FCC 47 CFR PART 15 SUBPART B

Product Type	:	Embedded Controller
Applicant	:	AAEON Technology. Inc.
Address	:	5F, No. 135, Lane 235, Pao Chiao Rd.,Hsin-Tien Dist,New Taipei City,Taiwan
Trade Name	:	AAEON
Model Number	:	xAEC-6402x(x - Where x may be any combination of alphanumeric characters or “-”or blank.)
Test Specification	:	FCC 47 CFR PART 15 SUBPART B: Oct., 2012 ANSI C63.4: 2009
Receive Date	:	Dec. 30, 2013
Test Period	:	Jan. 03 ~ Jan. 04, 2014
Issue Date	:	Feb. 11, 2014

Issue by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade City,
Taoyuan County 334, Taiwan R.O.C.
Tel：+886-3-2710188 / Fax：+886-3-2710190

Taiwan Accreditation Foundation accreditation number: 1330

Revision History

Rev.	Issue Date	Revisions	Revised By
00	Feb. 11, 2014	Initial Issue	

Verification of Compliance

Issued Date: 02/11/2014

Product Type	:	Embedded Controller
Applicant	:	AAEON Technology. Inc.
Address	:	5F, No. 135, Lane 235, Pao Chiao Rd.,Hsin-Tien Dist,New Taipei City,Taiwan
Trade Name	:	AAEON
Model Number	:	xAEC-6402x(x - Where x may be any combination of alphanumeric characters or “-”or blank.)
EUT Rated Voltage	:	DC 12V, 5.0A
Test Voltage	:	120 Vac / 60 Hz
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART B: Oct., 2012 ANSI C63.4: 2009
Test Result	:	Complied
Performing Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade City, Taoyuan County 334, Taiwan R.O.C. Tel：+886-3-2710188 / Fax：+886-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 http://www.atl-lab.com.tw/e-index.htm

The above equipment has been tested by A Test Lab Techno Corp., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved By	:	Cran Yang	Reviewed By	:	Frank Lin
(Manager)		(Cran Yang)	(Testing Engineer)		(Frank Lin)

TABLE OF CONTENTS

1 General Information

1.1 Summary of Test Result

Emission			
Standard	Item	Result	Remark
FCC 47 CFR PART 15 SUBPART B ANSI C63.4	Conducted Emission	PASS	Meet Class A limit
FCC 47 CFR PART 15 SUBPART B ANSI C63.4	Radiated Emission	PASS	Meet Class A limit

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

1.2 Measurement Uncertainty

Test Item	Frequency Range		Uncertainty (dB)
Conducted Emission	9kHz ~ 30MHz		± 2.02
Radiated Emission	30MHz ~ 1000MHz	Horizontal	± 3.98
		Vertical	± 3.62
	1000MHz ~ 18000MHz	Horizontal	± 3.11
		Vertical	± 3.07
	18000MHz ~ 40000MHz	Horizontal	± 3.66
		Vertical	± 3.54

2 EUT Description

Product Type	Embedded Controller
Trade Name	AAEON
Model Number	xAEC-6402x(x - Where x may be any combination of alphanumeric characters or “-”or blank.)
Applicant	AAEON Technology. Inc. 5F, No. 135, Lane 235, Pao Chiao Rd.,Hsin-Tien Dist,New Taipei City,Taiwan
Manufacturer	AAEON Technology. Inc. 5F, No. 135, Lane 235, Pao Chiao Rd.,Hsin-Tien Dist,New Taipei City,Taiwan
Component	
Adapter	FSP, FSP060-DBAE1
	I/P: 100-240VAC, 50-60Hz, 1.5A
	O/P: 12VDC, 5.0A
	Cable Out : Non-Shielded, 1.2m, Non-Detachable at Power Adaptor with a core

I/O Port Description：

I/O Port Types	Q’TY	Test Description
1). USB Port	2	Connected to Keyboard / Mouse
2). Mini HDMI Port	1	Connected to Monitor
3). CAN BUS Port	1	Connected to AE
4). LAN Port	2	Connected to Notebook
5). RS-232/422/485 Port	2	Connected to Terminal
6). DC Power Port	1	Connected to Adapter

3 Test Methodology

3.1. Decision of Test Mode

3.1.1. The following test mode(s) were scanned during the preliminary test:

Pre-Test Mode
Mode 1: Normal operate mode

3.1.2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode			
Emission	Conducted Emission		Mode 1
	Radiated Emission	Below 1GHz	Mode 1
		Above 1GHz	Mode 1

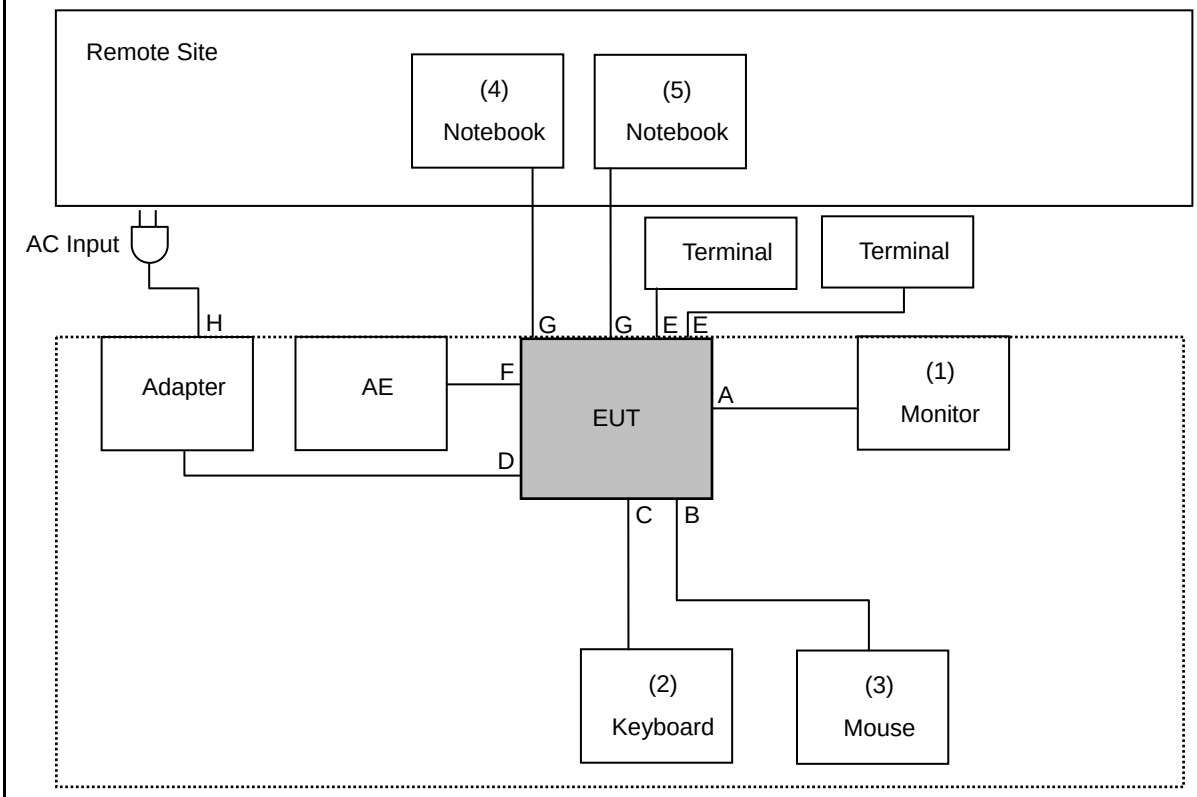
Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

3.2. EUT Exercise Software

1.	Setup the EUT and simulators as shown on 3.3.
2.	The EUT will start to operate function.
3.	EUT LAN port connected to partner Notebook, data will be communicated between EUT and partner Notebook.
4.	EUT CAN BUS connected to AE, data will be communicated between EUT and AE.
5.	Start to test get the worst reading.

3.3. Configuration of Test System Details

Mode 1



Signal Cable Type		Signal Cable Description
A	Mini HDMI Cable	Shielded, 2.0m
B	USB Cable	Shielded, 1.8m
C	USB Cable	Shielded, 1.8m with one core
D	DC Power Cable	Non-Shielded, 1.2m with one core
E	RS-232 Cable	Non-Shielded, 0.15m
F	CAN BUS Cable	Non-Shielded, 0.2m
G	LAN Cable	Non-Shielded, 5.0m
H	AC Power Cable	Non-Shielded, 1.8m

Devices Description					
Product		Manufacturer	Model Number	Serial Number	Power Cord
(1)	LCD Monitor	DELL	U2711	CN0H530T7426105K043L	Non-Shielded, 1.8m
(2)	Keyboard	DELL	SK-8115	MY-0DJ325-71619-71131366	Power by EUT
(3)	Mouse	Logitech	M-SBM96B	PID-HS83912	Power by EUT
(4)	Notebook	DELL	LAPTITU	25627158361	Non-Shielded, 2.0m
(5)	Notebook	DELL	LAPTITU	6699565657	Non-Shielded, 2.0m

3.4. Test Site Environment

Items	Test Item	Required (IEC 60068-1)	Actual
Temperature (°C)	FCC part 15: 15.107 Conducted Emission	15-35	26
Humidity (%RH)		25-75	60
Barometric pressure (mbar)		860-1060	950
Temperature (°C)	FCC part 15: 15.109 Radiated Emission	15-35	26
Humidity (%RH)		25-75	60
Barometric pressure (mbar)		860-1060	950

4 Emission Test

4.1. Conducted Emission Measurement

4.1.1. Limit

A.C. Mains Conducted Interference Limit

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

4.1.2. Test Instruments

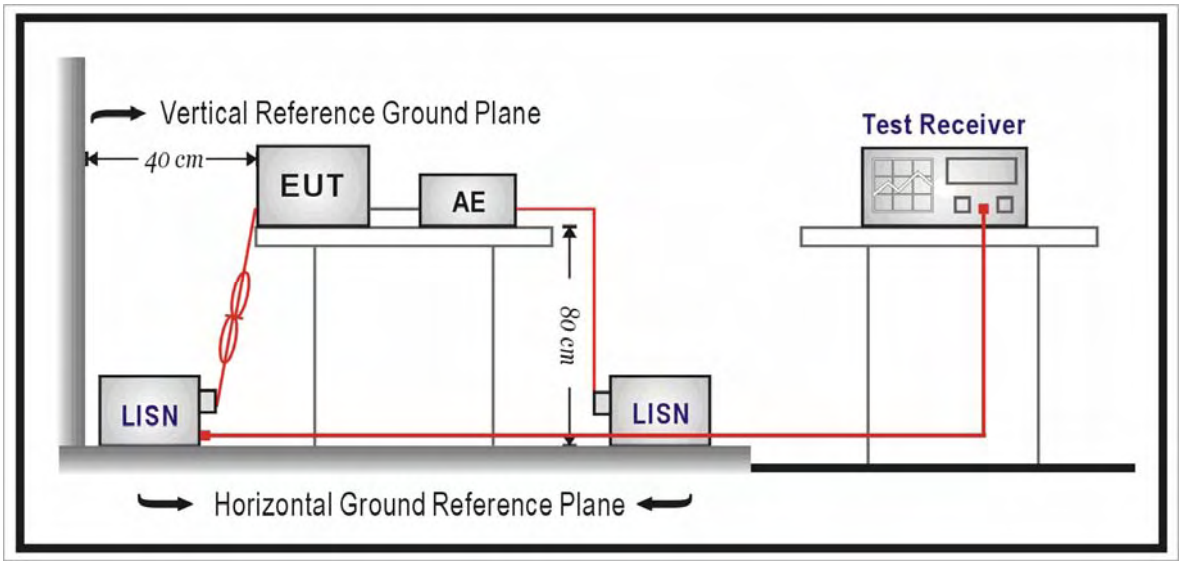
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/06/2013	(1)
LISN	R&S	ENV216	101040	03/04/2013	(1)
LISN	R&S	ENV216	101041	03/04/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

4.1.3. Test Setup

A.C. mains setup



4.1.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

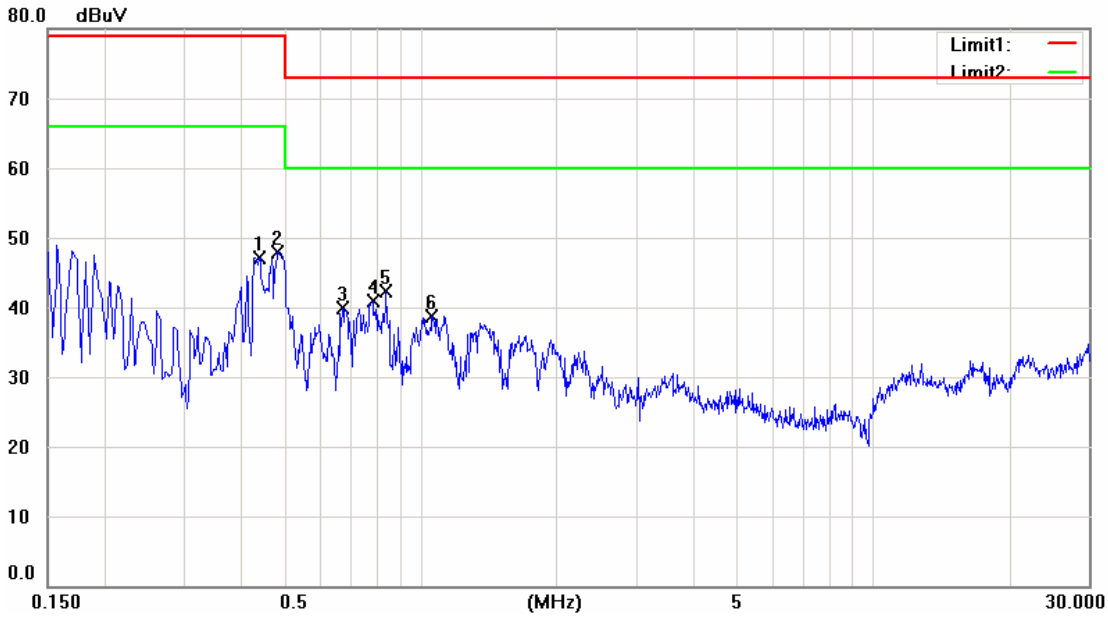
For A.C. mains conducted interference, measured both sides of A.C. lines and carried out using quasi-peak and average detector receivers of maximum conducted interference.

Conducted emissions were invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz. The equipment under test (EUT) shall be meet the limits in section 4.1.1, as applicable, including the average limit and the quasi-peak limit when using respectively, an average detector and quasi-peak detector measured in accordance with the methods described of related standard. The voltage limits shall be met. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

4.1.5. Test Result

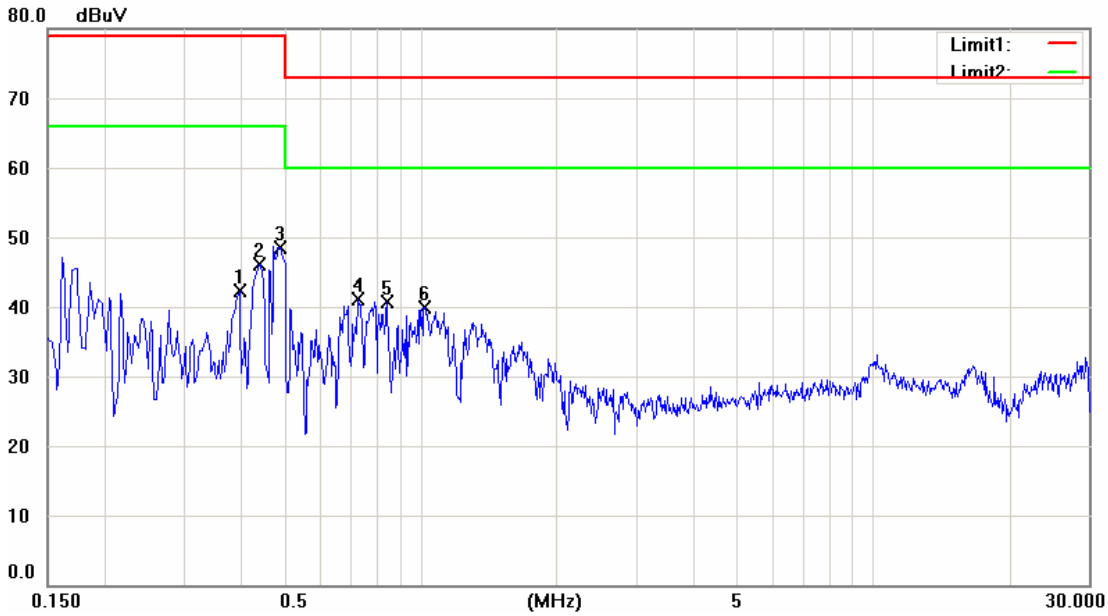
Standard:	FCC Part 15B Class A	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	AEC-6402	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1	Date:	2014/01/03
		Test By:	Frank Lin
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.4420	34.96	28.62	9.62	44.58	38.24	79.00	66.00	-34.42	-27.76	Pass
2	0.4860	37.38	31.33	9.62	47.00	40.95	79.00	66.00	-32.00	-25.05	Pass
3	0.6740	27.95	19.98	9.64	37.59	29.62	73.00	60.00	-35.41	-30.38	Pass
4	0.7860	28.64	21.13	9.65	38.29	30.78	73.00	60.00	-34.71	-29.22	Pass
5	0.8420	26.73	17.16	9.65	36.38	26.81	73.00	60.00	-36.62	-33.19	Pass
6	1.0620	26.01	17.63	9.67	35.68	27.30	73.00	60.00	-37.32	-32.70	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	FCC Part 15B Class A	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	AEC-6402	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1	Date:	2014/01/03
		Test By:	Frank Lin
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.3980	31.56	22.15	9.63	41.19	31.78	79.00	66.00	-37.81	-34.22	Pass
2	0.4420	34.58	28.06	9.63	44.21	37.69	79.00	66.00	-34.79	-28.31	Pass
3	0.4900	37.53	31.21	9.63	47.16	40.84	79.00	66.00	-31.84	-25.16	Pass
4	0.7300	28.57	21.81	9.64	38.21	31.45	73.00	60.00	-34.79	-28.55	Pass
5	0.8460	26.15	16.07	9.65	35.80	25.72	73.00	60.00	-37.20	-34.28	Pass
6	1.0220	27.87	19.80	9.66	37.53	29.46	73.00	60.00	-35.47	-30.54	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

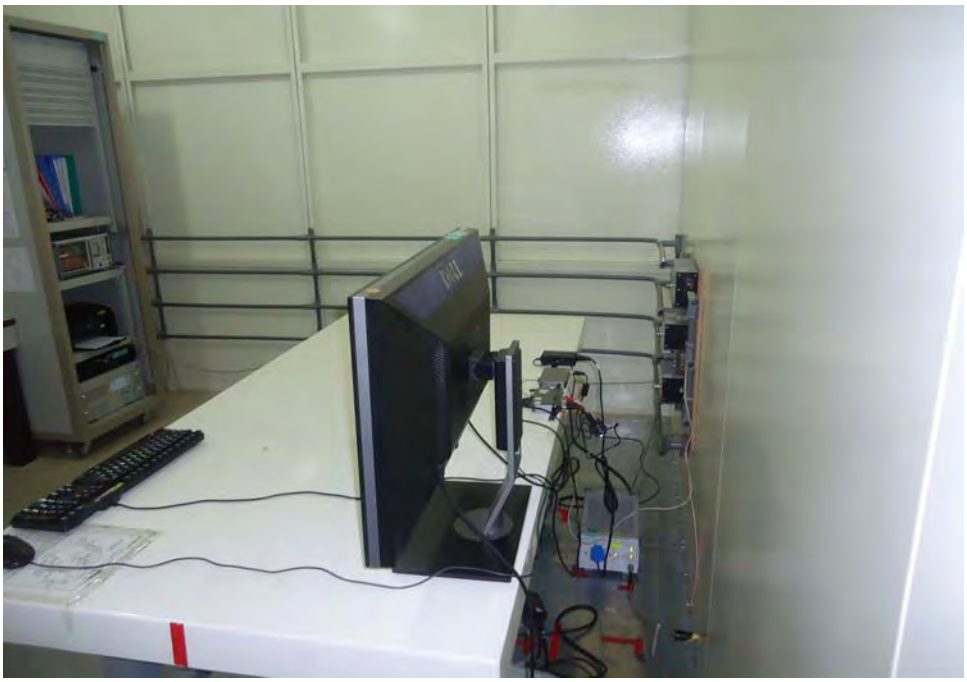
4.1.6. Test Photograph

Test Mode: Mode 1

Description: Front View of Conducted Test

Test Mode: Mode 1

Description: Back View of Conducted Test



4.2. Radiated Interference Measurement

4.2.1. Limit

Under 1GHz test shall not exceed following value

FCC 47 CFR PART 15 SUBPART B				
Frequency range (MHz)	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m
30 to 88	10	39	3	40
88 to 216	10	43.5	3	43.5
216 to 960	10	46.4	3	46
Above 960	10	49.5	3	54

CISPR 22				
Frequency range (MHz)	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m
30 to 230	10	40	10	30
230 to 1000	10	47	10	37

Above 1GHz test shall not exceed following value

Frequency (MHz)	dBuV/m (Distance 3m)			
	Class A		Class B	
	Average	Peak	Average	Peak
1000 ~ 40000	60	80	54	74

Remark: 1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
4. Peak detector limit is corresponding to 20 dB above the maximum permitted average limit.

According to FCC Part 15.33 (b), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or in which the device operated or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.75	30
1.75-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40GHz, whichever is lower

4.2.2. Test Instruments

10 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Pre Amplifier	Agilent	8447D	2944A11120	01/10/2013	(1)
Pre Amplifier	Agilent	8447D	2944A11119	01/10/2013	(1)
Test Receiver	R&S	ESCI	100722	10/26/2013	(1)
Test Receiver	R&S	ESCI	101000	12/03/2013	(1)
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3268	06/05/2013	(1)
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3273	11/29/2013	(1)
Test Site	ATL	TE06	TE06	08/06/2013	(1)

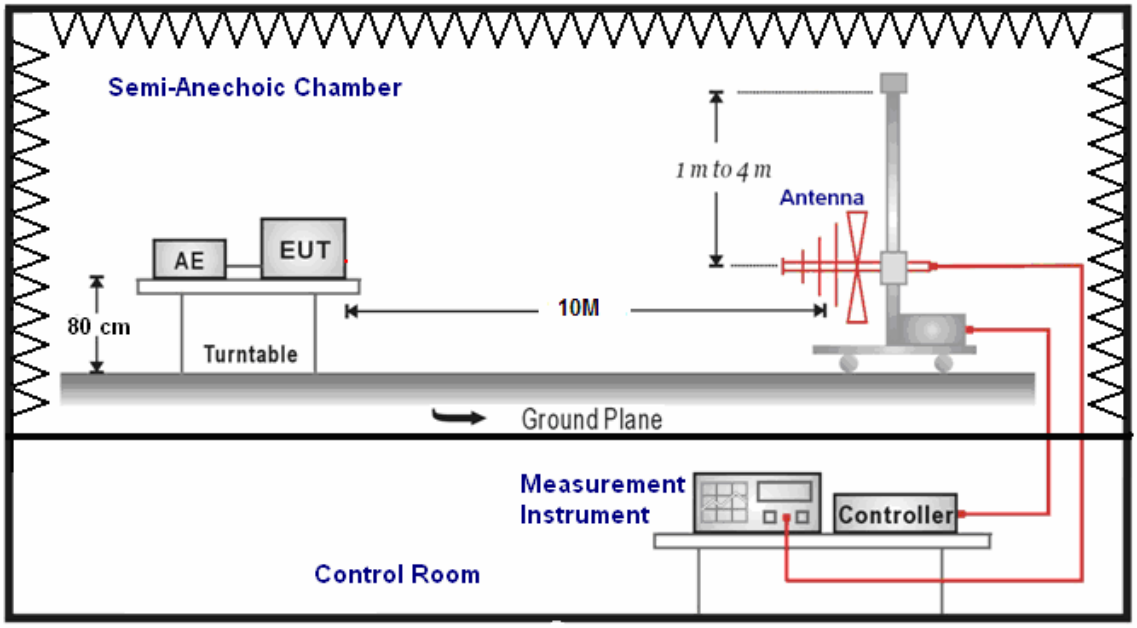
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/21/2013	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/21/2013	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2013	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/21/2013	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/10/2013	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/13/2013	(1)
Test Site	ATL	TE01	888001	02/20/2013	(1)

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

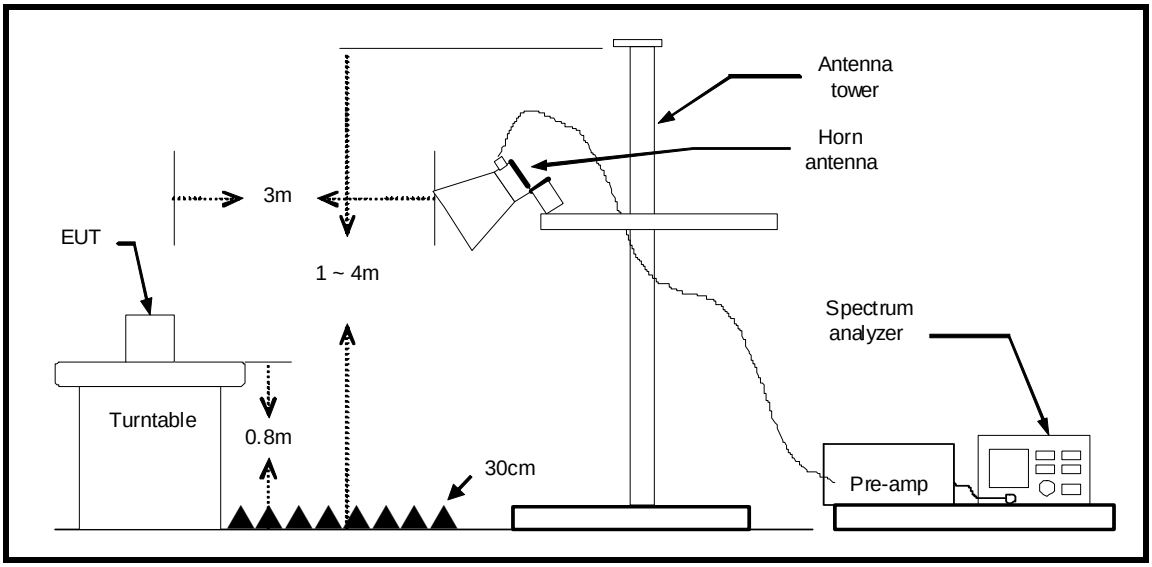
Note: N.C.R. = No Calibration Request.

4.2.3. Setup

Below 1GHz



Above 1GHz



4.2.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 meters for under 1GHz, and 3 meter for above 1GHz, the highest frequency performed according to internal source frequency of the EUT, the specification was below:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

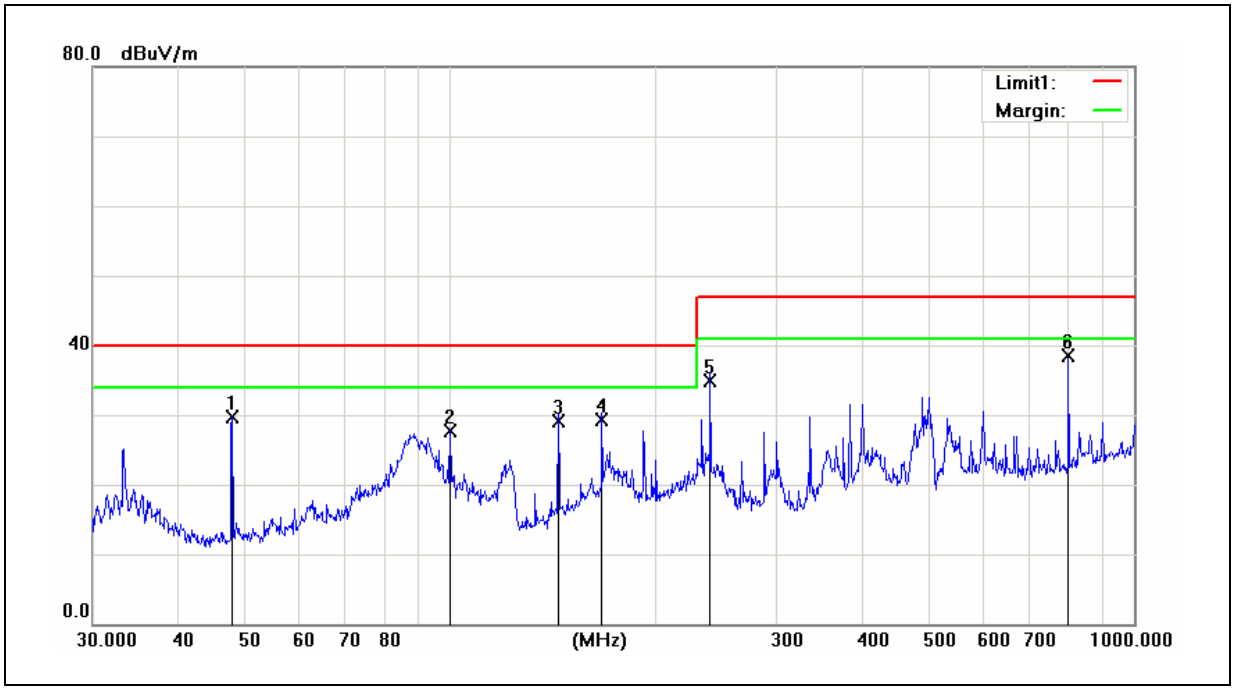
According to this standard paragraph 15.109, as an alternative to the radiated emission limits, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, “Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement”.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated on radiated measurement.

Radiated emissions were invested over the frequency range from 30MHz to1GHz using a receiver bandwidth of 120 kHz. Radiated was performed at an antenna to EUT distance of 10 meters.

4.2.5. Test Result

Standard:	CISPR 22 Class A	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AEC-6402	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1	Date:	2014/01/04
Ant.Polar.:	Horizontal	Test By:	Frank Lin

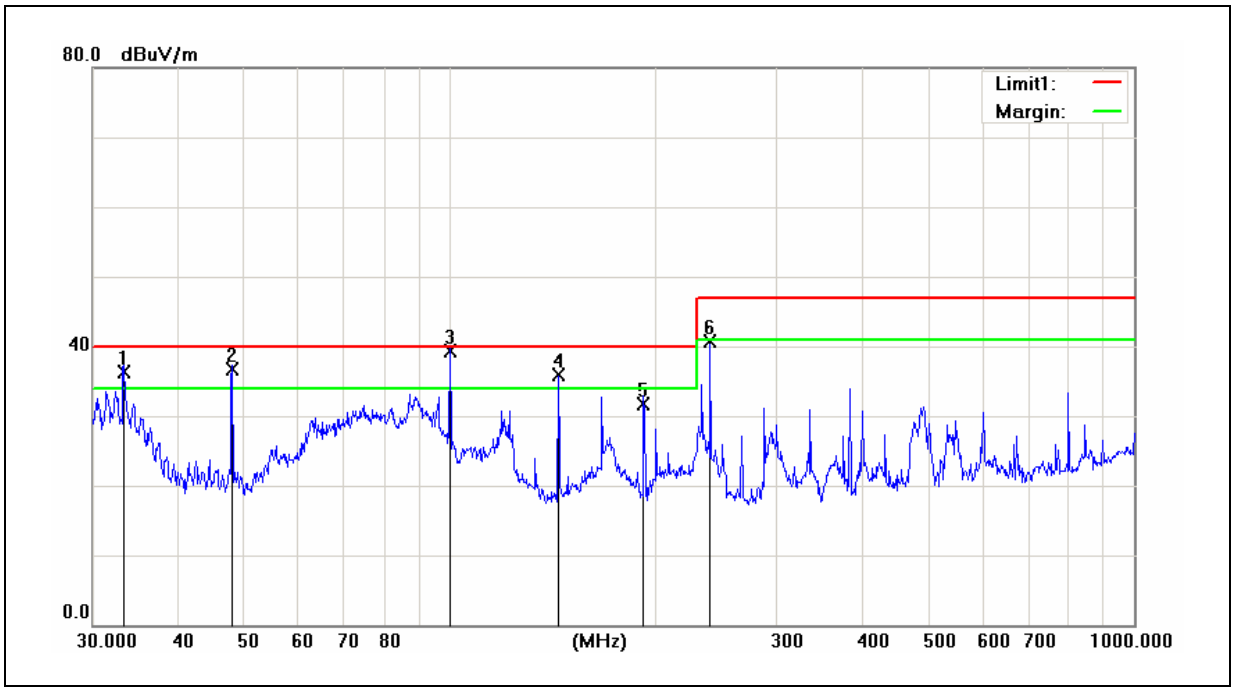


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	47.9940	44.36	-14.66	29.70	40.00	-10.30	400	329	QP
2	99.8777	45.44	-17.74	27.70	40.00	-12.30	400	126	QP
3	143.8295	42.91	-13.71	29.20	40.00	-10.80	400	308	QP
4	166.6514	42.67	-13.37	29.30	40.00	-10.70	400	56	QP
5	239.9874	49.03	-14.13	34.90	47.00	-12.10	400	21	QP
6	801.7863	40.87	-2.37	38.50	47.00	-8.50	100	0	QP

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

Standard:	CISPR 22 Class A	Test Distance:	10m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AEC-6402	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1	Date:	2014/01/04
Ant.Polar.:	Vertical	Test By:	Frank Lin

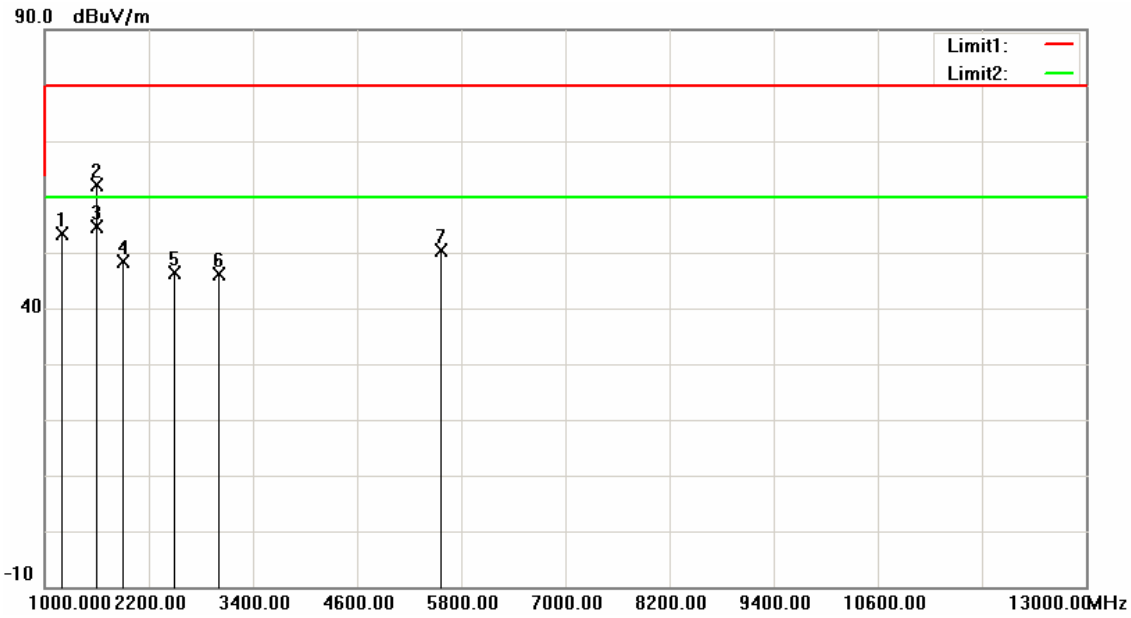


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	33.3280	51.96	-15.56	36.40	40.00	-3.60	100	230	QP
2	47.9940	50.93	-14.23	36.70	40.00	-3.30	100	236	QP
3	99.8777	56.48	-17.18	39.30	40.00	-0.70	200	266	QP
4	143.8295	49.03	-13.03	36.00	40.00	-4.00	100	149	QP
5	191.7450	47.03	-15.23	31.80	40.00	-8.20	101	0	QP
6	239.9874	54.09	-13.29	40.80	47.00	-6.20	100	178	QP

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

Standard:	FCC Part 15B Class A	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AEC-6402	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1 (1GHz~13GHz)	Date:	2014/01/03
Ant.Polar.:	Horizontal	Test By:	Frank Lin

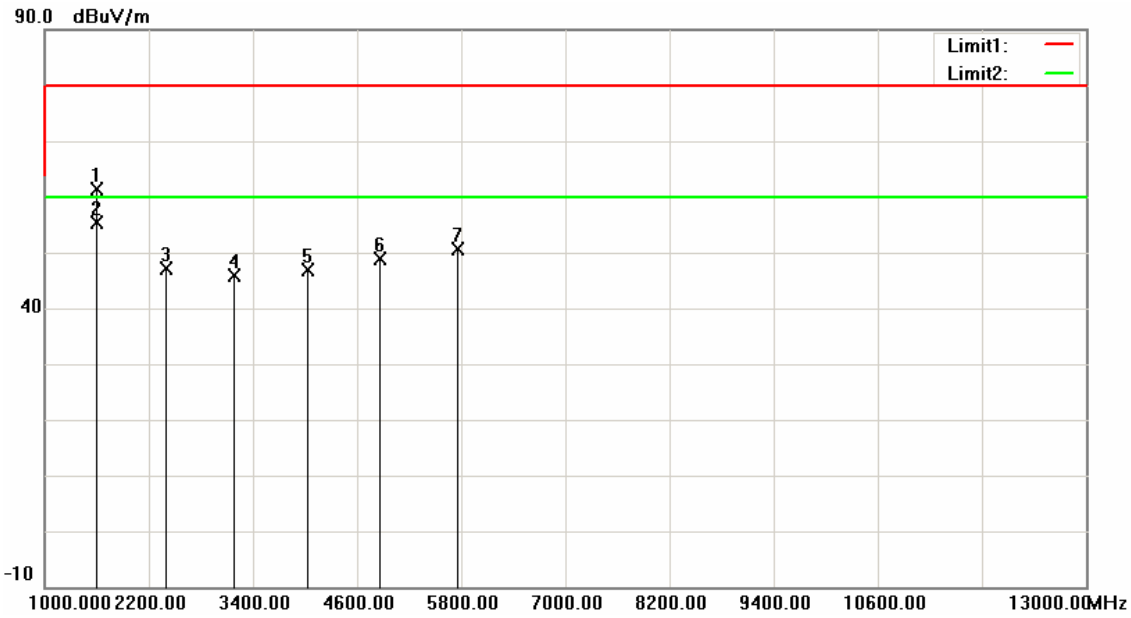


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1200.000	56.29	-2.85	53.44	80.00	-26.56	peak
2	1600.000	62.64	-0.52	62.12	80.00	-17.88	peak
3	1600.000	55.13	-0.52	54.61	60.00	-5.39	AVG
4	1895.000	47.40	0.94	48.34	80.00	-31.66	peak
5	2500.000	43.18	3.18	46.36	80.00	-33.64	peak
6	3000.000	41.17	5.04	46.21	80.00	-33.79	peak
7	5550.000	35.80	14.50	50.30	80.00	-29.70	peak

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

Standard:	FCC Part 15B Class A	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AEC-6402	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1 (1GHz~13GHz)	Date:	2014/01/03
Ant.Polar.:	Vertical	Test By:	Frank Lin



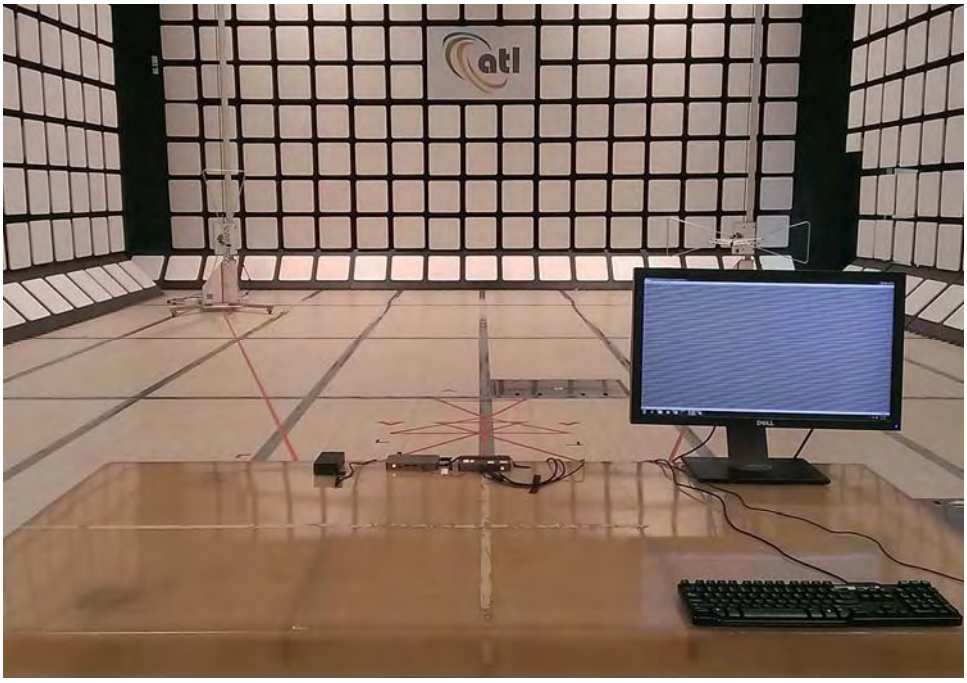
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1600.000	61.84	-0.52	61.32	80.00	-18.68	peak
2	1600.000	55.89	-0.52	55.37	60.00	-4.63	AVG
3	2400.000	44.32	2.85	47.17	80.00	-32.83	peak
4	3175.000	40.19	5.76	45.95	80.00	-34.05	peak
5	4025.000	37.97	8.95	46.92	80.00	-33.08	peak
6	4860.000	36.75	12.09	48.84	80.00	-31.16	peak
7	5755.000	50.56	0.00	50.56	80.00	-29.44	peak

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

4.2.6. Test Photograph

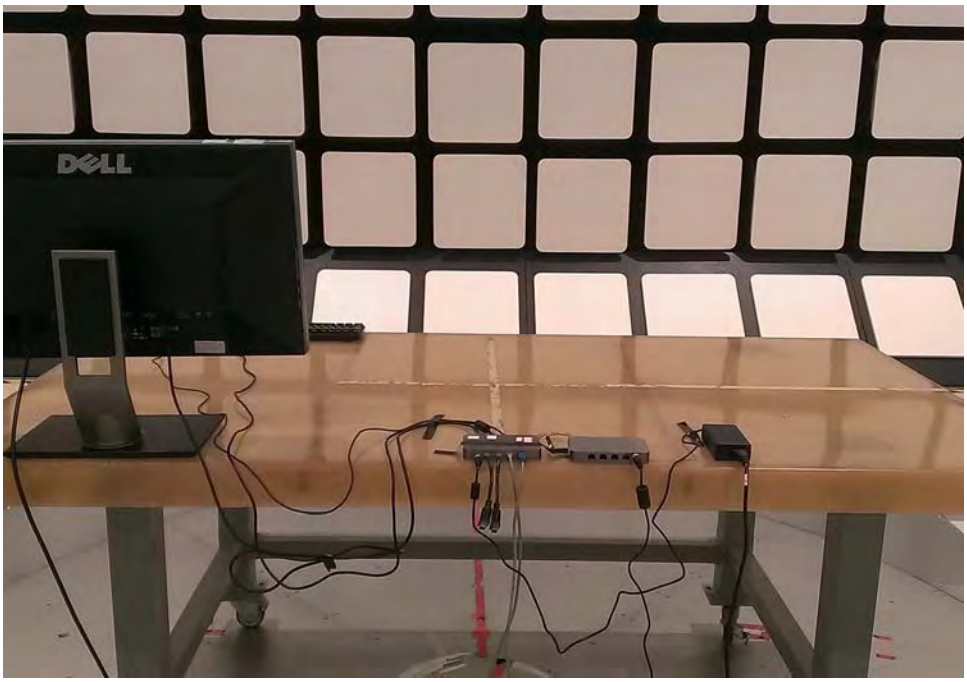
Test Mode: Mode 1

Description: Front View of Radiated Emission Test _ Below 1GHz



Test Mode: Mode 1

Description: Back View of Radiated Emission Test _ Below 1GHz

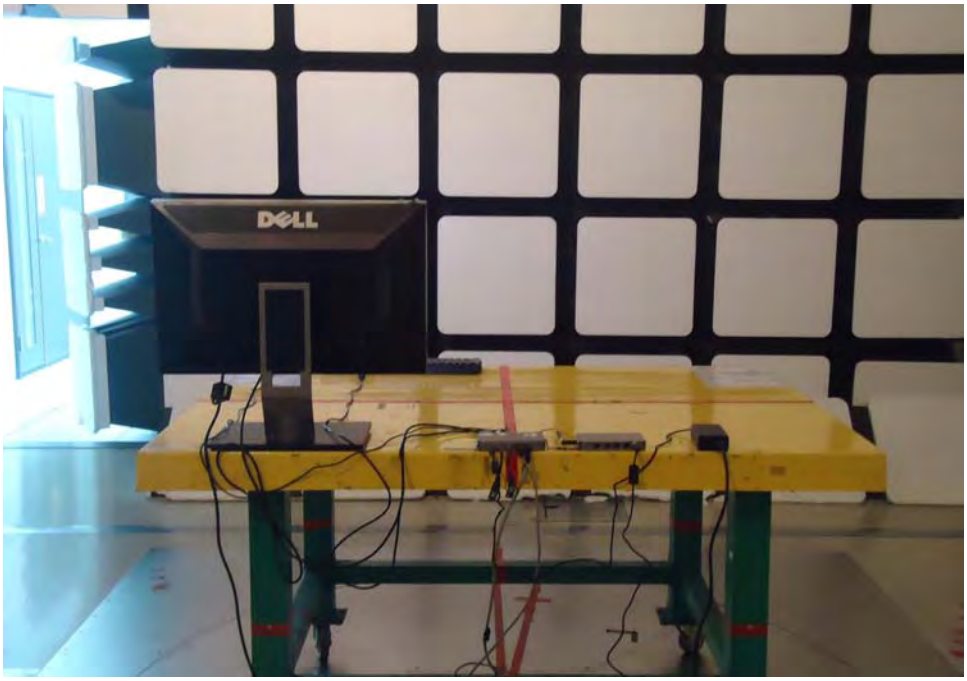


Test Mode: Mode 1

Description: Front View of Radiated Emission Test _ Above 1GHz

Test Mode: Mode 1

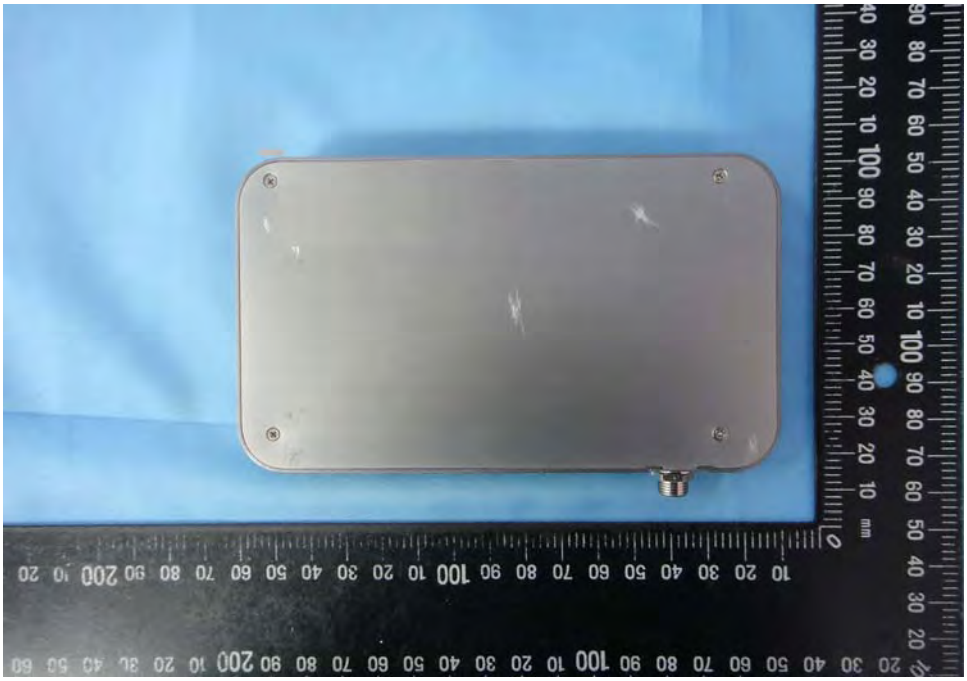
Description: Back View of Radiated Emission Test _ Above 1GHz



5 EUT Photograph

(1) EUT Photo

(2) EUT Photo



(3) EUT Photo

(4) EUT Photo

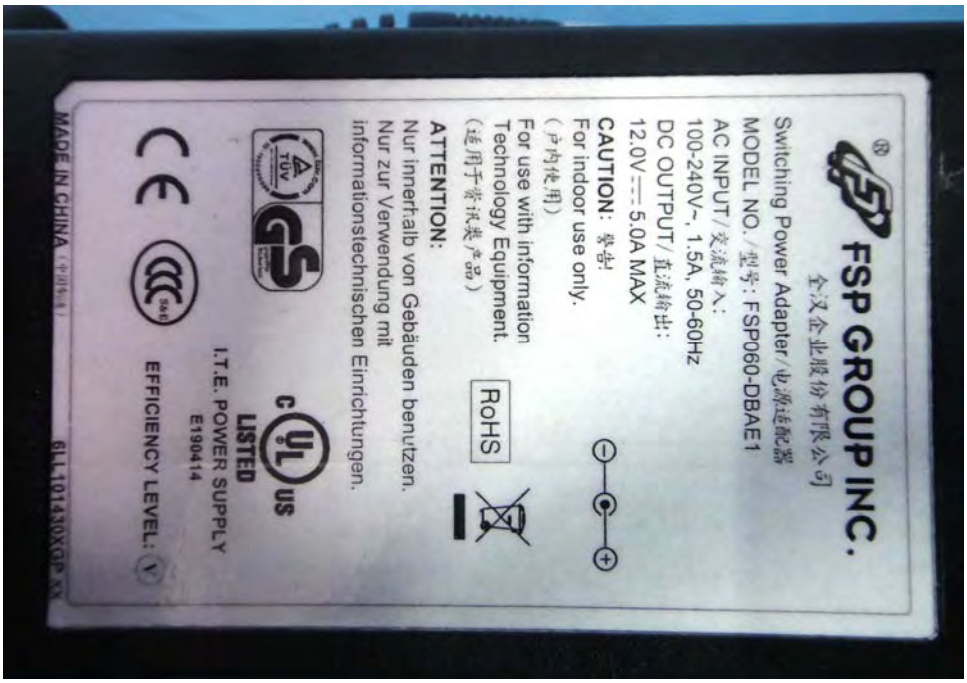
(5) EUT Photo

(6) EUT Photo

(7) EUT Photo

(8) EUT Photo

(9) EUT Photo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全汉企业股份有限公司
Switching Power Adapter/电源适配器
MODEL NO./型号: FSP060-DBAE1
AC INPUT/交流输入:
100-240V~, 1.5A, 50-60Hz
DC OUTPUT/直流输出:
12.0V ⎓ 5.0A MAX
CAUTION: 警告:
For indoor use only.
(户内使用)
For use with information
Technology Equipment.
(适用于资讯类产品)
ATTENTION:
Nur innerhalb von Gebäuden benutzen.
Nur zur Verwendung mit
informationstechnischen Einrichtungen.
RoHS
c UL us
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