

FCC Test Report

Report No.: FD180913D08

Test Model: VIG-120

Series Model: VIG-1XXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)

Received Date: Sep. 12, 2018

Test Date: Nov. 12 ~ 19, 2018

Issued Date: Dec. 3, 2018

Applicant: Vecow Co., Ltd.

Address: 3F., No.10, Jiankang Rd., Zhonghe Dist., New Taipei City 23586, Taiwan

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)

**FCC Registration/
Designation Number:** 418586 / TW1078



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 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 A2LA, or any agency of the U.S. 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 Description of EUT	6
3.2 Features of EUT	6
3.3 Operating Modes of EUT and Determination of Worst Case Operating Mode	7
3.4 Test Program Used and Operation Descriptions.....	7
3.5 Primary Clock Frequencies of Internal Source	7
4 Configuration and Connections with EUT	8
4.1 Connection Diagram of EUT and Peripheral Devices.....	8
4.2 Configuration of Peripheral Devices and Cable Connections.....	9
5 Conducted Emissions at Mains Ports	10
5.1 Limits	10
5.2 Test Instruments	10
5.3 Test Arrangement	11
5.4 Test Results.....	12
6 Radiated Emissions up to 1 GHz	14
6.1 Limits	14
6.2 Test Instruments	14
6.3 Test Arrangement	15
6.4 Test Results.....	16
7 Radiated Emissions above 1 GHz	18
7.1 Limits	18
7.2 Test Instruments	19
7.3 Test Arrangement	20
7.4 Test Results.....	21
8 Pictures of Test Arrangements	23
8.1 Conducted Emissions at Mains Ports	23
8.2 Radiated Emissions up to 1 GHz	24
8.3 Radiated Emissions above 1 GHz	25
Appendix – Information on the Testing Laboratories	26

Release Control Record

Issue No.	Description	Date Issued
FD180913D08	Original release.	Dec. 3, 2018

1 Certificate of Conformity

Product: VIG-100 series

Brand: Vecow

Test Model: VIG-120

Series Model: VIG-1XXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)

Sample Status: Engineering Sample

Applicant: Vecow Co., Ltd.

Test Date: Nov. 12 ~ 19, 2018

Standards: 47 CFR FCC Part 15, Subpart B, Class B
ICES-003:2016 Issue 6, 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 :  , **Date:** Dec. 3, 2018
Vivian Chen / Specialist

Approved by :  , **Date:** Dec. 3, 2018
Jim Hsiang / Associate Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart B / ICES-003:2016 Issue 6, Class B

ANSI C63.4:2014

FCC Clause	ICES-003 Clause	Test Item	Result/Remarks	Verdict
15.107	6.1	Conducted Emissions at mains ports	Minimum passing Class B margin is -6.26 dB at 0.43463 MHz	Pass
15.109	6.2.1	Radiated Emissions up to 1 GHz	Minimum passing Class B margin is -2.15 dB at 650.01 MHz	Pass
	6.2.2	Radiated Emissions above 1 GHz	Minimum passing Class B margin is -21.98 dB at 1980.04 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 as specified in CISPR 16-4-2:

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) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.97 dB
Radiated Emissions above 1 GHz	Above 1GHz	4.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Description of EUT

Product	VIG-100 series
Brand	Vecow
Test Model	VIG-120
Series Model	VIG-1XXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)
Model Difference	For Marketing difference
Sample Status	Engineering Sample
Operating Software	N/A
Power Supply Rating	Switching power adapter Rating: refer to Note below
Accessory Device	Adapter
Data Cable Supplied	N/A

Note:

1. The EUT has the following interfaces:

- ◆ USB x 1
- ◆ P1 ~ P4 (RS-232/422/485)
- ◆ LAN x 2 (10/100Mbps)
- ◆ GPIO
- ◆ CAN
- ◆ Console
- ◆ DC jack x 1

2. The EUT was power supplied from the following power adapter:

Item	Brand	Model	Spec.
Adapter	MW	GSM18U12	AC I/P: 100-240V, 0.5-0.25A, 50/60Hz DC O/P: 12V, 1.5A, 18W AC 2-pin Non-shielded DC cable (1.0m)

3.2 Features of EUT

The tests reported herein were performed according to the method specified by Vecow Co., Ltd., for detailed feature description, please refer to the manufacturer's specifications or user's manual.

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	Input Power
Conducted emission / Radiated emission tests		
1	Full system	120Vac/ 60Hz

All above test modes were recorded in this report.

3.4 Test Program Used and Operation Descriptions

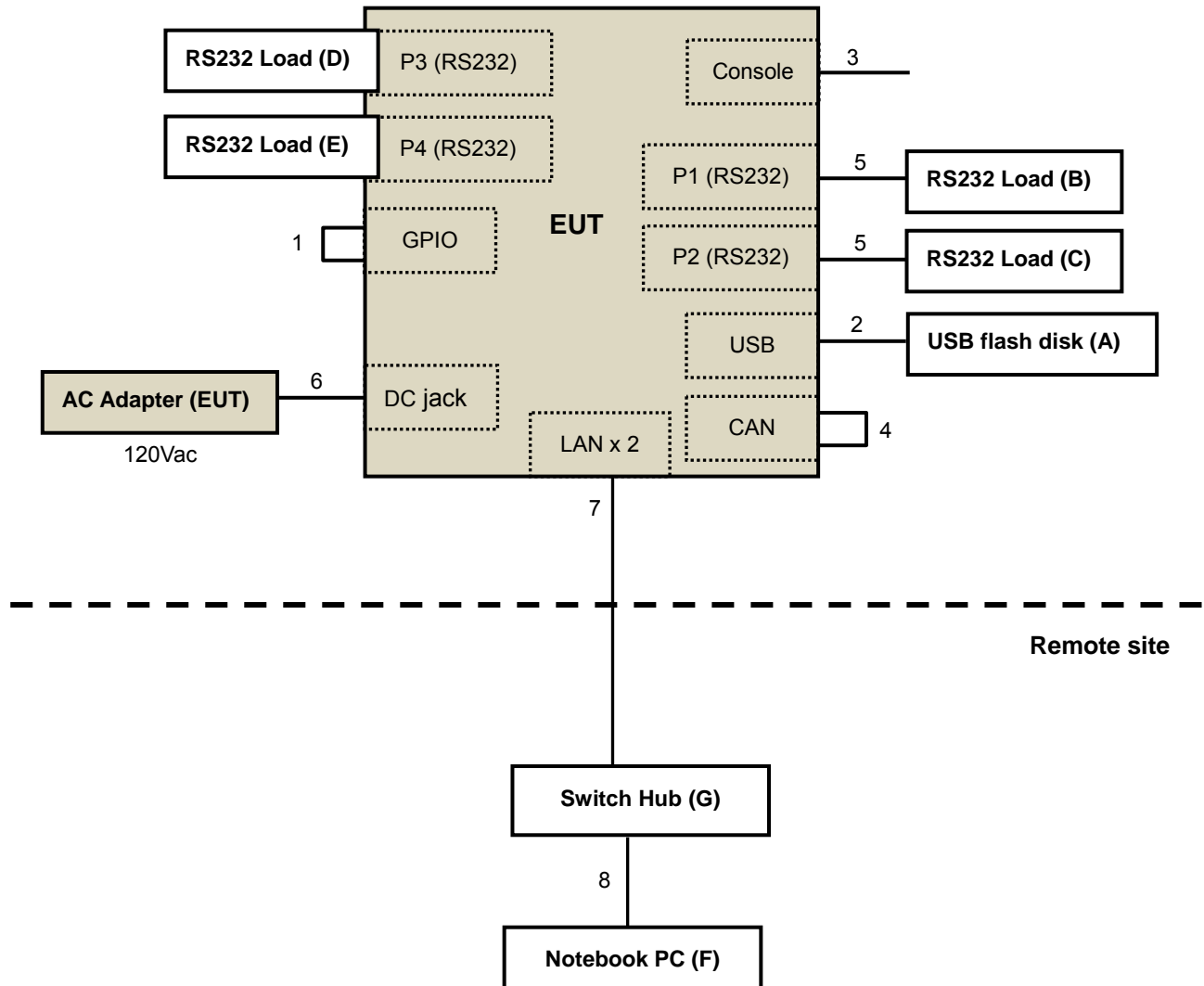
- a. Turned on the power of all equipment.
- b. EUT ran a test program to enable all functions.
- c. EUT read and wrote messages from/to ext. USB flash disk.
- d. EUT sent and received messages to/from Notebook PC (kept in a remote area) via switch hub with two UTP LAN cables (10m each).
- e. Steps c-d were repeated.

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 696MHz, provided by Vecow Co., Ltd., 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 flash disk	Transcend	16GB	N/A	N/A	Provided by Lab
B.	RS232 Load	N/A	N/A	N/A	N/A	Supplied by client
C.	RS232 Load	N/A	N/A	N/A	N/A	Supplied by client
D.	RS232 Load	N/A	N/A	N/A	N/A	Supplied by client
E.	RS232 Load	N/A	N/A	N/A	N/A	Supplied by client
F.	Notebook PC	SONY	SVS151A12P	275548477001024	FCC DoC Approved	Supplied by client
G.	Switch Hub	DELL	Power Connent 2608	N/A	N/A	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items F-G acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	GPIO cable	4	0.1	N	0	Supplied by client
2.	USB cable	1	1.8	Y	0	Provided by Lab
3.	Console to USB cable	1	1.15	N	0	Supplied by client
4.	CAN cable	2	0.1	N	0	Supplied by client
5.	LAN to RS232 cable	2	1.15	N	0	Supplied by client
6.	DC cable	1	1.0	N	0	Supplied by client
7.	LAN cable (Cat.5e)	2	10	N	0	Provided by Lab
8.	LAN cable (Cat.5e)	1	1.2	N	0	Provided by Lab

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

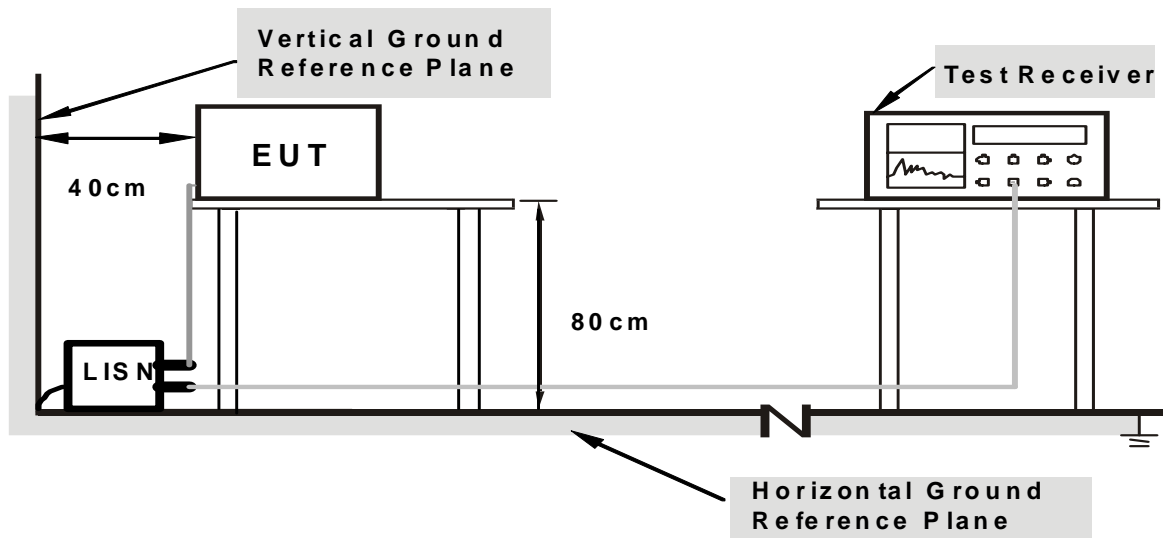
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESR3	102413	Feb. 8, 2018	Feb. 7, 2019
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 6, 2017	Dec. 5, 2018
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 6, 2017	Dec. 5, 2018
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Nov. 5, 2018	Nov. 4, 2019
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 3, 2018	May 2, 2019
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK 8121	8121-808	Mar. 5, 2018	Mar. 4, 2019
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C09.01	Feb. 21, 2018	Feb. 20, 2019
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 8, 2018	May 7, 2019

Notes: 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 Shielded Room No. 9.
 3. The VCCI Site Registration No. C-1312.
 4. Tested Date: Nov. 19, 2018

5.3 Test Arrangement

- 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/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test 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 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



Note: Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

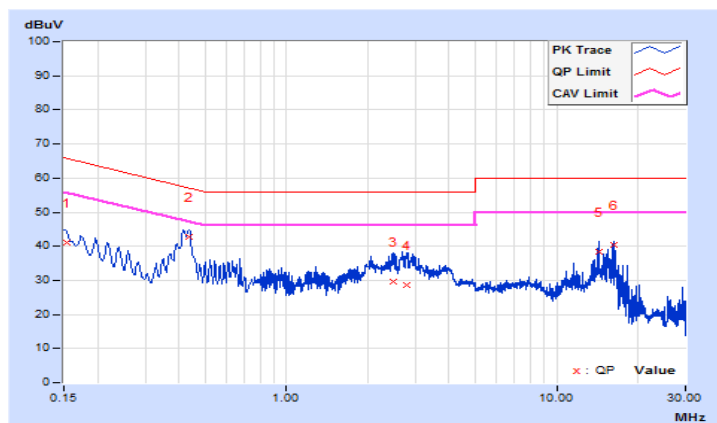
5.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Adam Chen		
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	0.15391	10.14	30.94	23.29	41.08	33.43	65.79	55.79	-24.71	-22.36
2	0.43463	10.23	32.61	30.67	42.84	40.90	57.16	47.16	-14.32	-6.26
3	2.48628	10.49	19.25	15.12	29.74	25.61	56.00	46.00	-26.26	-20.39
4	2.77562	10.52	18.15	12.58	28.67	23.10	56.00	46.00	-27.33	-22.90
5	14.27449	11.11	27.11	18.97	38.22	30.08	60.00	50.00	-21.78	-19.92
6	16.22561	11.21	29.11	24.81	40.32	36.02	60.00	50.00	-19.68	-13.98

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

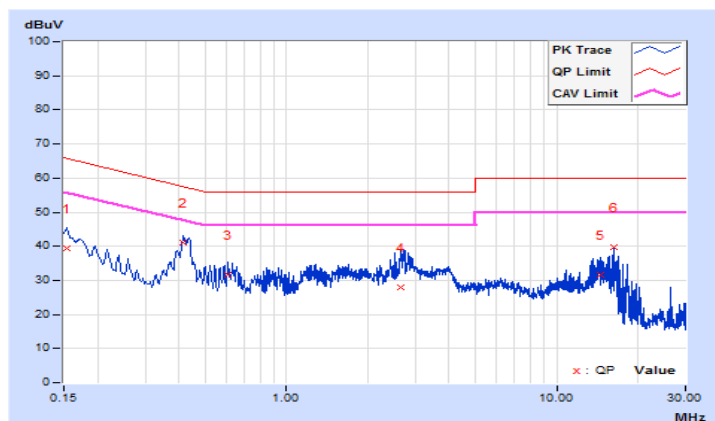


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Adam Chen		
Test Mode	Mode 1		

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	0.15391	10.14	29.13	15.81	39.27	25.95	65.79	55.79	-26.52	-29.84
2	0.41559	10.21	31.01	27.78	41.22	37.99	57.54	47.54	-16.32	-9.55
3	0.60948	10.27	21.24	17.93	31.51	28.20	56.00	46.00	-24.49	-17.80
4	2.64663	10.54	17.31	9.28	27.85	19.82	56.00	46.00	-28.15	-26.18
5	14.45829	11.03	20.78	13.22	31.81	24.25	60.00	50.00	-28.19	-25.75
6	16.22952	11.09	28.71	27.06	39.80	38.15	60.00	50.00	-20.20	-11.85

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 (dB μ V/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				
960-1000	49.5	43.5	47	37

Radiated Emissions Limits at 3 meters (dB μ V/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				
960-1000	60	54	57.5	47.5

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

6.2 Test Instruments

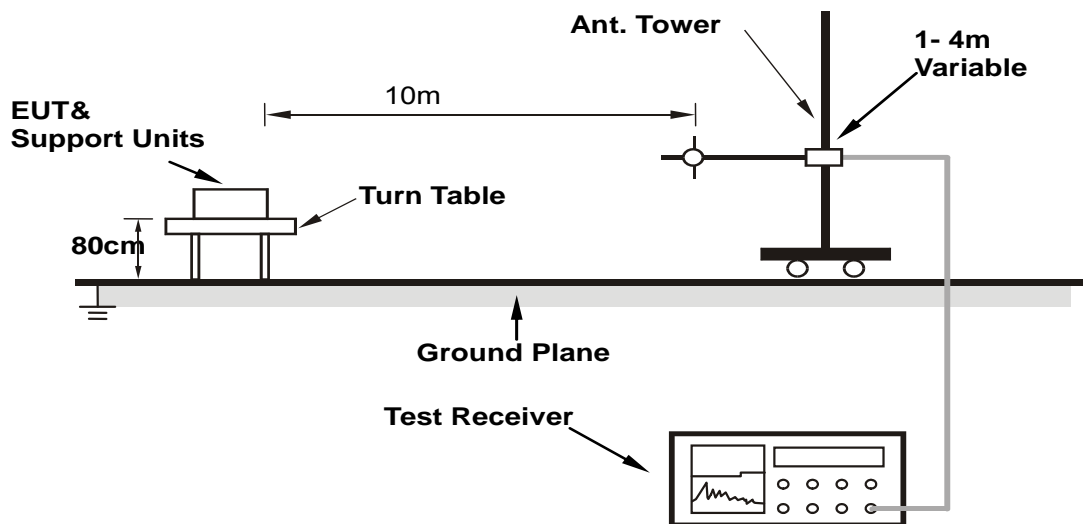
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100027	Dec. 4, 2017	Dec. 3, 2018
Schwarzbeck Bilog Antenna	VULB9168	9168-303	Nov. 29, 2017	Nov. 28, 2018
Agilent Preamplifier	8447D	2944A08119	Feb. 21, 2018	Feb. 20, 2019
ADT. Turn Table	TT100	0205	NA	NA
ADT. Tower	AT100	0205	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
ADT RF Switches BOX	EMH-011	1001	Oct. 25, 2018	Oct. 24, 2019
Pacific RF cable With 5dB PAD	8D	CABLE-ST2-01	Oct. 25, 2018	Oct. 24, 2019

- Notes:
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 Open Site No. 2.
 3. The VCCI Site Registration No. R-237.
 4. Tested Date: Nov. 12, 2018

6.3 Test Arrangement

- 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.
- The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- 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 120kHz for quasi-peak detection (QP) at frequency below 1GHz.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

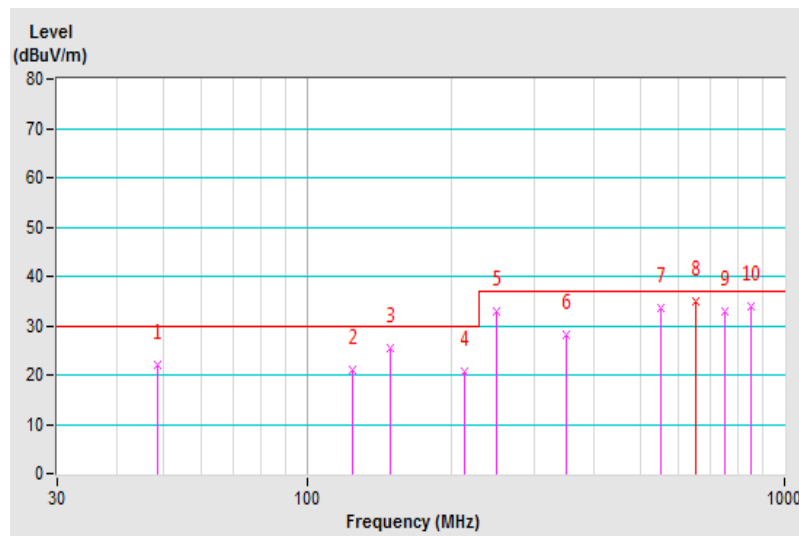
6.4 Test Results

Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 76%RH
Tested by	Paul Chen		
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	48.65	22.06 QP	30.00	-7.94	4.00 H	138	30.82	-8.76
2	125.00	21.18 QP	30.00	-8.82	4.00 H	199	31.75	-10.57
3	150.00	25.39 QP	30.00	-4.61	4.00 H	168	34.05	-8.66
4	213.06	20.83 QP	30.00	-9.17	4.00 H	267	33.04	-12.21
5	250.02	32.96 QP	37.00	-4.04	3.77 H	275	43.27	-10.31
6	350.01	28.11 QP	37.00	-8.89	3.32 H	274	35.38	-7.27
7	550.01	33.72 QP	37.00	-3.28	1.84 H	296	35.83	-2.11
8	650.01	34.85 QP	37.00	-2.15	1.25 H	267	34.86	-0.01
9	750.01	32.94 QP	37.00	-4.06	1.00 H	115	31.68	1.26
10	850.02	33.74 QP	37.00	-3.26	1.00 H	85	31.20	2.54

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

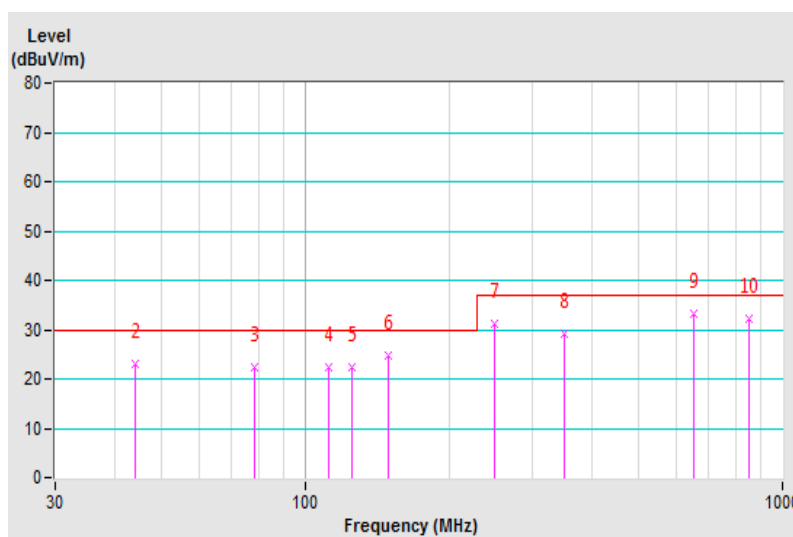


Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 76%RH
Tested by	Paul Chen		
Test Mode	Mode 1		

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	22.16	21.15 QP	30.00	-8.85	1.00 V	319	31.44	-10.29
2	44.26	23.16 QP	30.00	-6.84	1.07 V	294	31.98	-8.82
3	78.26	22.46 QP	30.00	-7.54	1.58 V	261	35.50	-13.04
4	112.36	22.44 QP	30.00	-7.56	1.00 V	188	34.27	-11.83
5	125.01	22.39 QP	30.00	-7.61	1.00 V	254	32.96	-10.57
6	150.01	24.59 QP	30.00	-5.41	1.00 V	218	33.25	-8.66
7	250.01	31.15 QP	37.00	-5.85	1.00 V	176	41.46	-10.31
8	350.01	29.16 QP	37.00	-7.84	1.00 V	13	36.43	-7.27
9	650.01	33.19 QP	37.00	-3.81	3.18 V	321	33.20	-0.01
10	850.01	32.19 QP	37.00	-4.81	2.45 V	250	29.65	2.54

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 (dB μ V/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	Avg: 43.5	Not defined	Not defined
Above 3000	Peak: 69.5	Peak: 63.5	Not defined	Not defined

Radiated Emissions Limits at 3 meters (dB μ V/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	Avg: 54	Avg: 56 Peak: 76	Avg: 50 Peak: 70
Above 3000	Peak: 80	Peak: 74	Avg: 60 Peak: 80	Avg: 54 Peak: 74

- Notes:
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dB μ V/m) = 20 log Emission level (uV/m).
 3. As shown in 15.35(b), for frequencies above 1000MHz, 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 20dB 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 40GHz, whichever is lower

7.2 Test Instruments

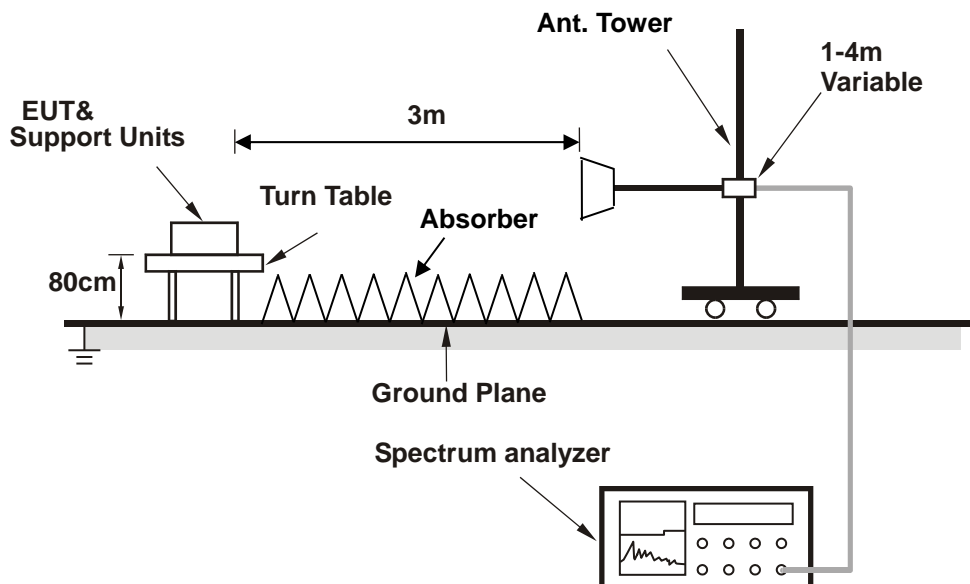
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Agilent Spectrum	E4446A	MY51100009	Jun. 4, 2018	Jun. 3, 2019
Agilent Test Receiver	N9038A	MY51210129	Feb. 6, 2018	Feb. 5, 2019
Agilent Preamplifier	8449B	3008A01201	Feb. 22, 2018	Feb. 21, 2019
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2018	Feb. 20, 2019
EMCI Preamplifier	EMC184045B	980235	Feb. 22, 2018	Feb. 21, 2019
Schwarzbeck Horn Antenna	BBHA-9170	212	Dec. 1, 2017	Nov. 30, 2018
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Dec. 12, 2017	Dec. 11, 2018
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V8.7.08	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Aug. 13, 2018	Aug. 12, 2019
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH8-02 (3.6m)	Aug. 13, 2018	Aug. 12, 2019
MICRO-TRONICS Notch filter	BRC50703-01	010	May 31, 2018	May 30, 2019
MICRO-TRONICS Band Pass Filter	BRM17690	005	May 31, 2018	May 30, 2019

- Notes: 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 Chamber No. 6.
3. The Industry Canada Reference No. IC 7450E-6.
4. The VCCI Site Registration No. G-257.
5. Tested Date: Nov. 19, 2018

7.3 Test Arrangement

- 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.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB 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.
- 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.
- 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 1MHz and video bandwidth is 3MHz for Peak detection (PK) at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.



* :depends on the EUT height and the antenna 3dB beamwidth both.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.4 Test Results

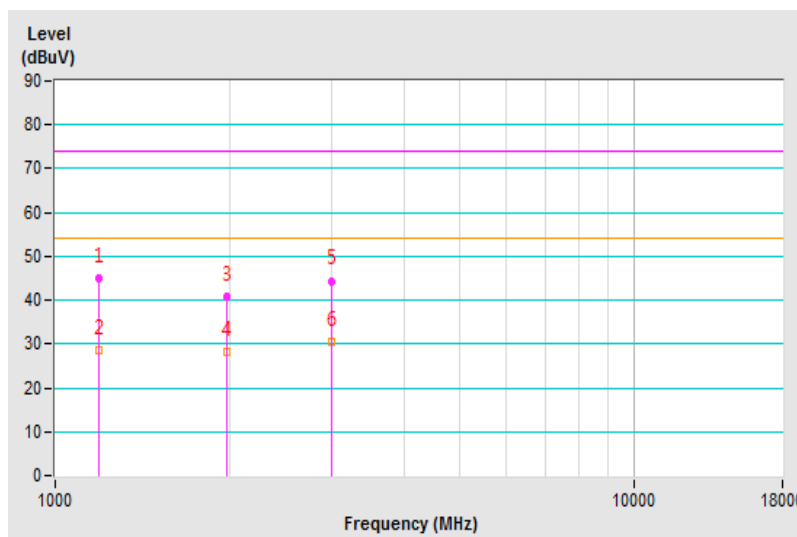
Frequency Range	1GHz ~ 5GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 79%RH
Tested by	Hermes Lin		
Test Mode	Mode 1		

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	1188.02	45.04 PK	74.00	-28.96	1.59 H	306	50.62	-5.58
2	1188.02	28.69 AV	54.00	-25.31	1.59 H	306	34.27	-5.58
3	1980.05	40.78 PK	74.00	-33.22	1.00 H	352	44.70	-3.92
4	1980.05	28.04 AV	54.00	-25.96	1.00 H	352	31.96	-3.92
5	2998.37	44.41 PK	74.00	-29.59	1.23 H	200	43.93	0.48
6	2998.37	30.63 AV	54.00	-23.37	1.23 H	200	30.15	0.48

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

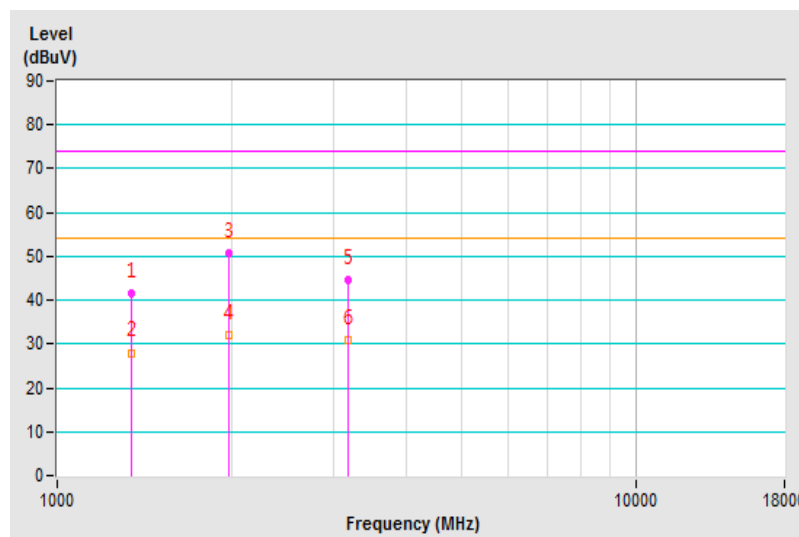


Frequency Range	1GHz ~ 5GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 79%RH
Tested by	Hermes Lin		
Test Mode	Mode 1		

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	1342.55	41.42 PK	74.00	-32.58	1.49 V	347	45.56	-4.14
2	1342.55	27.99 AV	54.00	-26.01	1.49 V	347	32.13	-4.14
3	1980.04	50.58 PK	74.00	-23.42	1.63 V	200	54.50	-3.92
4	1980.04	32.02 AV	54.00	-21.98	1.63 V	200	35.94	-3.92
5	3169.20	44.71 PK	74.00	-29.29	1.25 V	76	43.83	0.88
6	3169.20	30.85 AV	54.00	-23.15	1.25 V	76	29.97	0.88

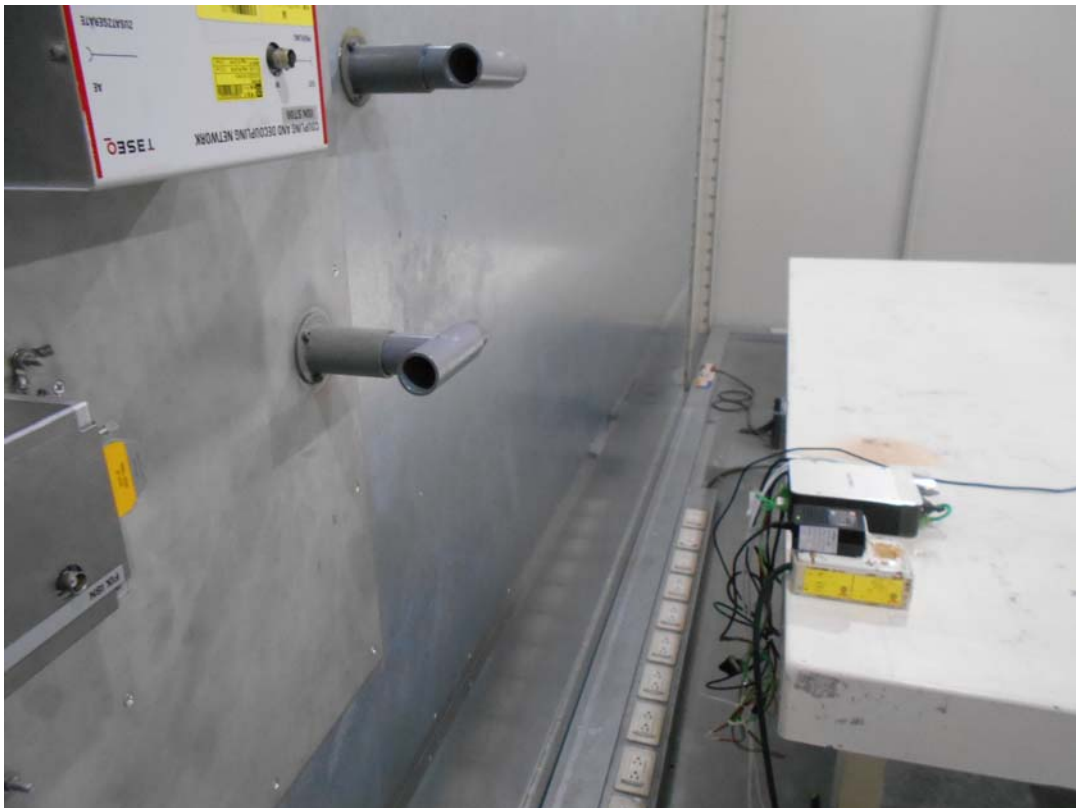
Remarks:

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

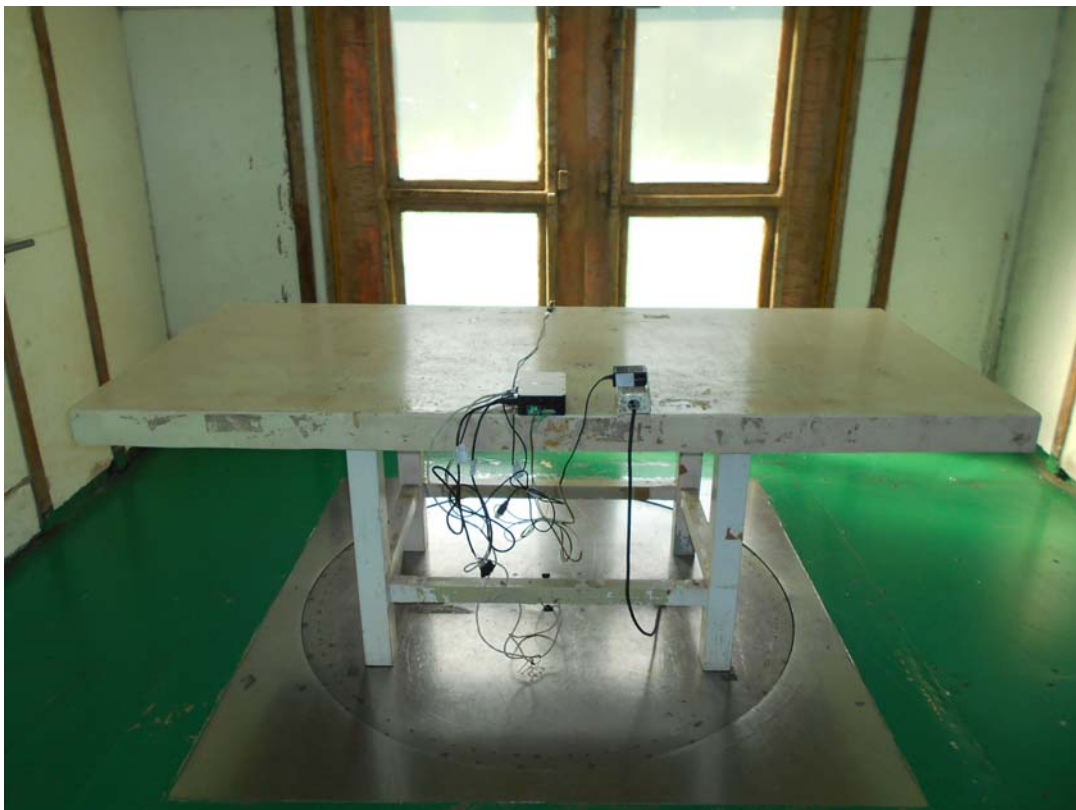


8 Pictures of Test Arrangements

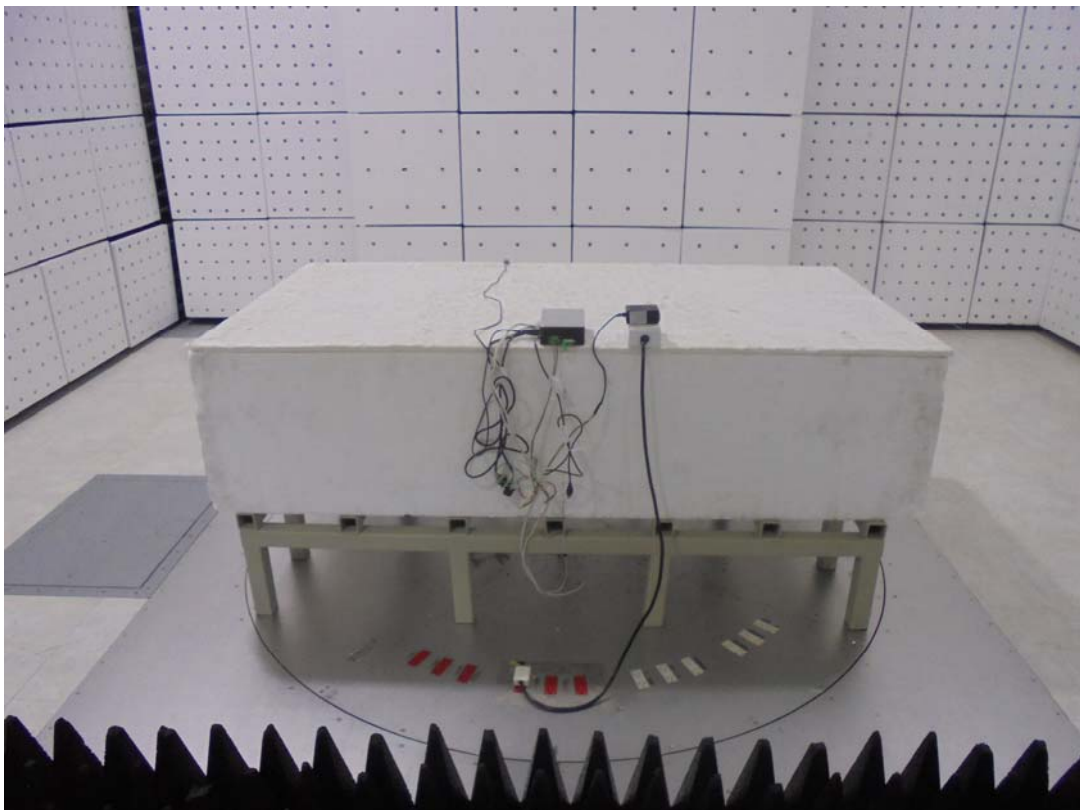
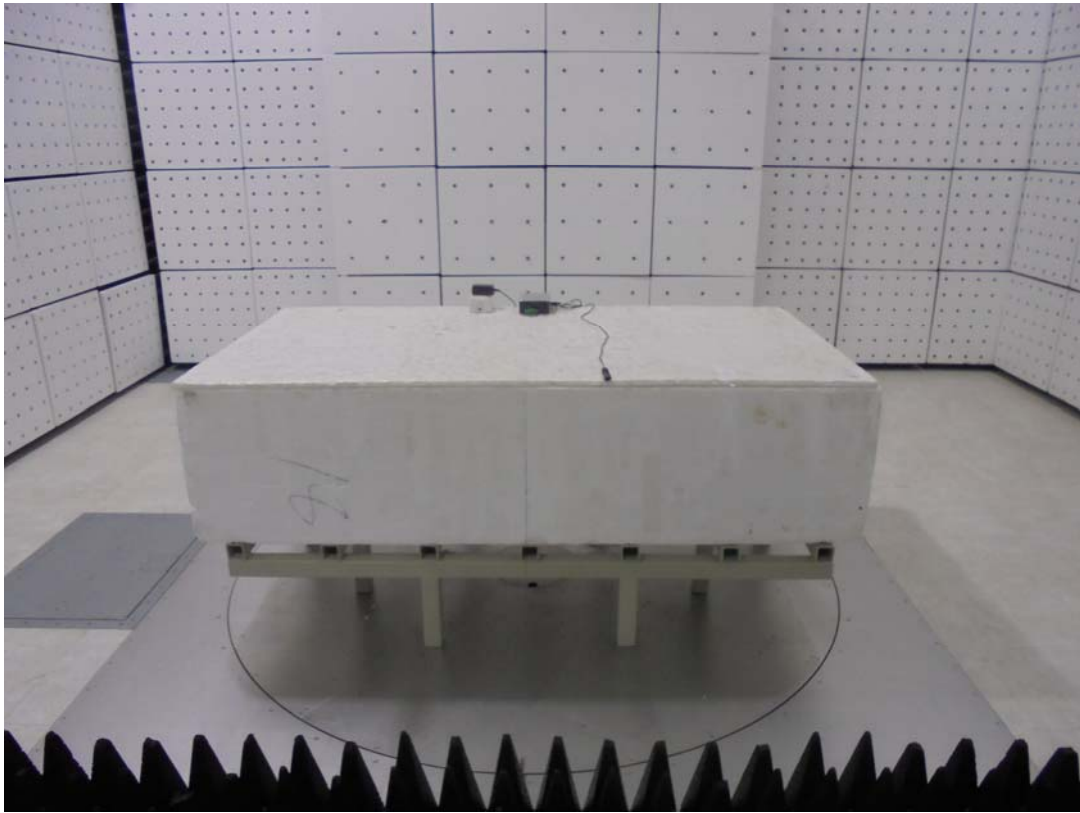
8.1 Conducted Emissions at Mains Ports



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 Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety/Telecom 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 ---