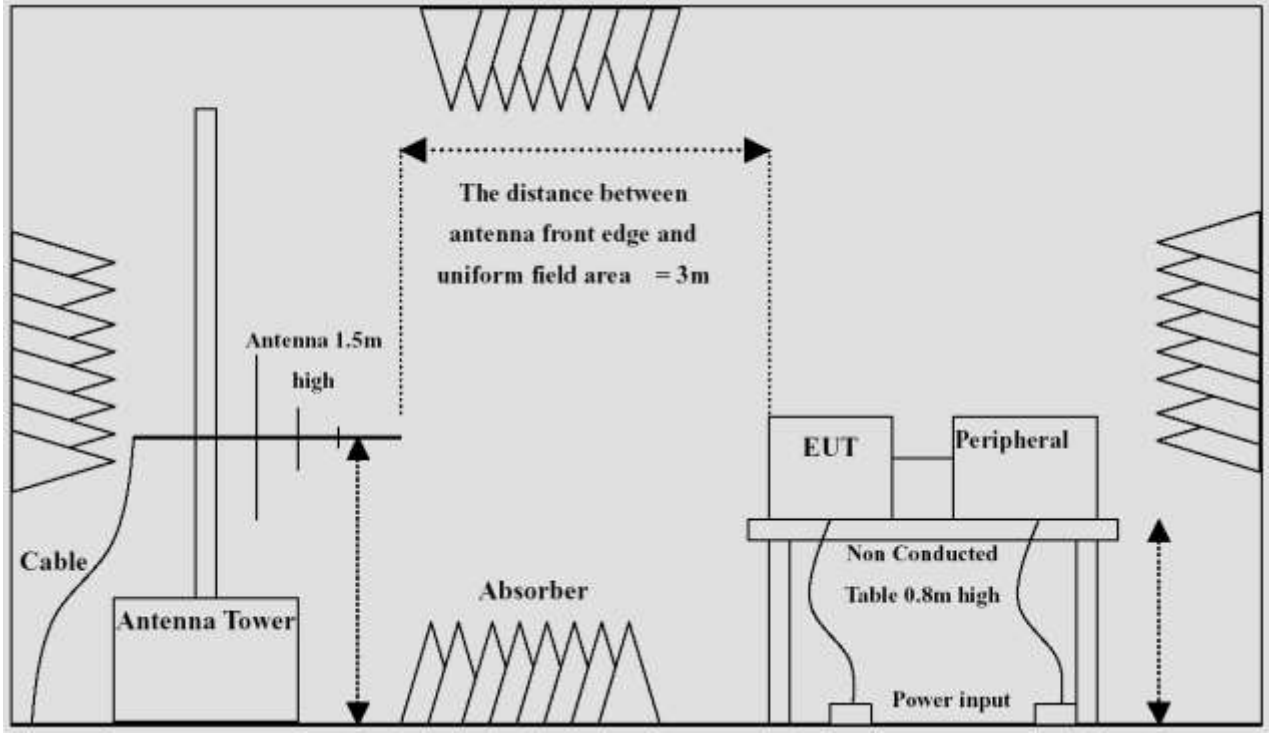
Frequency Range : 80 MHz ~ 1000 MHz	Field Strength : 3 V/m	Modulation (AM 1kHz 80%)
Sweep Rate : ≤ 1.5×10^{-3} decades/s	Step Size : ≤ 1 % of preceding frequency value	Dwell Time : 5 s

Frequency Range (MHz)	Polarization of Antenna	EUT Position (Angle)	Test Result	Comments
80 MHz ~ 1000 MHz	Vertical	0	A	--
80 MHz ~ 1000 MHz	Vertical	90	A	--
80 MHz ~ 1000 MHz	Vertical	180	A	--
80 MHz ~ 1000 MHz	Vertical	270	A	--
80 MHz ~ 1000 MHz	Horizontal	0	A	--
80 MHz ~ 1000 MHz	Horizontal	90	A	--
80 MHz ~ 1000 MHz	Horizontal	180	A	--
80 MHz ~ 1000 MHz	Horizontal	270	A	--

Result:	■ Complied	□ Does not comply		
Criterion Required:	A	Criterion Met:	A	PASS

(1)Note: " A "means the EUT continued to operate as intended. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended.
(2)Note: " B "means the EUT continued to operate as intended after the test. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended. During the test, degradation of performance was however allowed. No change of actual operating state or stored data was allowed.
(3)Note: " C "means the EUT temporary loss of function was allowed, provided the function was self recoverable or could be restored by the operation of the controls.
(4)Additional Information :
The frequency range is scaned as specified. However , when specified in Annex A, an additional comprehensive functional test shall carried out at a limited number of frequencies. And additional frequencies tested for Korean KN24 . The selected frequencies are : 80 , 120 , 145 , 160 , 230 , 375, 434 , 435 , 460 , 600 , 814 , 835 , 863 , and 900MHz(±1%).

5.2.2.2 RF Radiated Fields Immunity Test Block Diagram



5.2.3 EFT/Burst Immunity Test:

5.2.3.1 EFT/Burst Immunity Test Data:

A. Test Port : Main Power

Test Date	Mar. 6, 2018	
Test Specification	EN 61000-4-4:2012 IEC 61000-4-4:2012	
Model Number	SQF-S25M4-256G-S9C	Series:N/A
Climatic Condition	Ambient Temperature: 24 °C Relative Humidity: 54 % RH Atmospheric Pressure: 996 mbar	
Power Supply System	AC Power: 230 Vac 50 Hz	
Test Set-up	Table-top Equipment	

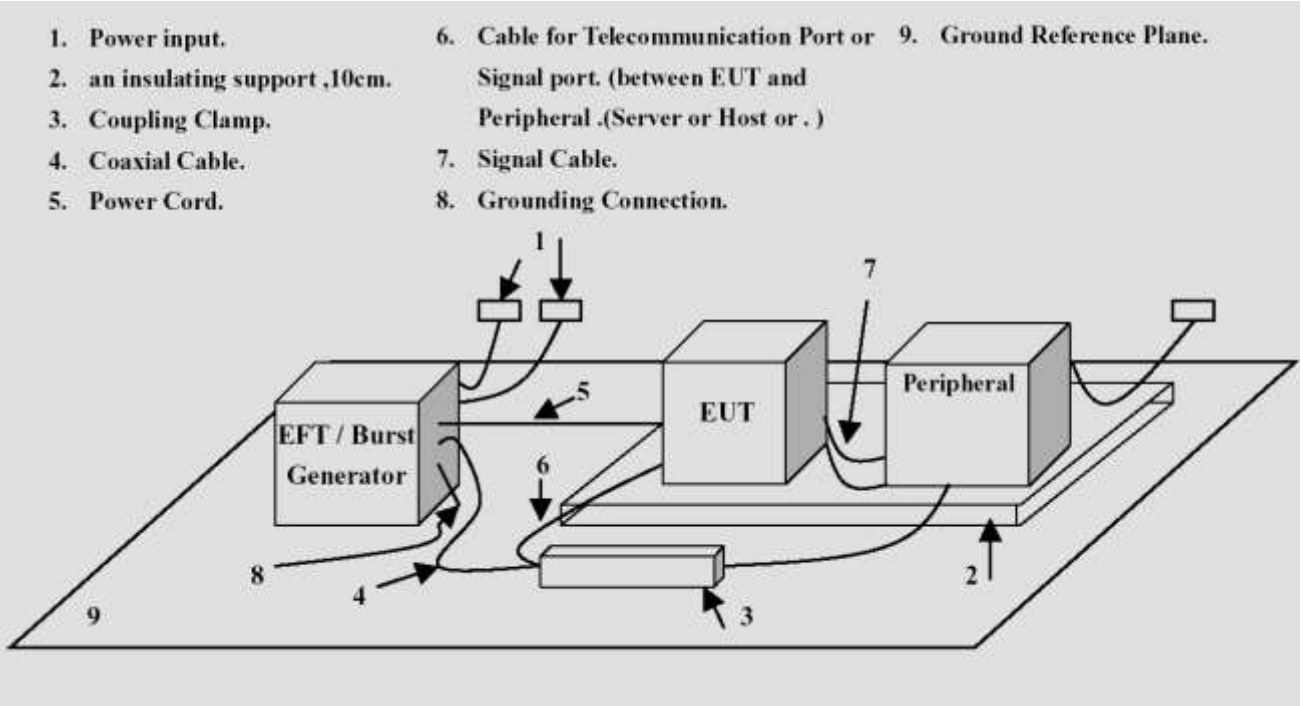
Pulse: 5 /50ns Repetition Rate: 2.5kHz above 2.0kV Test time: 2 min/each condition
Burst: 15ms /300ms 5kHz below and equal 2.0kV

Applied Voltage	Test Line	Severity Level	Test Duration (min)	Test Result	Comments
±1KV	L	2	1	A	
	N	2	1	A	
	PE	2	1	A	
	L+N	2	1	A	
	L+PE	2	1	A	
	N+PE	2	1	A	
	L+N+PE	2	1	A	

Result:	■ Complied	□ Does not comply			
Criterion Required:	1KV	B	Criterion Met:	A	PASS

(1)Note: ” A ”means the EUT continued to operate as intended. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended.
(2)Note: ” B ”means the EUT continued to operate as intended after the test. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended. During the test, degradation of performance was however allowed. No change of actual operating state or stored data was allowed.
(3)Note: ” C ”means the EUT temporary loss of function was allowed, provided the function was self recoverable or could be restored by the operation of the controls.
(4)Additional Information :

5.2.3.2 EFT/Burst Immunity Test Block Diagram



5.2.4 Surge Immunity Test:

5.2.4.1 Surge Immunity Test Data:

A. Test Port : Main Power

Test Date	Mar. 8, 2018	
Test Specification	EN 61000-4-5:2014 IEC 61000-4-5:2014	
Model Number	SQF-S25M4-256G-S9C	Series:N/A
Climatic Condition	Ambient Temperature: 21 °C Relative Humidity: 57 % RH Atmospheric Pressure: 995 mbar	
Power Supply System	AC Power: 230 Vac 50 Hz	

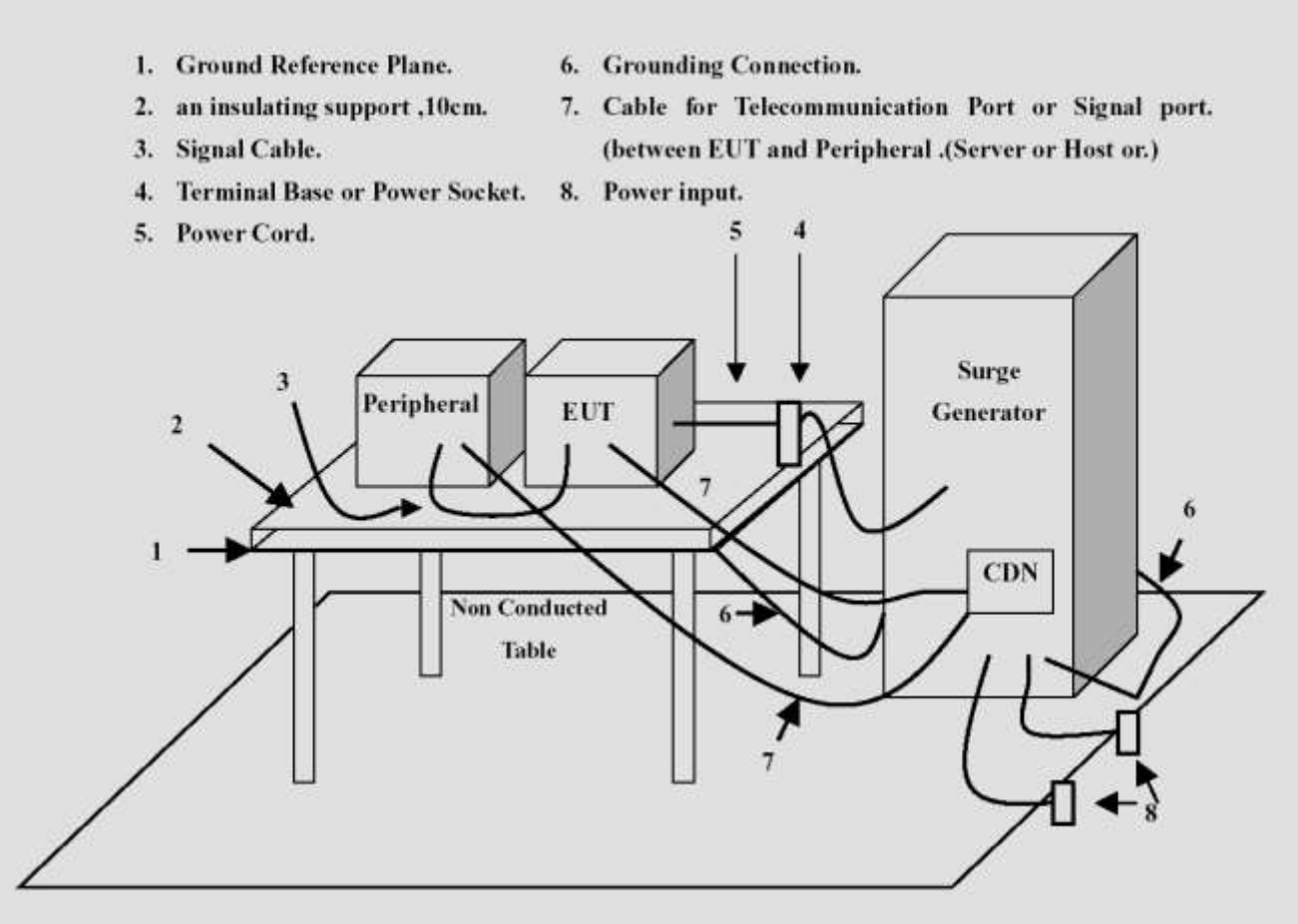
Waveform: 1.2/50μs (8/20μs) Repetition rate: 30 sec Times: 5 times/each condition

Applied Voltage(KV)	Mode	Test Line	Severity Level	Phase Angle	Test Result	Comments
±0.5	Differential Mode	L - N	1	0°/90°/180°/270°	A	
±1.0	Differential Mode	L - N	2	0°/90°/180°/270°	A	
±0.5	Common Mode	L - PE	1	0°/90°/180°/270°	A	
±0.5	Common Mode	N - PE	1	0°/90°/180°/270°	A	
±1.0	Common Mode	L - PE	2	0°/90°/180°/270°	A	
±1.0	Common Mode	N - PE	2	0°/90°/180°/270°	A	
±2.0	Common Mode	L - PE	3	0°/90°/180°/270°	A	
±2.0	Common Mode	N - PE	3	0°/90°/180°/270°	A	

Result:	■ Complied		□ Does not comply		
Criterion Required:	0.5KV , 1KV	B	Criterion Met:	A	PASS
Criterion Required:	2.0KV	B	Criterion Met:	A	PASS

(1)Note: ” A ”means the EUT continued to operate as intended. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended.
(2)Note: ” B ”means the EUT continued to operate as intended after the test. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended. During the test, degradation of performance was however allowed. No change of actual operating state or stored data was allowed.
(3)Note: ” C ”means the EUT temporary loss of function was allowed, provided the function was self recoverable or could be restored by the operation of the controls.
(4)Additional Information :

5.2.4.2 Surge Immunity Test



5.2.5 RF Common Mode Immunity Test:

5.2.5.1 RF Common Mode Immunity Test Data:

A. Operating Conditions of the EUT:

Test Date	Mar. 7, 2018	
Test Specification	EN 61000-4-6:2014 IEC 61000-4-6:2013	
Model Number	SQF-S25M4-256G-S9C	Series:N/A
Climatic Condition	Ambient Temperature: 22 °C Relative Humidity: 54 % RH Atmospheric Pressure: 994 mbar	
Power Supply System	AC Power: 230 Vac 50 Hz	

Frequency Range ：0.15 MHz ~ 80 MHz	Test Voltage ：3 V	Modulation (AM 1kHz 80%)
Sweep Rate ：≤ 1.5×10^{-3} decades/s	Step Size ：≤ 1 % of preceding frequency value	Dwell Time ：3.0 s
Frequency Range (MHz)	Tested Line	Test Result
0.15~80	Power Line (CDN-M3)	A

Result:	■ Complied	□ Does not comply		
Criterion Required:	A	Criterion Met:	A	PASS

(1)Note: ” A ”means the EUT continued to operate as intended. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended.

(2)Note: ” B ”means the EUT continued to operate as intended after the test. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended. During the test, degradation of performance was however allowed. No change of actual operating state or stored data was allowed.

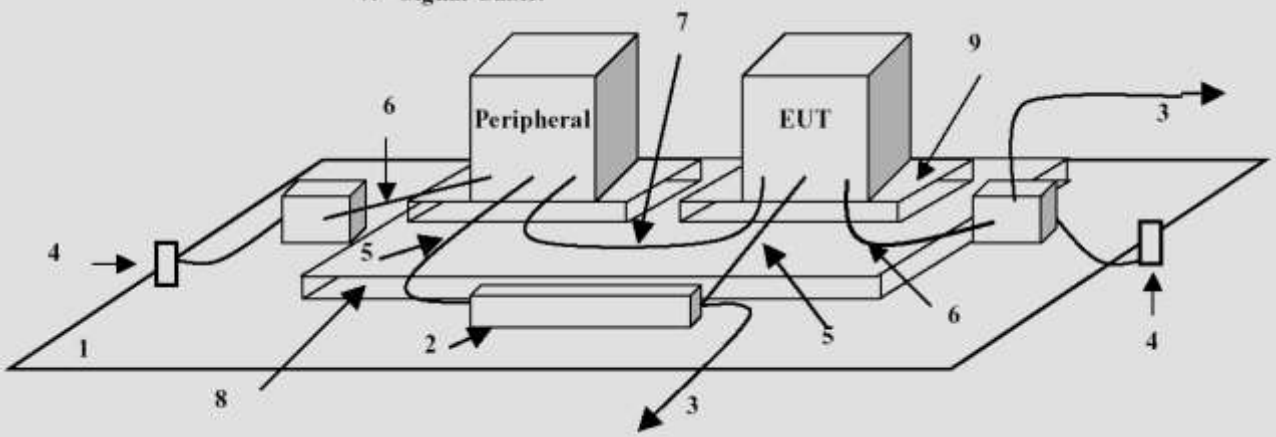
(3)Note: ” C ”means the EUT temporary loss of function was allowed, provided the function was self recoverable or could be restored by the operation of the controls.

(4)Additional Information :

The frequency range is scaned as specified. However , when specified in Annex A, an additional comprehensive functional test shall carried out at a limited number of frequencies. And additional frequencies tested for Korean KN24 . The selected frequencies are : 0.2 , 1.0 , 7.1 , 13.56 , 21.0, 27.12 , 40.68 and MHz(±1%).

5.2.5.2 RF Common Mode Immunity Test Block Diagram

1. Ground Reference Plane.
2. EM-Clamp or CDN.
3. To RF Ouput.
4. Power input.
5. Cable for Telecommunication Port or Signal port. (between EUT and Peripheral .(Server or Host or .)
6. Power Cord.
7. Signal Cable.
8. an insulating support , above the GRP 3-5cm.
9. an insulating support , above the GRP 10cm.

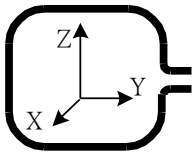


5.2.6 Power Frequency Magnetic Field Immunity Test:

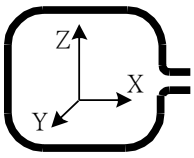
5.2.6.1 Power Frequency Magnetic Field Immunity Test Data:

A. Operating Conditions of The EUT:

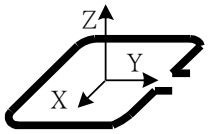
Test Date	Mar. 6, 2018	
Test Specification	EN 61000-4-8:2010 IEC 61000-4-8:2009	
Model Number	SQF-S25M4-256G-S9C	Series:N/A
Climatic Condition	Ambient Temperature: 21 °C Relative Humidity: 54 % RH Atmospheric Pressure: 995 mbar	
Power Supply System	AC Power: 230 Vac 50 Hz	



X - Axis



Y - Axis



Z - Axis

Magnetic field frequency: 50 Hz	Continuous magnetic field strength: 1A/m
Magnetic field direction	Testing result
X - Axis	A
Y – Axis	A
Z - Axis	A

Result:	■ Complied	□ Does not comply		
Criterion Required:	A	Criterion Met:	A	PASS

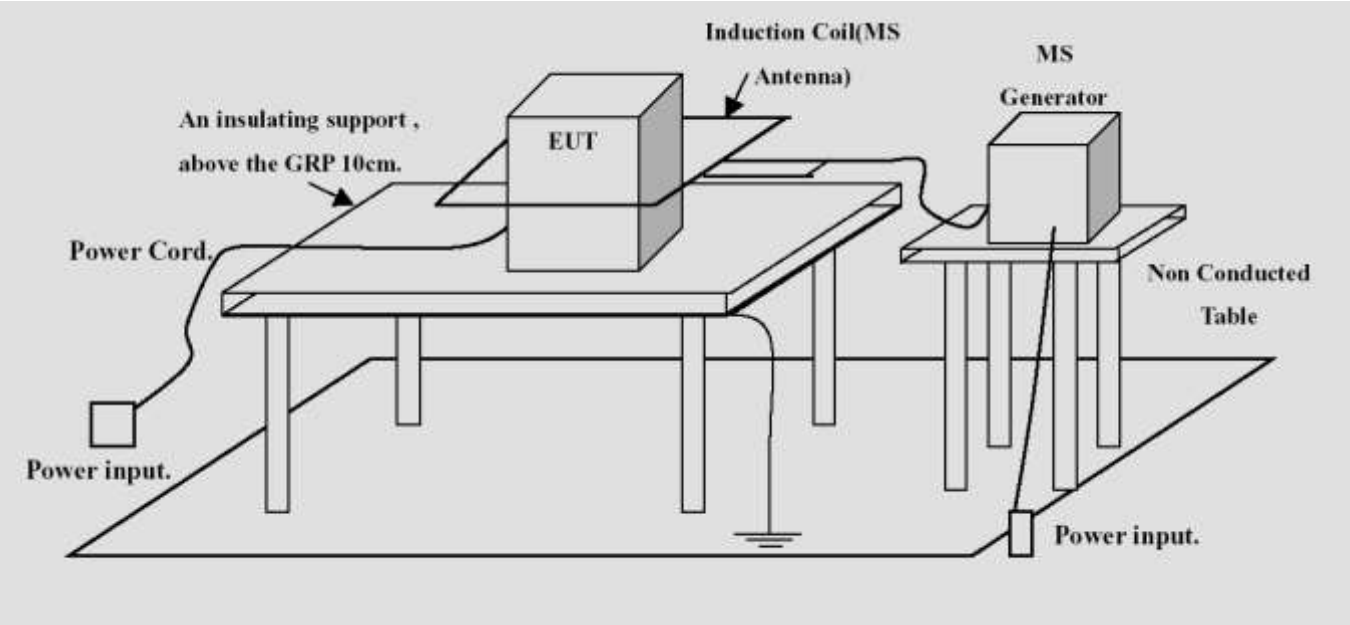
(1)Note: ” A ”means the EUT continued to operate as intended. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended.

(2)Note: ” B ”means the EUT continued to operate as intended after the test. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended. During the test, degradation of performance was however allowed. No change of actual operating state or stored data was allowed.

(3)Note: ” C ”means the EUT temporary loss of function was allowed, provided the function was self recoverable or could be restored by the operation of the controls.

(4)Additional Information :

5.2.6.2 Power Frequency Magnetic Field Immunity Test Block Diagram



5.2.7 Voltage Interruptions and Voltage Dips Immunity Test:

5.2.7.1 Voltage Interruptions and Voltage Dips Immunity Test Data:

A. Operating Conditions of the EUT:

Test Date	Feb. 22, 2018	
Test Specification	EN 61000-4-11:2004 IEC 61000-4-11:2004	
Model Number	SQF-S25M4-256G-S9C	Series:N/A
Climatic Condition	Ambient Temperature: 22 °C Relative Humidity: 54 % RH Atmospheric Pressure: 996 mbar	
Power Supply System	AC Power: 230 Vac 50 Hz & 100 Vac 50 Hz	

Test mode	Voltage dips	Durations (ms)	Phase	Criterion Required	Result
Voltage interruptions	100%	5000	0 ° / 180 °	C	C
Voltage dips in %U_T	100%	10	0 ° ~ 360 ° step 45	B	A
	30%	500		C	A

Result:	■ Complied □ Does not comply

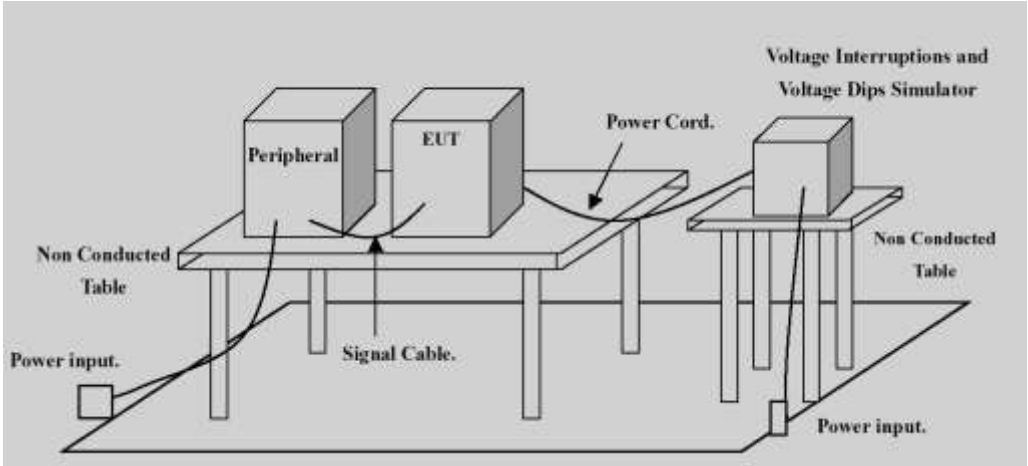
(1)Note: ” A ”means the EUT continued to operate as intended. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended.

(2)Note: ” B ”means the EUT continued to operate as intended after the test. No degradation of performance or loss of function was allowed below a performance level specified by the manufacturer, when the EUT was used as intended. During the test, degradation of performance was however allowed. No change of actual operating state or stored data was allowed.

(3)Note: ” C ”means the EUT temporary loss of function was allowed, provided the function was self recoverable or could be restored by the operation of the controls.

(4)Additional Information :

5.2.7.2 Voltage Interruptions and Voltage Dips Immunity Test Block Diagram



6 EQUIPMENTS LIST FOR TESTING

6.1 Test Equipment for Conducted Emissions

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	EMI Receiver	R&S	ESCI	13054418-001 (100941)	Jan.15,2018	Jan.14,2019
2	V-LISN	R&S	ENV216	13057719-002 (101029)	Sep.12,2017	Sep.11,2018
3	Control Computer	Lemel	WLIEG31G 8CP	13080462-004	N/A	N/A
4	Software	FARAD	EZ-EMC	EZEMCCE04	N/A	N/A

6.2 Test Equipment for Radiated Emissions Test

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	EMI Receiver	R&S	ESIB7	13054417-001	Sep.04,2017	Sep.03,2018
2	Horn Antenna	ETS-LINDGREN	3117	13059211-003 (157645)	Apr.17,2017	Apr.16,2018
3	Preamplifier	Agilent	8449B	13040719-001(3008A02636)	Aug.31,2017	Aug.30,2018
4	Bi-log Hybrid Antenna With 5dB Attenuator	ETC&JYEBAO	MCTD 2786B&FAT-NM5NF5T 3G2WXX	BLB16M04003&JB-5-003	Mar.15,2017	Mar.14,2018
5	Bi-log Hybrid Antenna With 5dB Attenuator	ETC&JYEBAO	MCTD 2786B&FAT-NM5NF5T 3G2WXX	BLB16M04002&JB-5-002	Mar.20,2017	Mar.19,2018
6	Control Computer	DELL	INSPIRON 660	13080491-001	N/A	N/A
7	Software	FARAD	EZ-EMC	EZEMCN5	N/A	N/A

6.3 Test Equipment for Harmonics Current Emissions and Voltage Fluctuations , Flicker Test

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	AC Source	TESEQ	Profline 2145	13034939-001	Sep.06,2017	Sep.05,2018

6.4 Test Equipment for ESD Test

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	ESD Simulator	EMTEST	DITO	13033708-001	Nov.24,2017	Nov.23,2018

6.5 Test Equipment for RS Test

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	RF Power Amplifier	AR	120S1G4M1	13052911-001	Jul.05,2017	Jul.04,2018
2	RF Power Amplifier	AR	250W1000A	13052908-001	Jul.05,2017	Jul.04,2018
3	RF Power Amplifier	AR	250A250A	13052907-001	Jul.05,2017	Jul.04,2018
4	Signal Generator	R&S	IMS	13045401-001	Oct.25,2017	Oct.24,2018
5	Log-Periodic Antenna	AR	AT5080	13057613-001	Jul.05,2017	Jul.04,2018
6	POWER SENSOR	R&S	NRP-Z91	13053516-001	Oct.20,2017	Oct.19,2018
7	Control Computer	HP	D530SFF	13053516	N/A	N/A
8	Software	R&S	EMC32	EMC32RS	N/A	N/A

6.6 Test Equipment for EFT Test

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	EMS tester	EMC Partner	IMU 3000	13046511-001	Dec.13,2017	Dec.12,2018

6.7 Test Equipment for SURGE Test

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	Surge Simulator	EMC Partner	IMU3000	13046511-001	Dec.13,2017	Dec.12,2018

6.8 Test Equipment for CS Test

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	Coupling Decoupling Network	LUTHI	CDN L-801 M3/50	13057721-002	Oct.25,2017	Oct.24,2018
2	Signal Generator	R&S	SMB100A	13051717-003	Jan. 02, 2018	Jan.01, 2019
3	RF Power Amplifier	AR	25A250A	13052909-001	Aug.21.2017	Aug.20.2018

6.9 Test Equipment for MS Test

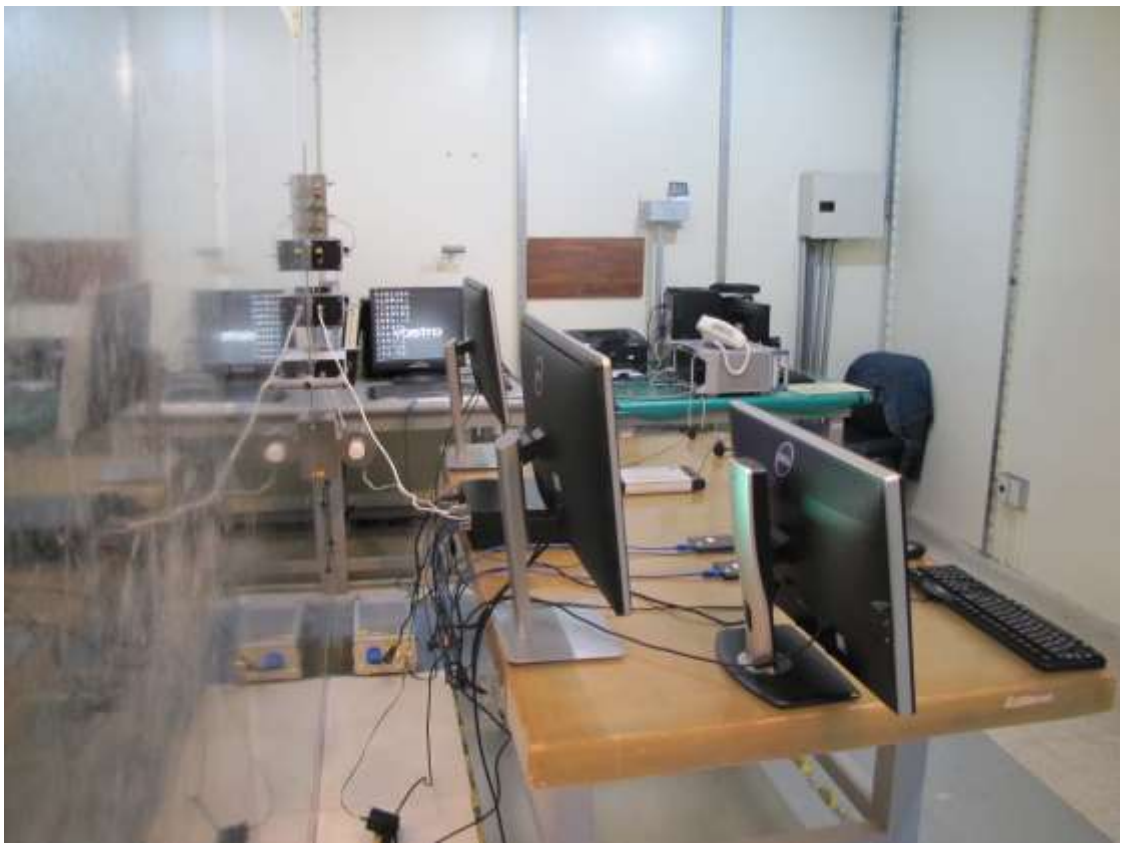
Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	Magnetic Loop Antenna	EMC Partner	MF1000-1	13070701-001	N.C.R.	N.C.R.

6.10 Test Equipment for DIP Test

Item	Name	Manufacturer	Model	ID(SN)	Calibration Date	Recommended Recal. Date
1	AC Source	TESEQ	Profline 2145	13034939-001	Sep.06,2017	Sep.05,2018

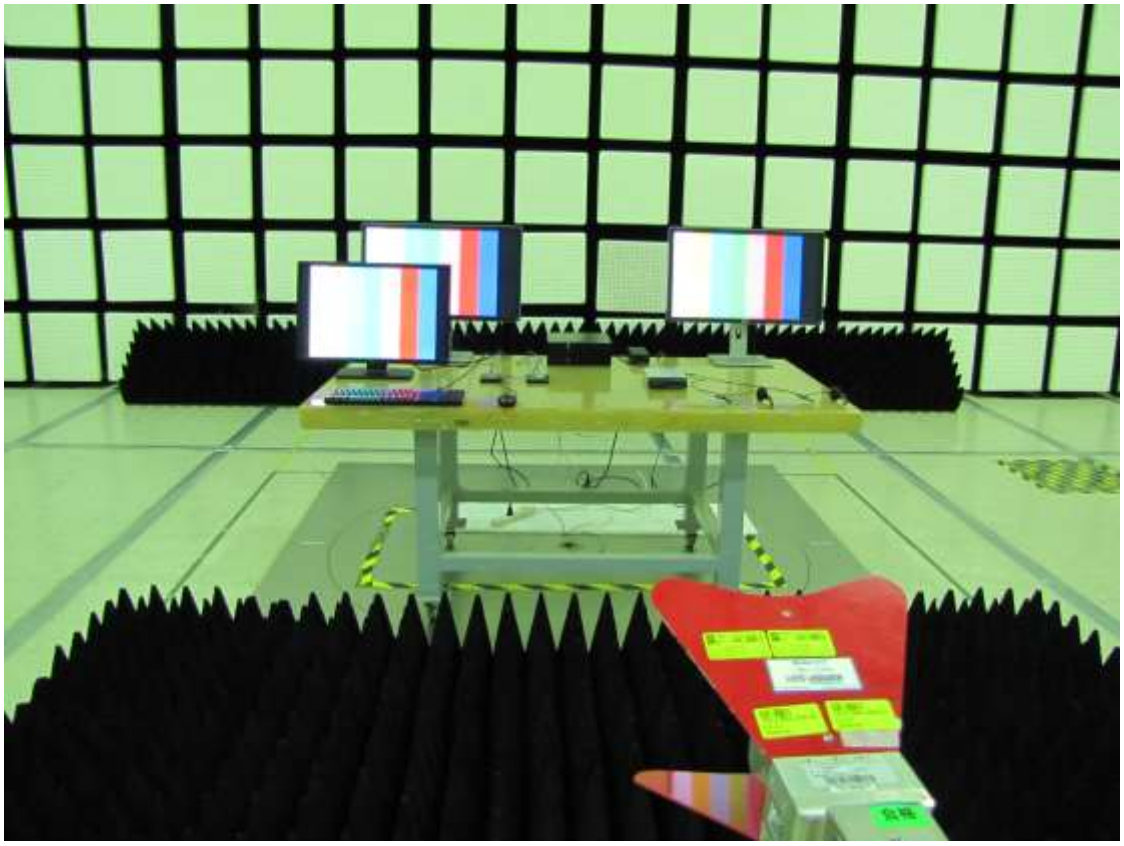
ANNEX A: PHOTOS

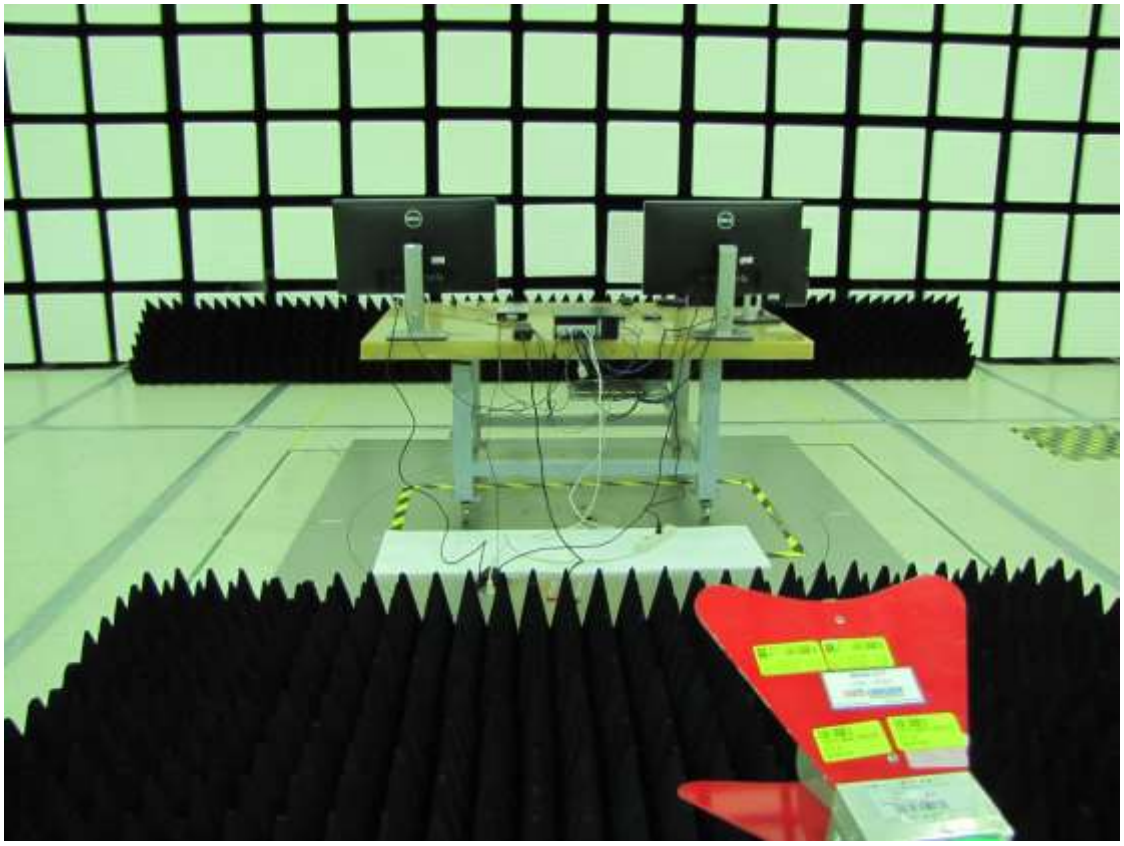
1. Conducted Emissions Test Setup Photos



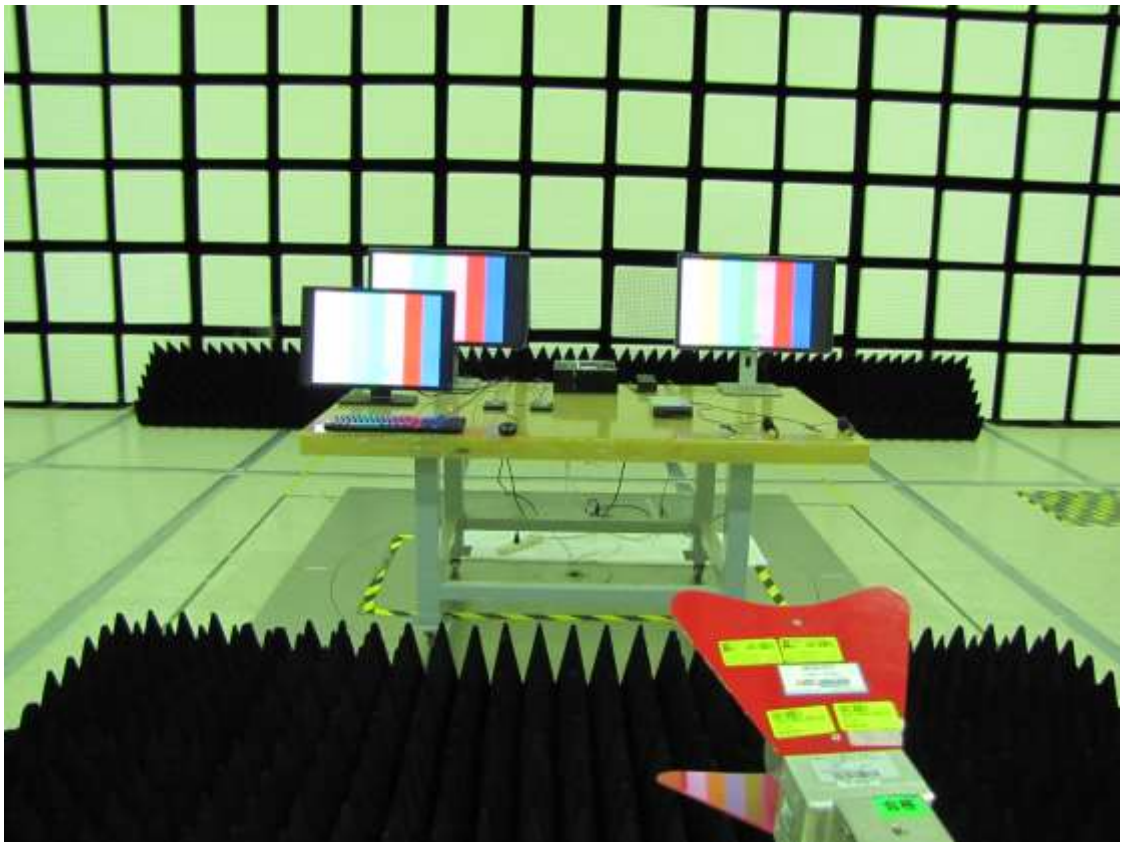
2. Radiated Emissions Test Setup Photos (30MHz~1GHz)

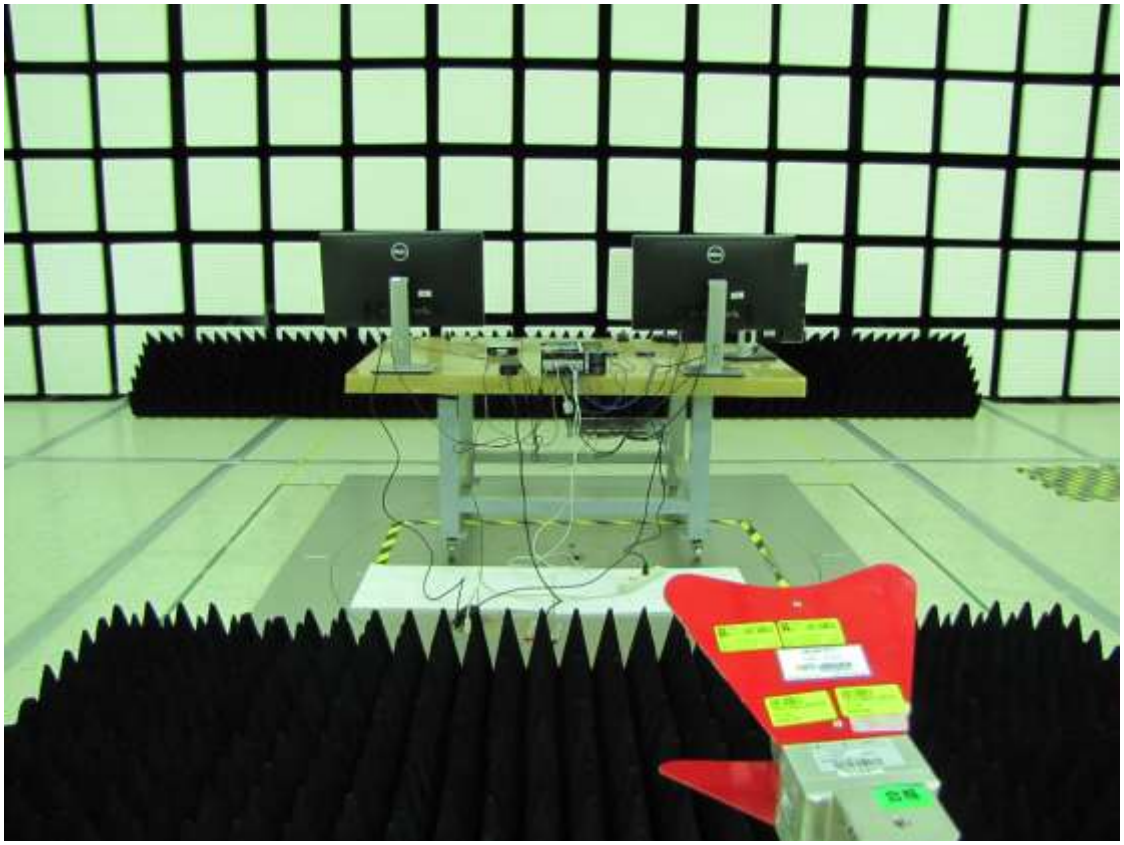
Close Case





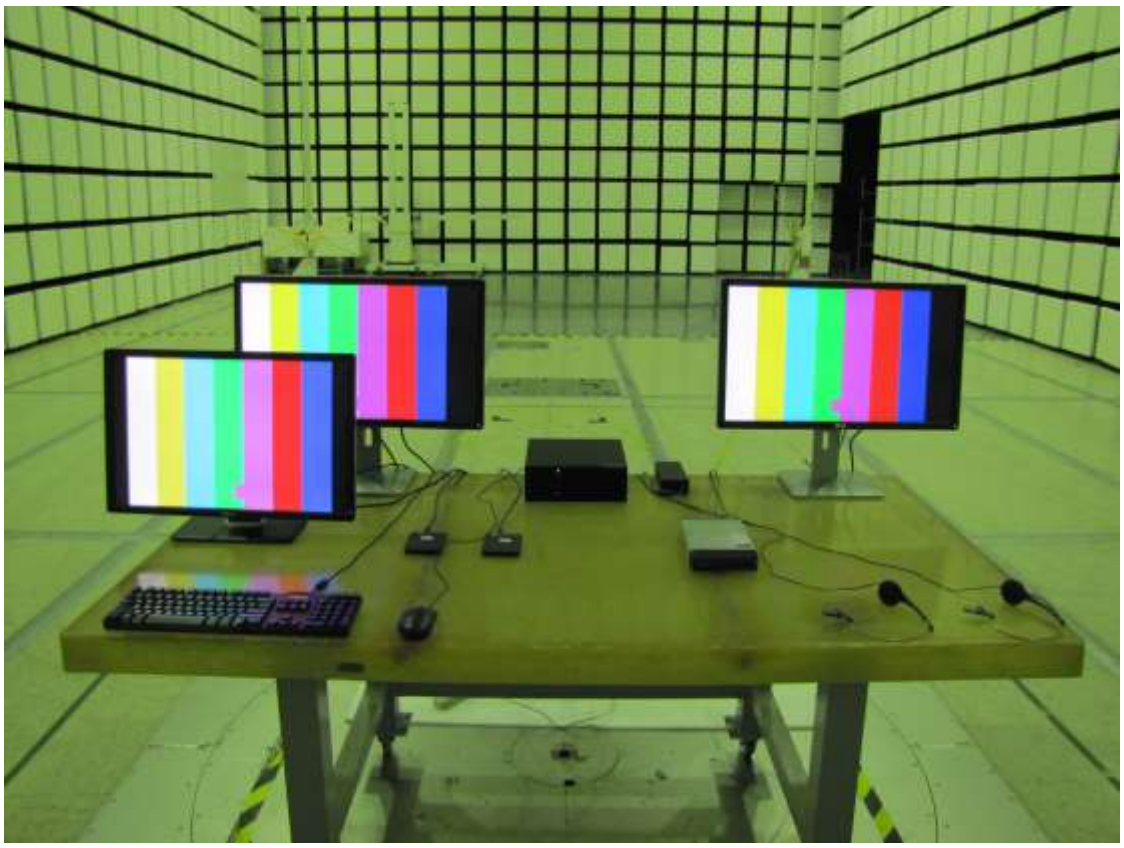
Open Case

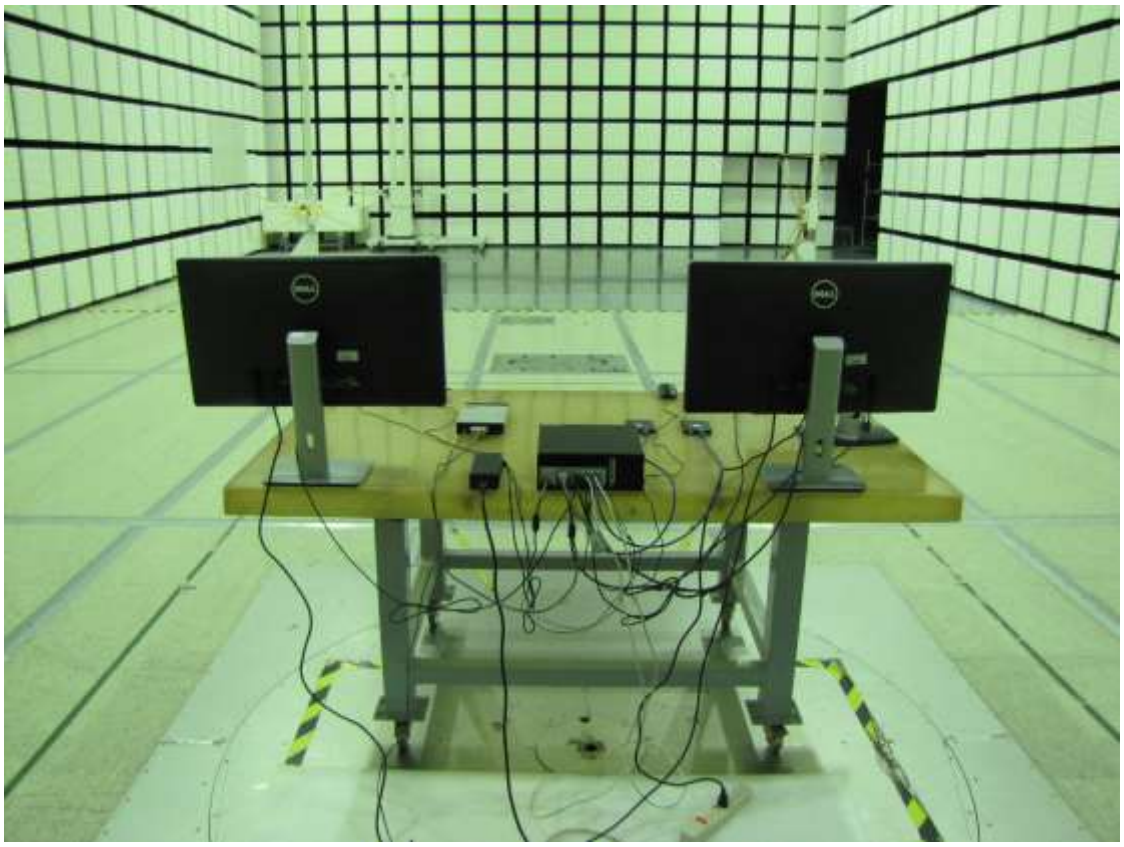




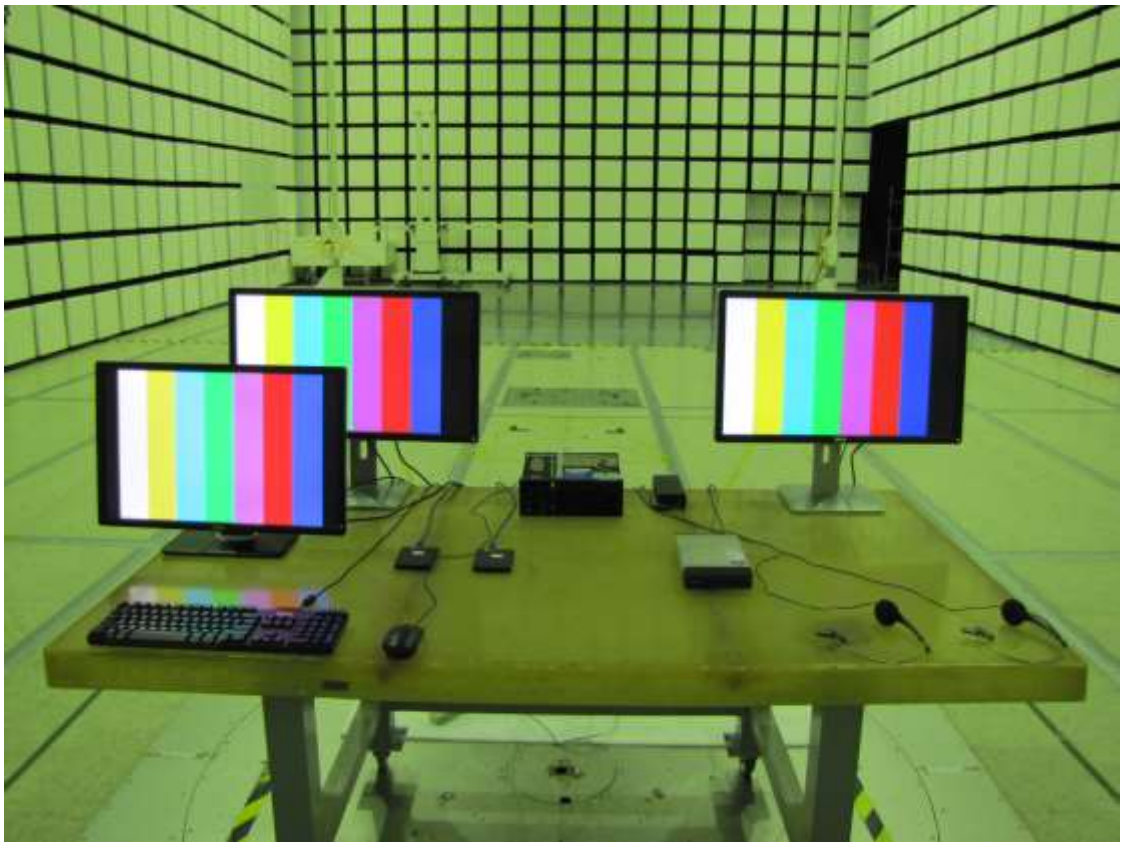
3. Radiated Emissions Test Setup Photos (1GHz~6GHz)

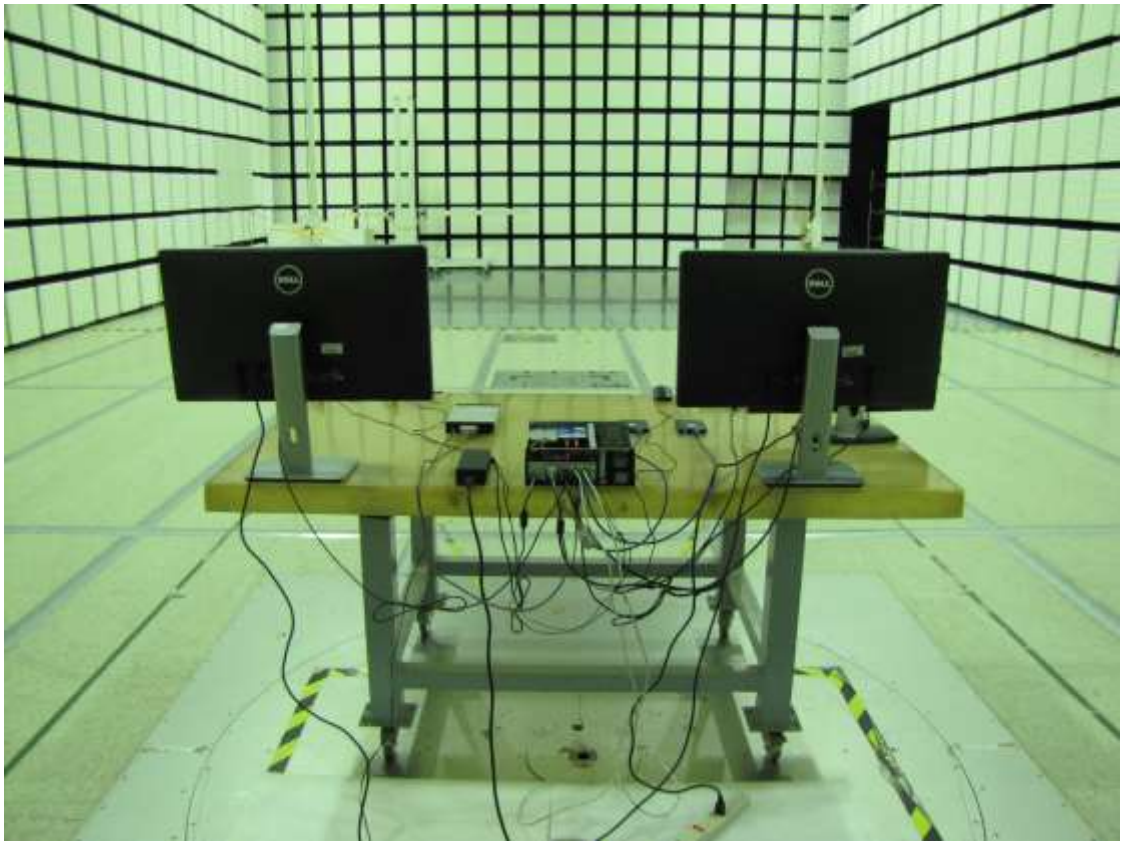
Close Case





Open Case





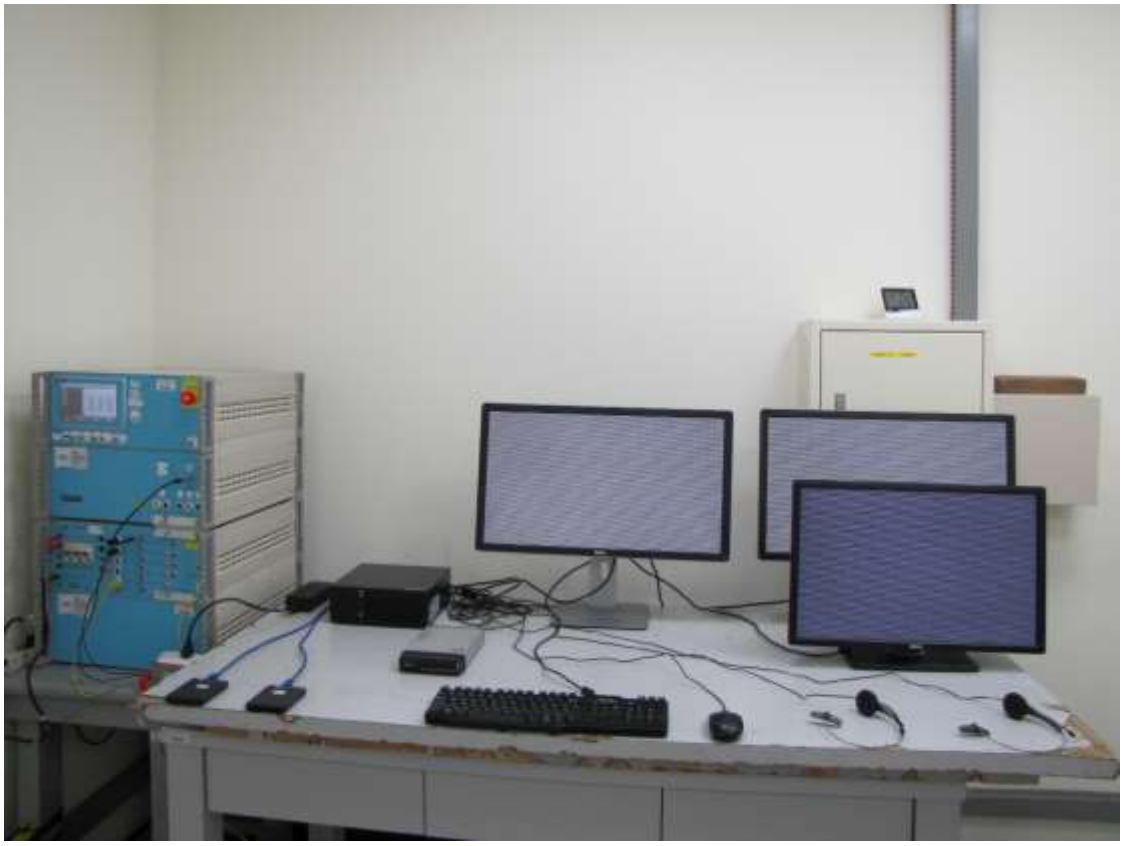
4. Harmonics Current Emissions Test Setup Photo

5. Voltage Fluctuations and Flicker Test Setup Photos

6. Electrostatic Discharge Immunity Test Setup Photo

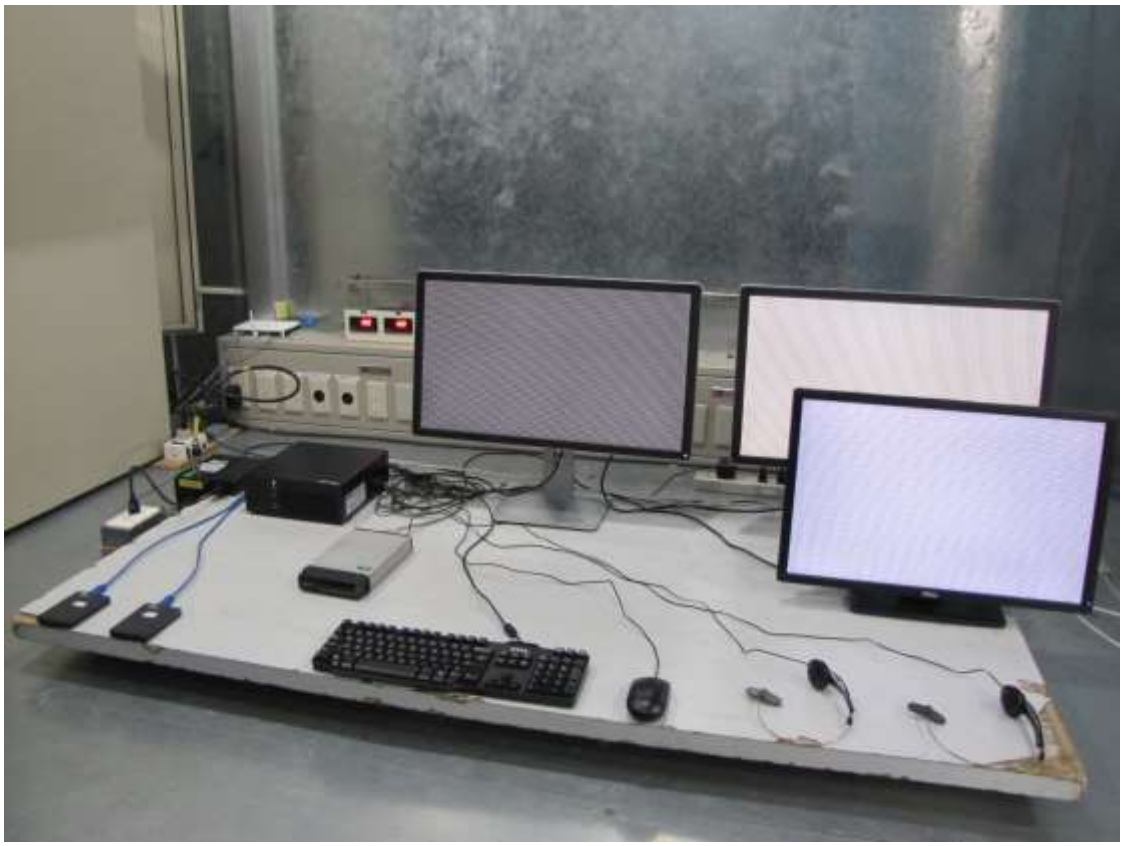
7. RF Radiated Fields Immunity Test Setup Photo

8. EFT/Burst Immunity Test Setup Photo (Main Power)



9. Surge Immunity Test Setup Photo

10. RF Common Mode Immunity Test Setup Photo (Power)



11. Power Frequency Magnetic Field Immunity Test Setup Photo

12. Voltage Interruptions and Voltage Dips Immunity Test Setup Photo

13. Outside view 1 of EUT

14. Outside view 2 of EUT