FCC Test Report

Report No.: FD180115C15

Test Model: OTE060

Received Date: Jan. 15, 2018

Test Date: Jan. 19, 2018 ~ Jan. 20, 2018

Issued Date: Jan. 25, 2018

Applicant: GN Audio A/S

Address: Lautrupbjerg 7 DK-2750 Ballerup Denmark

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

Lab Address: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

FCC Registration / Designation Number: 328930 / TW1050

Certificate #4327.01

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.
The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record **3**

1 Certificate of Conformity **4**

2 Summary of Test Results **5**

2.1 Measurement Uncertainty 5
2.2 Modification Record 5

3 General Information **6**

3.1 Features of EUT 6
3.2 General Description of EUT 6
3.3 Operating Modes of EUT and Determination of Worst Case Operating Mode 6
3.4 Test Program Used and Operation Descriptions 6
3.5 Primary Clock Frequencies of Internal Source 6

4 Configuration and Connections with EUT **7**

4.1 Connection Diagram of EUT and Peripheral Devices 7
4.2 Configuration of Peripheral Devices and Cable Connections 7

5 Conducted Emissions at Mains Ports **8**

5.1 Limits 8
5.2 Test Instruments 8
5.3 Test Arrangement 9
5.4 Test Results 10

6 Radiated Emissions up to 1 GHz **12**

6.1 Limits 12
6.2 Test Instruments 13
6.3 Test Arrangement 14
6.4 Test Results 15

7 Radiated Emissions above 1 GHz **17**

7.1 Limits 17
7.2 Test Instruments 18
7.3 Test Arrangement 19
7.4 Test Results 20

8 Pictures of Test Arrangements **22**

8.1 Conducted Emissions at Mains Ports 22
8.2 Radiated Emissions up to 1 GHz 23
8.3 Radiated Emissions above 1 GHz 24

Appendix – Information on the Testing Laboratories **25**

Release Control Record

Issue No.	Description	Date Issued
FD180115C15	Original Release	Jan. 25, 2018

1 Certificate of Conformity

Product: Bluetooth Headset
Brand: Jabra
Test Model: OTE060
Sample Status: Production Unit
Applicant: GN Audio A/S
Test Date: Jan. 19, 2018 ~ Jan. 20, 2018
Standards: 47 CFR FCC Part 15, Subpart B, Class B
ANSI C63.4:2014

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Gina Liu , **Date:** Jan. 25, 2018
Gina Liu / Specialist

Approved by : Carl Chen , **Date:** Jan. 25, 2018
Carl Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart B, Class B
ANSI C63.4:2014

FCC Clause	Test Item	Result/Remarks	Verdict
15.107	AC Power Line Conducted Emissions	Minimum passing Class B margin is -15.25 dB at 0.17734 MHz	Pass
15.109	Radiated Emissions up to 1 GHz	Minimum passing Class B margin is -3.91 dB at 110.56 MHz	Pass
	Radiated Emissions above 1 GHz	Minimum passing Class B margin is -21.47 dB at 2243.19 MHz	Pass

Note: There is no deviation to the applied test methods and requirements covered by the scope of this report.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:
The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 1 GHz	4.70 dB
Radiated Emissions above 1 GHz	Above 1 GHz	2.26 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Features of EUT

The tests reported herein were performed according to the method specified by GN Audio A/S, for detailed feature description, please refer to the manufacturer's specifications or user's manual.

3.2 General Description of EUT

Product	Bluetooth Headset
Brand	Jabra
Test Model	OTE060
Status of EUT	Production Unit
Operating Software	N/A
Power Supply Rating	3.7 Vdc (Battery) 5.0 Vdc (Host equipment)
Accessory Device	Refer to Note as below
Data Cable Supplied	0.3m shielded cable w/o core

Note:

1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Battery	VDL	71330	3.7 Vdc, 120 mAh
USB Cable	LianGang	USB／MICRO USB 300mm 1C1S*4	0.3 m shielded cable w/o core

3.3 Operating Modes of EUT and Determination of Worst Case Operating Mode

Test modes are presented in the report as below.

Mode	Test Condition
	Conducted Emission
1	BT Link + Charging with NB
	Radiated Emission
1	BT Link + Charging with NB
2	BT Link (Stand alone)

Remark:

1. For radiated emission test, test mode 1 was the worst case and only this mode was presented in the report.

3.4 Test Program Used and Operation Descriptions

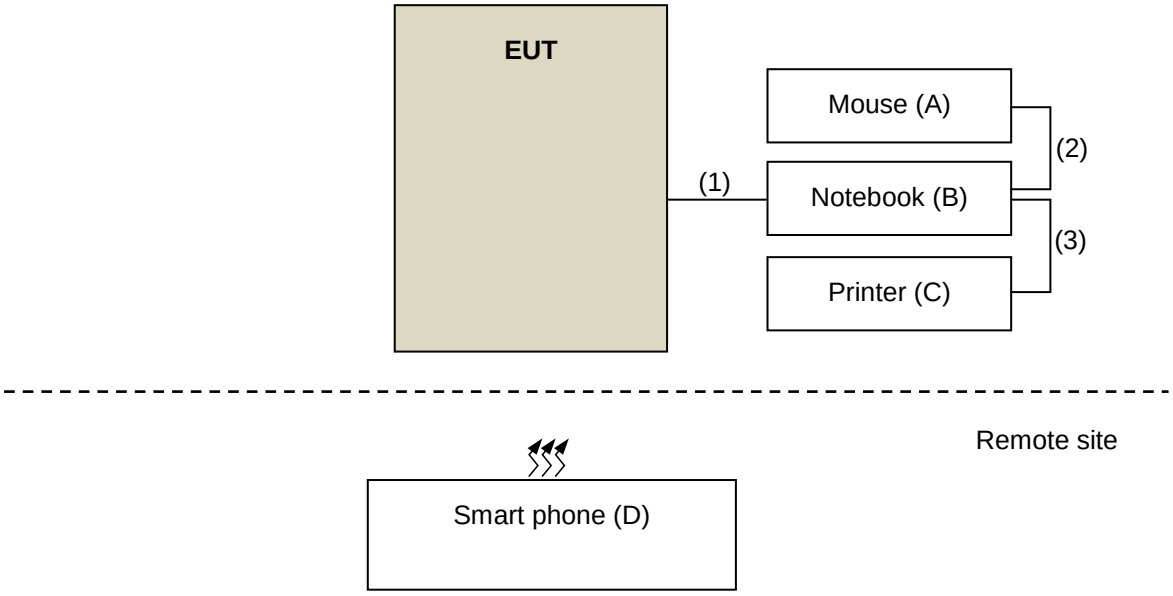
a. The EUT charged from the Notebook via Micro USB cable.
b. Notebook ran test program to enable all functions.
c. Notebook sent “H” patterns to the printer and the printer printed “H” patterns.
d. The EUT communicated data with the smart phone, which acted as communicaton partner.

3.5 Primary Clock Frequencies of Internal Source

The highest frequency generated or used within the EUT or on which the EUT operates or tunes is 2400 MHz, provided by GN Audio A/S, for detailed internal source, please refer to the manufacturer's specifications.

4 Configuration and Connections with EUT

4.1 Connection Diagram of EUT and Peripheral Devices



4.2 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	USB MOUSE	DELL	MS111-P	CN-011D3V-7158 1-1CJ-018C	FCC DoC Approved	--
B.	NOTEBOOK	DELL	E6440	FMLNM32	N/A	--
C.	USB PRINTER	EPSON	T22	MEEZ070388	N/A	--
D.	SONY XPERIA SL MOBLIE	SONY	LT26ii	BX9037FAHS	N/A	--

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item D acted as communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Micro USB Cable	1	0.3	Y	0	Accessory of the EUT
2.	USB Cable	1	1.8	Y	0	
3.	USB Cable	1	1.8	Y	0	

Note: The core(s) is(are) originally attached to the cable(s).

5 Conducted Emissions at Mains Ports

5.1 Limits

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

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

5.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS 30	100288	Aug. 17, 2017	Aug. 16, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 08, 2017	Sep. 07, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 02, 2017	Aug. 01, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

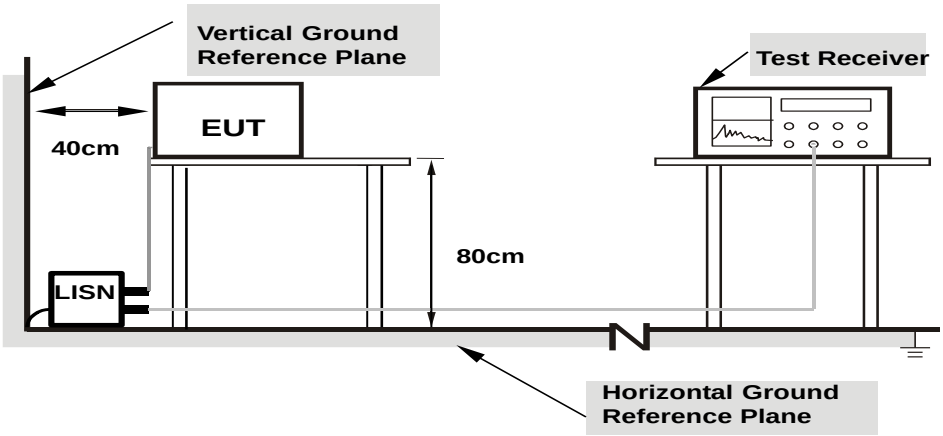
5.3 Test Arrangement

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50 uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The tset results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

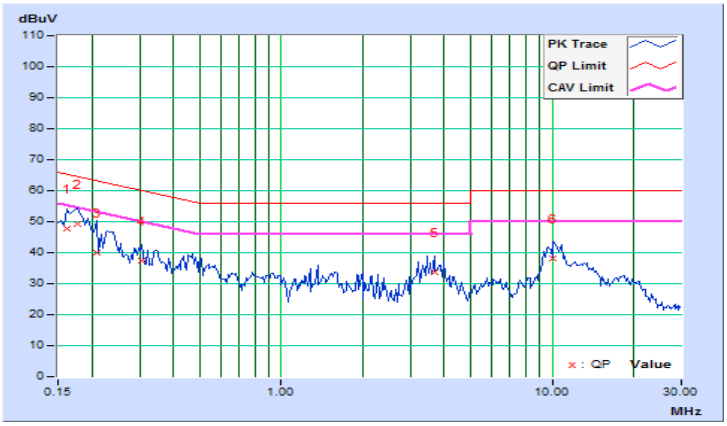
5.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 75%RH
Tested by	Jim Lee	Test Date	2018/1/20
Test Mode	Mode 1		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	9.66	38.25	19.61	47.91	29.27	65.38	55.38	-17.47	-26.11
2	**0.17734**	**9.66**	**39.70**	**26.74**	**49.36**	**36.40**	**64.61**	**54.61**	**-15.25**	**-18.21**
3	0.20859	9.66	30.18	12.96	39.84	22.62	63.26	53.26	-23.42	-30.64
4	0.30625	9.66	27.57	17.23	37.23	26.89	60.07	50.07	-22.84	-23.18
5	3.67578	9.75	23.80	15.35	33.55	25.10	56.00	46.00	-22.45	-20.90
6	10.07813	9.87	28.43	23.42	38.30	33.29	60.00	50.00	-21.70	-16.71

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

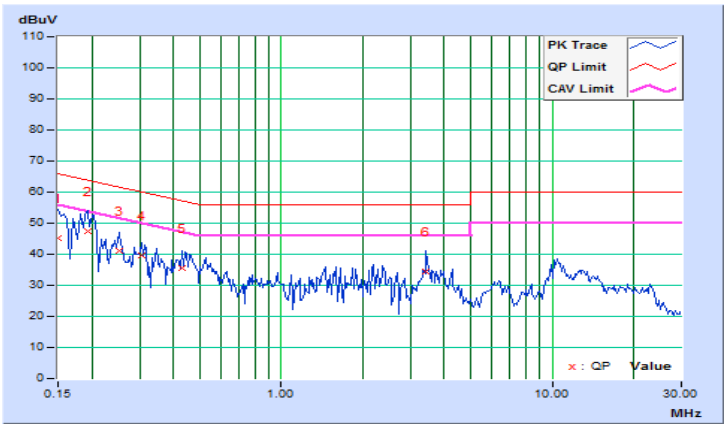


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 75%RH
Tested by	Jim Lee	Test Date	2018/1/20
Test Mode	Mode 1		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.79	35.39	12.14	45.18	21.93	66.00	56.00	-20.82	-34.07
2	0.19297	9.79	37.63	19.23	47.42	29.02	63.91	53.91	-16.49	-24.89
3	0.25156	9.78	31.48	14.43	41.26	24.21	61.71	51.71	-20.45	-27.50
4	0.30625	9.78	29.98	17.01	39.76	26.79	60.07	50.07	-20.31	-23.28
5	0.43125	9.78	25.82	18.85	35.60	28.63	57.23	47.23	-21.63	-18.60
6	3.43359	9.86	24.68	14.74	34.54	24.60	56.00	46.00	-21.46	-21.40

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



6 Radiated Emissions up to 1 GHz

6.1 Limits

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		

Radiated Emissions Limits at 3 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	49.5	40	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960			57.5	47.5
960-1000	60	54		

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. QP detector shall be applied if not specified.

6.2 Test Instruments

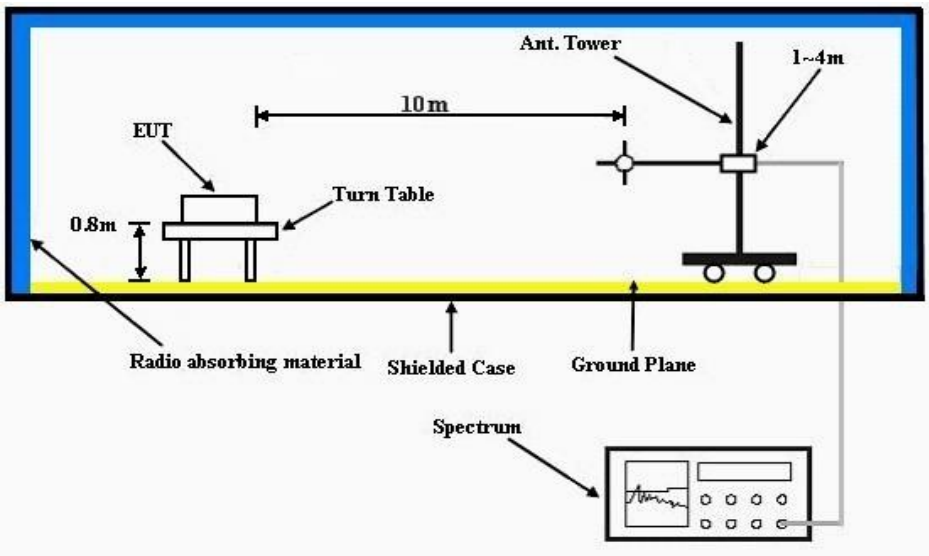
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ (V)	ESR	101240	Oct. 24, 2017	Oct. 23, 2018
Test Receiver ROHDE & SCHWARZ (H)	ESR	101264	Dec. 25, 2017	Dec. 24, 2018
BILOG Antenna SCHWARZBECK (V)	VULB9168	9168-160	Nov. 29, 2017	Nov. 28, 2018
BILOG Antenna SCHWARZBECK (H)	VULB9168	9168-156	Nov. 29, 2017	Nov. 28, 2018
Preamplifier Sonoma (V)	310N	352924	Jul. 12, 2017	Jul. 11, 2018
Preamplifier Sonoma (H)	310N	352923	Jul. 12, 2017	Jul. 11, 2018
RF signal cable (with 5dB PAD) Times (V)	LMR-600 (18M) +LMR-400 (7M)	CABLE-CH1 (VER) -01	Oct. 24, 2017	Oct. 23, 2018
RF signal cable (with 5dB PAD) Times (H)	LMR-600 (11.8M) +LMR-400 (7M)	CABLE-CH1 (HOR) -01	Oct. 24, 2017	Oct. 23, 2018
Software BV ADT	BV ADT_Radiated_ V8.7.08	NA	NA	NA
Antenna Tower (V)	MFA-440	9707	NA	NA
Antenna Tower (H)	MFA-440	970705	NA	NA
Turn Table	DS430	50303	NA	NA
Controller (V)	MF7802	074	NA	NA
Controller (H)	MF7802	08093	NA	NA

NOTE:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 1.
3. The IC Site Registration No. is IC 7450F-1.
4. The VCCI Site Registration No. is R-1893.

6.3 Test Arrangement

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for quasi-peak detection (QP) at frequency below 1 GHz.



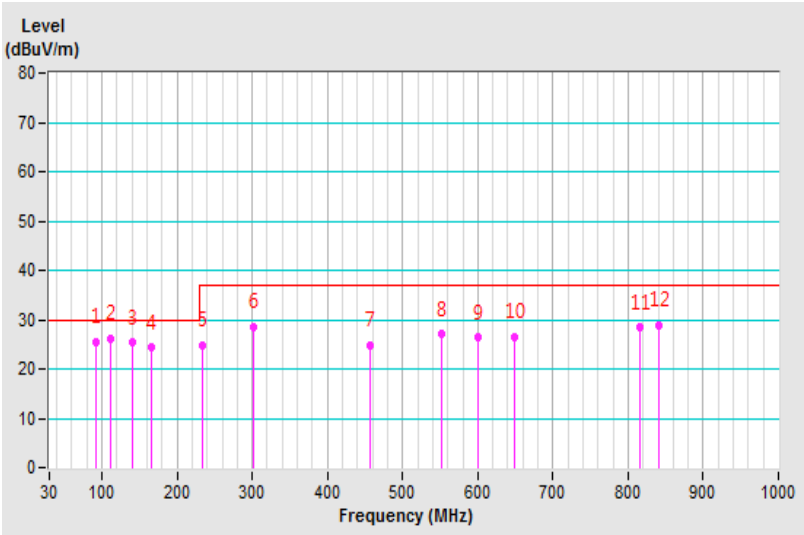
6.4 Test Results

Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Input Power	5 Vdc	Environmental Conditions	23℃, 63%RH
Tested by	Rolan Zheng	Test Date	2018/1/20
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Horizontal at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	92.13	25.44 QP	30.00	-4.56	3.50 H	34	44.09	-18.65
2	**110.56**	**26.09 QP**	**30.00**	**-3.91**	**4.00 H**	**121**	**42.30**	**-16.21**
3	141.31	25.32 QP	30.00	-4.68	3.50 H	187	38.93	-13.61
4	166.58	24.26 QP	30.00	-5.74	4.00 H	72	37.63	-13.37
5	233.23	24.90 QP	37.00	-12.10	4.00 H	266	40.33	-15.43
6	301.90	28.57 QP	37.00	-8.43	3.00 H	16	40.79	-12.22
7	456.34	24.72 QP	37.00	-12.28	2.00 H	63	33.15	-8.43
8	552.42	27.03 QP	37.00	-9.97	2.00 H	204	34.00	-6.97
9	600.44	26.31 QP	37.00	-10.69	2.00 H	336	31.79	-5.48
10	648.50	26.41 QP	37.00	-10.59	2.00 H	17	31.10	-4.69
11	816.66	28.35 QP	37.00	-8.65	1.00 H	309	30.03	-1.68
12	840.67	28.82 QP	37.00	-8.18	1.00 H	129	30.23	-1.41

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

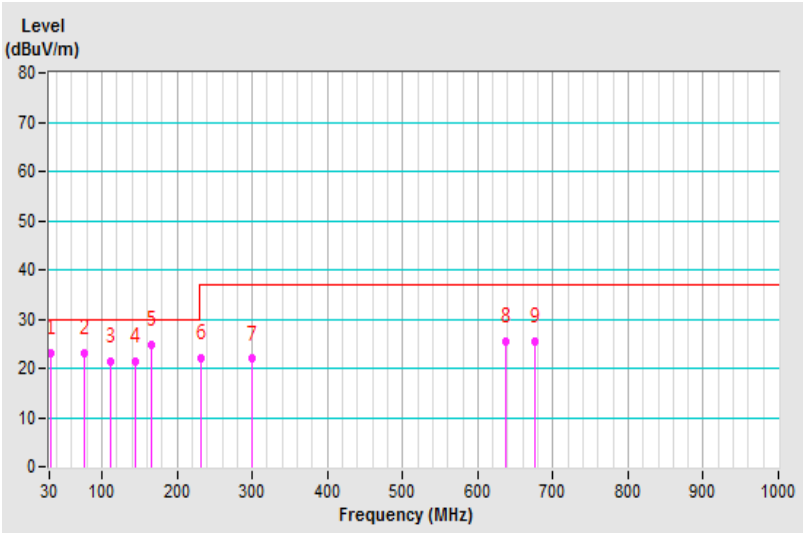


Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Input Power	5 Vdc	Environmental Conditions	23℃, 63%RH
Tested by	Rolan Zheng	Test Date	2018/1/20
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Vertical at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	31.46	23.07 QP	30.00	-6.93	1.00 V	1	38.11	-15.04
2	75.74	23.18 QP	30.00	-6.82	1.50 V	39	39.58	-16.40
3	110.56	21.29 QP	30.00	-8.71	1.50 V	49	37.65	-16.36
4	144.08	21.47 QP	30.00	-8.53	1.50 V	328	34.79	-13.32
5	165.95	24.73 QP	30.00	-5.27	1.50 V	286	38.16	-13.43
6	232.35	21.97 QP	37.00	-15.03	1.00 V	212	37.25	-15.28
7	299.87	21.91 QP	37.00	-15.09	1.00 V	192	34.03	-12.12
8	636.28	25.37 QP	37.00	-11.63	2.00 V	145	29.70	-4.33
9	676.29	25.46 QP	37.00	-11.54	4.00 V	85	29.64	-4.18

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



7 Radiated Emissions above 1 GHz

7.1 Limits

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
1000-3000	Avg: 49.5 Peak: 69.5	Avg: 43.5 Peak: 63.5	Not defined	Not defined
Above 3000			Not defined	Not defined

Radiated Emissions Limits at 3 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
1000-3000	Avg: 60 Peak: 80	Avg: 54 Peak: 74	Avg: 56 Peak: 76	Avg: 50 Peak: 70
Above 3000			Avg: 60 Peak: 80	Avg: 54 Peak: 74

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Frequency Range (For unintentional radiators)

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

7.2 Test Instruments

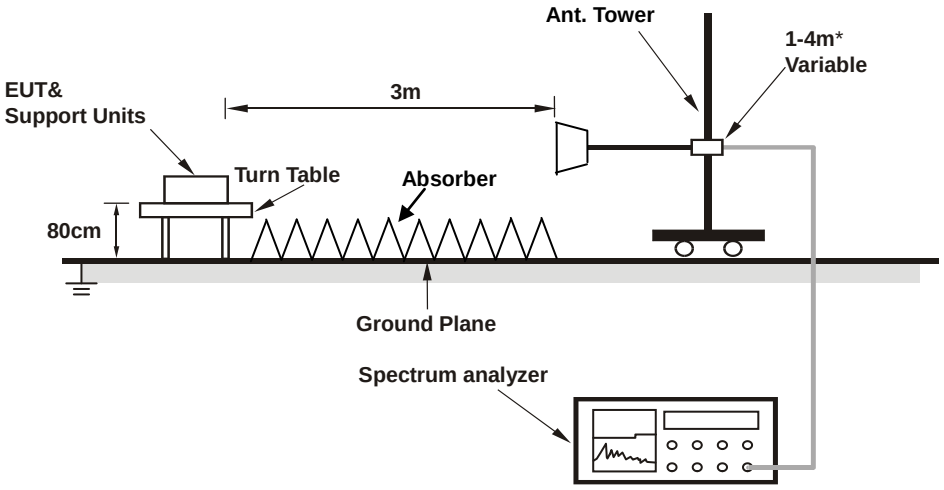
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ (Above 1GHz)	ESR7	101471	Feb. 23, 2017	Feb. 22, 2018
Spectrum Analyzer Agilent	E4446A	MY51100039	Sep. 05, 2017	Sep. 04, 2018
RF signal cable (with 5dB PAD) Times	LMR-400 (18M)	CABLE-CH2-01	Apr. 28, 2017	Apr. 27, 2018
HORN Antenna (with 4dB PAD) SCHWARZBECK	BBHA 9120 D	9120D-405	Dec. 01, 2017	Nov. 30, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A01922	Sep. 15, 2017	Sep. 14, 2018
RF signal cable ALLTEST & EMC	JUNFLON+EMC104-SM-SM-6000	Cable-CH2-02(MWX3221308G003+130710)	Jun. 12, 2017	Jun. 11, 2018
Software BV ADT	BV ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Controller BV ADT	SC100	SC93021702	NA	NA
RF Coaxial Cable EMCI	EMC102-KM-KM-1000	170820	Aug. 29, 2017	Aug. 28, 2018
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	170818	Aug. 29, 2017	Aug. 28, 2018
Fix tool for Boresight antenna	BAF-01	2	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 2.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The IC Site Registration No. is IC 7450F-2.
5. The VCCI Site Registration No. is G-18.

7.3 Test Arrangement

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. For frequency range 1 GHz ~ 18 GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. f adjustment depends on the EUT height and the antenna 3 dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The spectrum analyzer system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note: The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1 GHz.



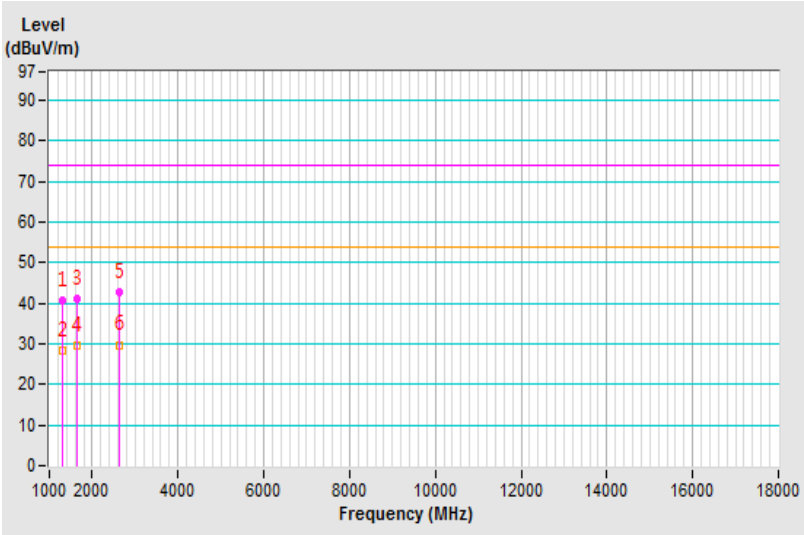
7.4 Test Results

Frequency Range	1GHz ~ 18GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Input Power	5 Vdc	Environmental Conditions	16℃, 76%RH
Tested by	Fox Chang	Test Date	2018/1/19
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1305.09	40.49 PK	74.00	-33.51	1.27 H	310	43.32	-2.83
2	1305.09	28.28 AV	54.00	-25.72	1.27 H	310	31.11	-2.83
3	1657.92	41.00 PK	74.00	-33.00	1.71 H	198	43.46	-2.46
4	1657.92	29.63 AV	54.00	-24.37	1.71 H	198	32.09	-2.46
5	2615.46	42.59 PK	74.00	-31.41	1.40 H	264	40.98	1.61
6	2615.46	29.77 AV	54.00	-24.23	1.40 H	264	28.16	1.61

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

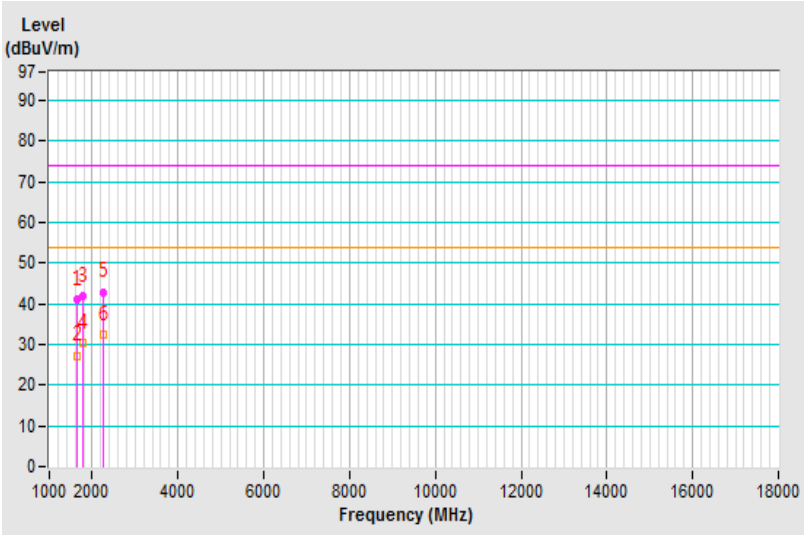


Frequency Range	1GHz ~ 18GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Input Power	5 Vdc	Environmental Conditions	16℃, 76%RH
Tested by	Fox Chang	Test Date	2018/1/19
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1657.92	41.19 PK	74.00	-32.81	1.28 V	309	43.65	-2.46
2	1657.92	27.32 AV	54.00	-26.68	1.28 V	309	29.78	-2.46
3	1792.82	41.90 PK	74.00	-32.10	1.00 V	279	43.69	-1.79
4	1792.82	30.33 AV	54.00	-23.67	1.00 V	279	32.12	-1.79
5	2243.19	42.91 PK	74.00	-31.09	1.45 V	203	41.49	1.42
6	**2243.19**	**32.53 AV**	**54.00**	**-21.47**	**1.45 V**	**203**	**31.11**	**1.42**

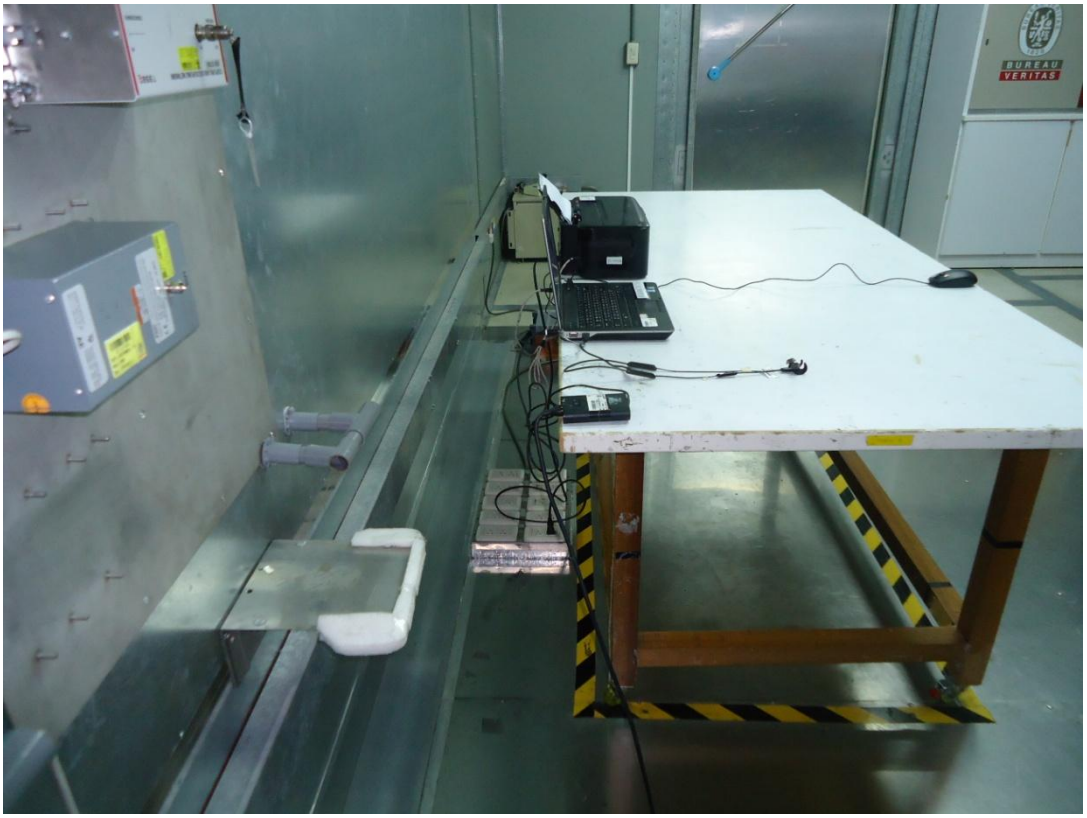
Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

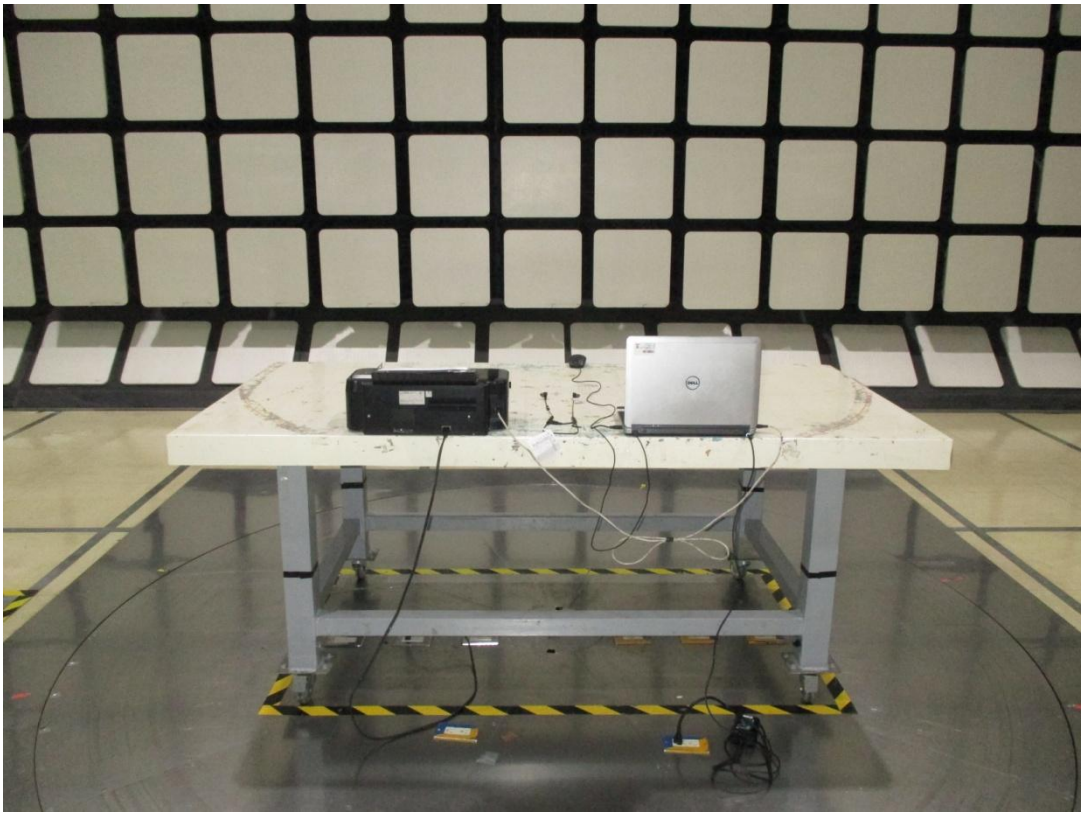


8 Pictures of Test Arrangements

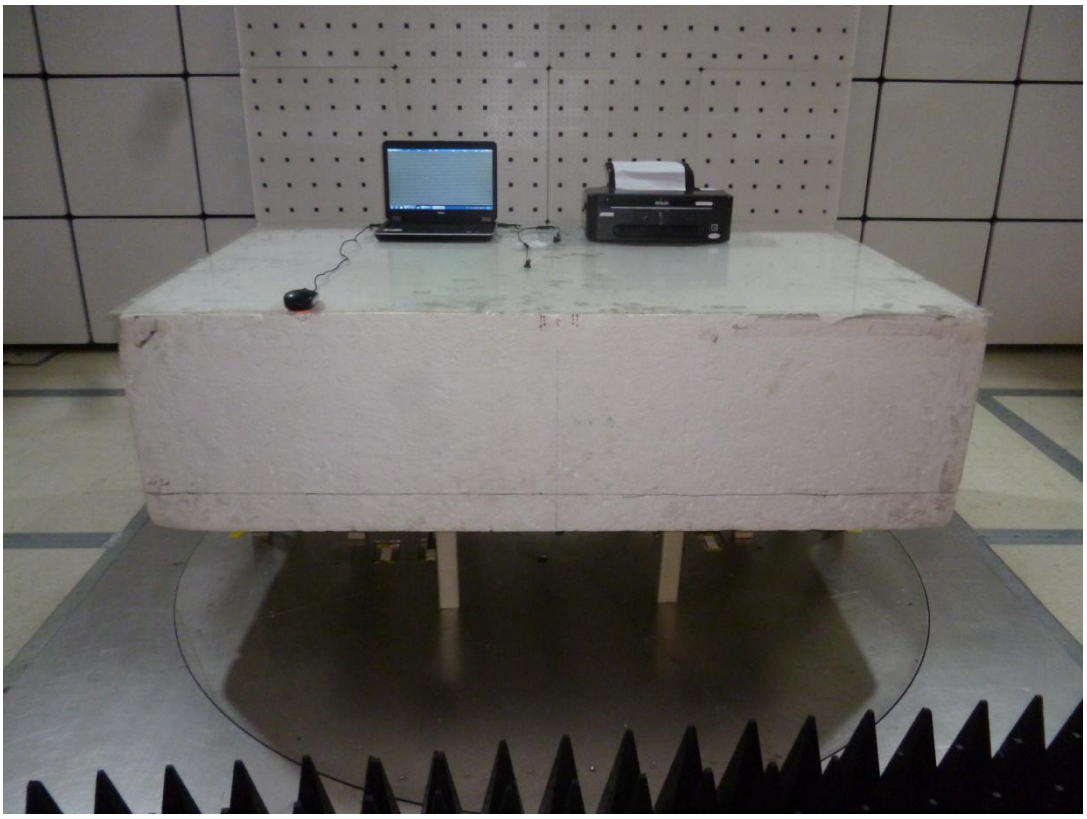
8.1 Conducted Emissions at Mains Ports

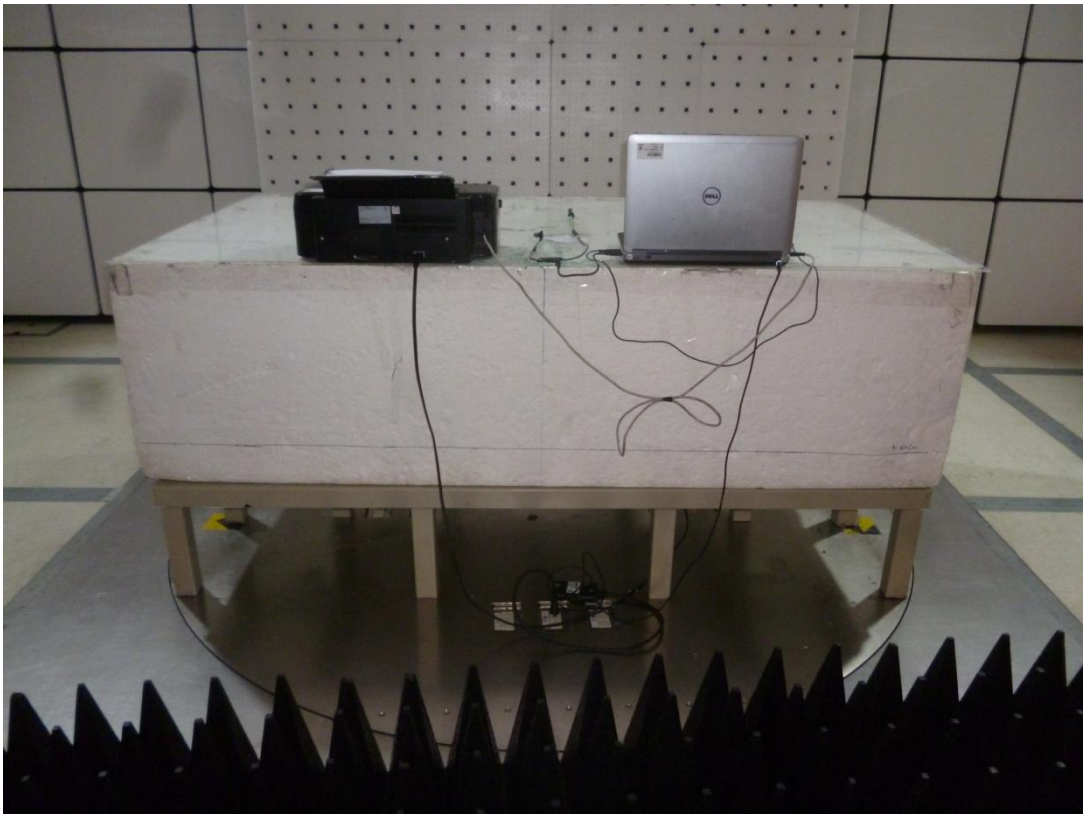


8.2 Radiated Emissions up to 1 GHz



8.3 Radiated Emissions above 1 GHz





Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---