

## FCC Test Report

**Report No.:** FD190611D10

**Test Model:** SE-1004

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

**Received Date:** Jun. 11, 2019

**Test Date:** Jun. 17 to 19, 2019

**Issued Date:** Aug. 28, 2019

**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  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

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



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### Release Control Record

Issue No.	Description	Date Issued
FD190611D10	Original release.	Aug. 28, 2019

## 1 Certificate of Conformity

**Product:** PCI Express LAN Switch/PoE+ Expansion Card

**Brand:** Vecow

**Test Model:** SE-1004

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

**Sample Status:** Engineering sample

**Applicant:** Vecow Co., Ltd.

**Test Date:** Jun. 17 to 19, 2019

**Standards:** 47 CFR FCC Part 15, Subpart B, Class A  
ICES-003: 2016 Issue 6, updated Apr. 2019 Class A  
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:** Aug. 28, 2019  
Jessica Cheng / Senior Specialist

**Approved by :** \_\_\_\_\_ , **Date:** Aug. 28, 2019  
Jim Hsiang / Associate Technical Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart B / ICES-003: 2016 Issue 6, updated Apr. 2019 Class A

ANSI C63.4:2014

FCC Clause	ICES-003 Clause	Test Item	Result/Remarks	Verdict
15.107	6.1	AC Power Line Conducted Emissions	Minimum passing Class A margin is -17.95 dB at 14.55469 MHz	Pass
15.109	6.2.1	Radiated Emissions up to 1 GHz	Minimum passing Class A margin is -4.66 dB at 141.72 MHz	Pass
	6.2.2	Radiated Emissions above 1 GHz	Minimum passing Class A margin is -13.11 dB at 1000.08 MHz	Pass

Note:

1. There is no deviation to the applied test methods and requirements covered by the scope of this report.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.77 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.01 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.21 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 Description of EUT

Product	PCI Express LAN Switch/PoE+ Expansion Card
Brand	Vecow
Test Model	SE-1004
Series Model	SE-1XXXXXXXXXXXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)
Model Difference	Marketing Purpose
Sample Status	Engineering sample
Operating Software	N/A
Power Supply Rating	DC power from IPC
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT is a PCI Express LAN Switch/PoE+ Expansion Card with four LAN ports.
2. The EUT maximum data rate is 1Gbps.

#### 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

1. The EUT is consumes power from PC which designed with AC power of rating 100-240Vac, 50/60Hz. For radiated emission evaluation, 230Vac/50Hz (EN 50121-3-2), 120Vac/60Hz (for FCC Part 15) had been covered during the pre-test. The worst data was found at **230Vac/50Hz** and recorded in the applied test report. Then the other test items were tested at 120Vac/60Hz.
2. Test modes are presented in the report as below.

Mode	Test Condition	Input Power (System)
Conducted emission test		
1	EUT installed in IPC+ *IP Camera (100Mbps)	120Vac/ 60Hz
Radiated emission test		
1	EUT installed in IPC+ *IP Camera (100Mbps)	230Vac/50Hz

**Note\*:** As client's request, using the maximum data rate of IP camera (Supplied by client) is 100Mbps during the test.

### 3.4 Test Program Used and Operation Descriptions

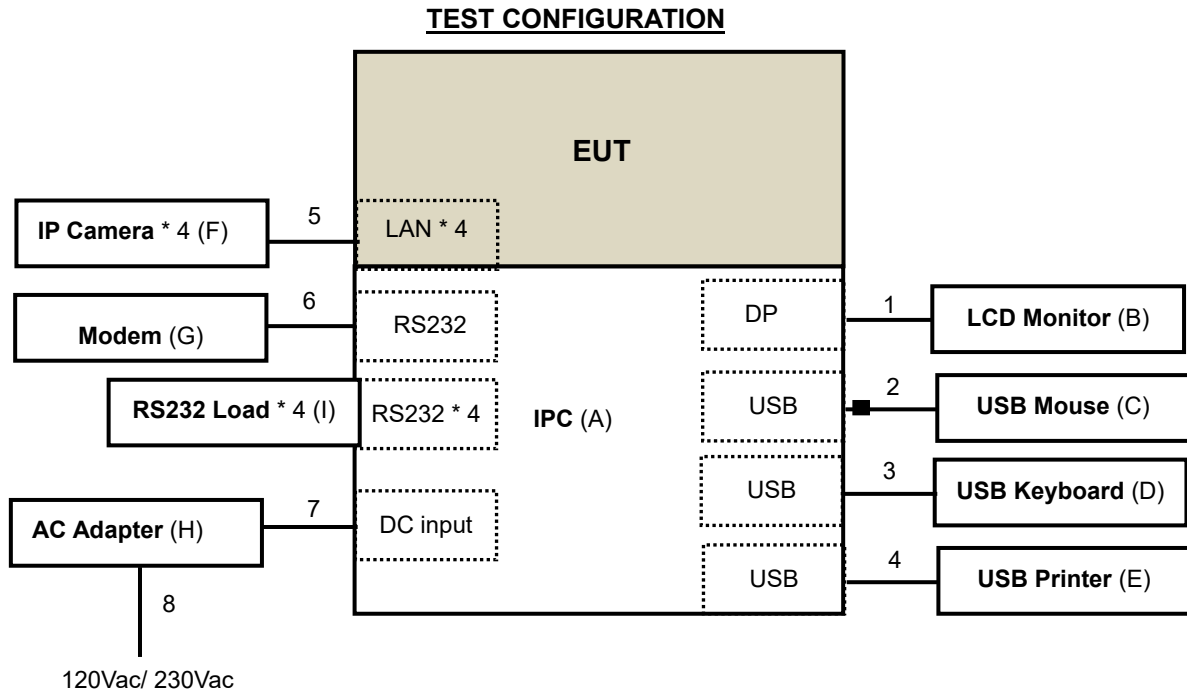
- a. Installed the EUT into IPC.
- b. Turned on the power of all equipment.
- c. IPC ran a test program to enable all functions.
- d. IPC read and wrote messages from/to HDD.
- e. IP camera ping IPC via EUT with four UTP LAN cables.
- f. IPC sent "H" messages to monitor then displayed these messages on its screen.
- g. IPC sent messages to printer and printer printed them out.
- h. IPC sent messages to modem.
- i. Steps d-h 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 1000 MHz, 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.	IPC	Vecow	RCS-9000	N/A	N/A	Supplied by client
B.	LCD Monitor	ASUS	MG28UQ	J1LMTF114786	N/A	Provided by Lab
C.	USB Mouse	Microsoft	1113	9170528318292	FCC DoC Approved	Provided by Lab
D.	USB KEYBOARD	Dell	KB216t	CN-0W33XP-LO300-7CL-1908	FCC DoC Approved	Provided by Lab
E.	Printer	HP	Officejet pro 251dw	N/A	N/A	Provided by Lab
F.	IP Camera*4	N/A	A301RZ-0309P	WXF1E84H2ASN	FCC DoC Approved	Supplied by client
G.	Modem	ACEEX	1414	0206026747	IFAXDM1414	Provided by Lab
H.	Adapter	Seasonic	SSA-1201-24	N/A	N/A	Supplied by client
I.	RS232 Load*4	N/A	N/A	N/A	N/A	Supplied by client

Note:

1. All power cords of the above support units are non-shielded (1.8m).

2. The rating of support unit H is as follows:

AC I/P: 100-240Vac, 2A, 50/60Hz

DC O/P: 24V/5A, 120W Max

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DP cable	1	1.8	Y	0	Provided by Lab
2.	USB cable	1	1.8	Y	1	Provided by Lab
3.	USB cable	1	1.8	Y	0	Provided by Lab
4.	USB cable	1	1.5	Y	0	Provided by Lab
5.	LAN cable (Cat.5e)	4	10	N	0	Provided by Lab
6.	RS232 cable	1	1.5	Y	0	Provided by Lab
7.	DC power	1	1.0	N	0	Supplied by client
8.	AC power cord	1	1.8	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

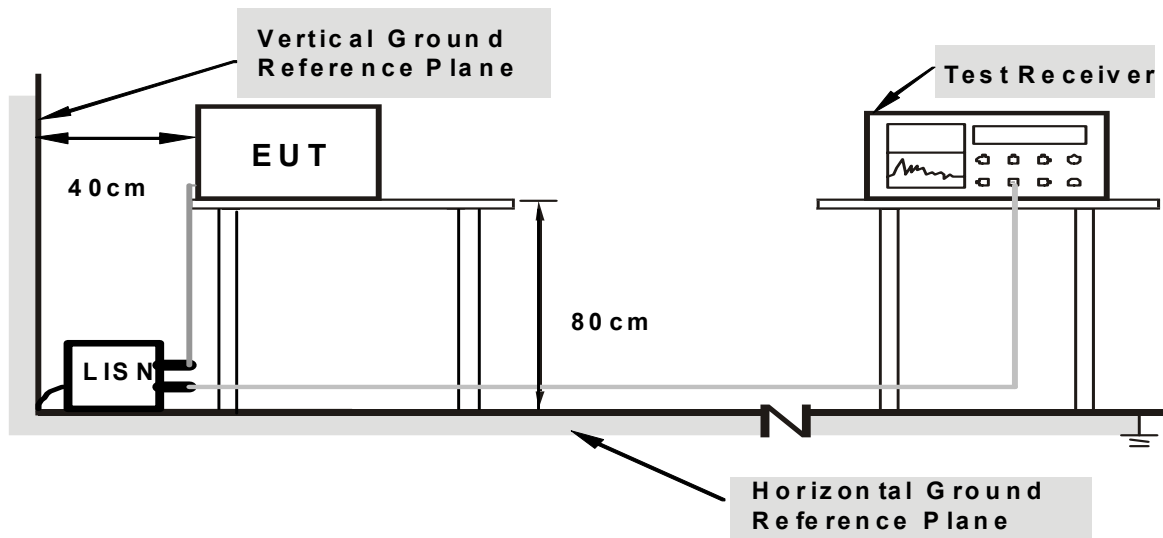
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	838251/021	Nov. 1, 2018	Oct. 31, 2019
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ENV216	101195	May 9, 2019	May 8, 2020
LISN With Adapter(for EUT)	101195	N/A	May 9, 2019	May 8, 2020
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	Jul. 26, 2018	Jul. 25, 2019
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 14, 2019	May 13, 2020
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK 8121	8121-808	Mar. 15, 2019	Mar. 14, 2020
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C03-01	Sep. 18, 2018	Sep. 17, 2019
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-300	Jan. 25, 2019	Jan. 24, 2020
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-301	Jan. 25, 2019	Jan. 24, 2020
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 21, 2018	Nov. 20, 2019
LISN With Adapter(for TV EUT)	100220	NA	Nov. 21, 2018	Nov. 20, 2019

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 Shielded Room No. 3.  
 3. The VCCI Site Registration No. C-10274.  
 4. Tested Date: Jun. 17, 2019

### 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.

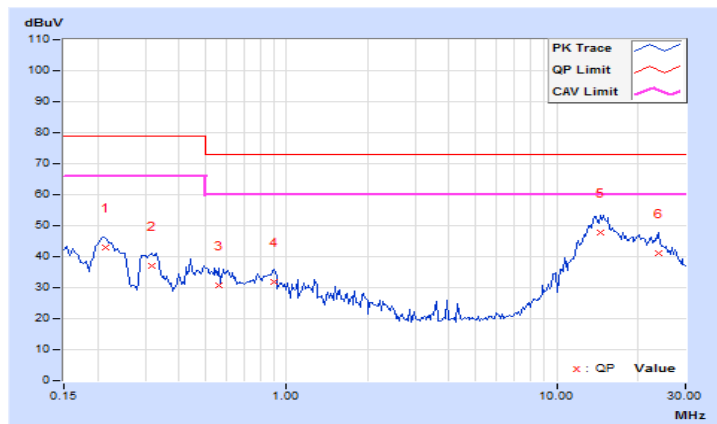
### 5.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	120Vac, 60Hz	Environmental Conditions	25°C, 71%RH
Tested by	John Liao		
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	0.21505	9.61	33.25	21.96	42.86	31.57	79.00	66.00	-36.14	-34.43
2	0.31798	9.62	27.32	13.36	36.94	22.98	79.00	66.00	-42.06	-43.02
3	0.56016	9.64	21.25	12.32	30.89	21.96	73.00	60.00	-42.11	-38.04
4	0.89872	9.67	22.36	14.10	32.03	23.77	73.00	60.00	-40.97	-36.23
<b>5</b>	<b>14.55469</b>	<b>9.90</b>	<b>37.85</b>	<b>32.15</b>	<b>47.75</b>	<b>42.05</b>	<b>73.00</b>	<b>60.00</b>	<b>-25.25</b>	<b>-17.95</b>
6	23.78639	9.94	31.23	24.26	41.17	34.20	73.00	60.00	-31.83	-25.80

**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

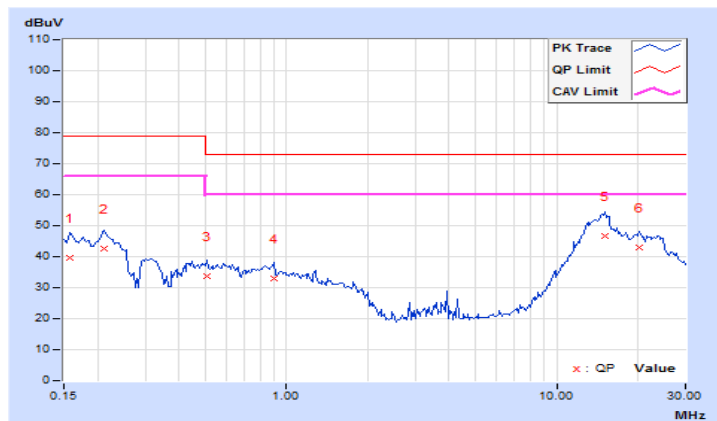


<b>Frequency Range</b>	150kHz ~ 30MHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 71%RH
<b>Tested by</b>	John Liao		
<b>Test Mode</b>	Mode 1		

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	0.15781	9.60	30.12	18.30	39.72	27.90	79.00	66.00	-39.28	-38.10
2	0.21252	9.60	32.99	22.12	42.59	31.72	79.00	66.00	-36.41	-34.28
3	0.50938	9.62	24.12	16.35	33.74	25.97	73.00	60.00	-39.26	-34.03
4	0.90002	9.65	23.32	15.99	32.97	25.64	73.00	60.00	-40.03	-34.36
5	15.07422	9.92	36.85	31.31	46.77	41.23	73.00	60.00	-26.23	-18.77
6	20.26172	9.97	33.12	28.63	43.09	38.60	73.00	60.00	-29.91	-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 (dB $\mu$ 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 $\mu$ 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 $\mu$ V/m) = 20 log Emission level (uV/m).
  3. QP detector shall be applied if not specified.

### 6.2 Test Instruments

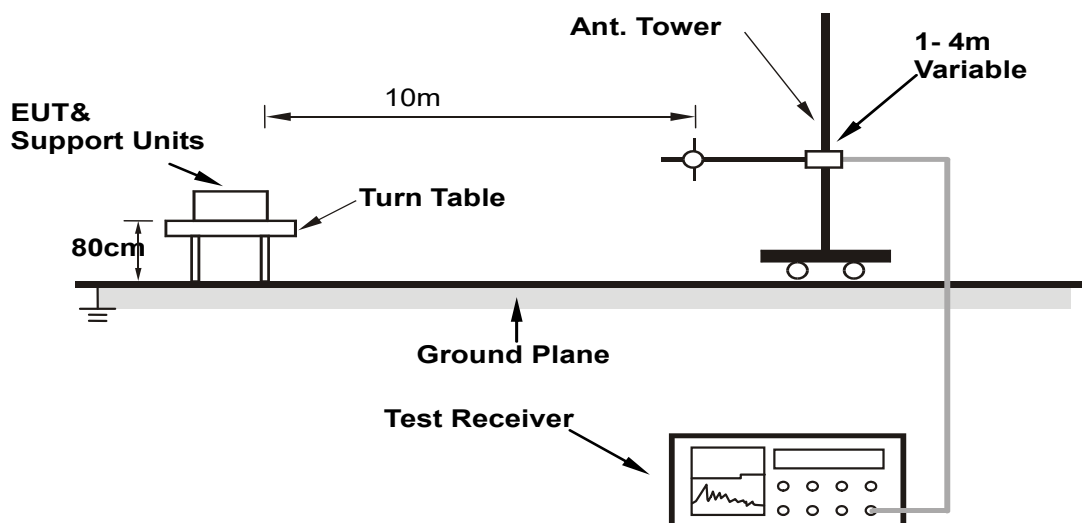
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCI	100612	Nov. 26, 2018	Nov. 25, 2019
SCHAFFNER BILOG Antenna	CBL6111D	22263	Nov. 23, 2018	Nov. 22, 2019
Sonoma Preamplifier	310N	352922	Feb. 19, 2019	Feb. 18, 2020
ADT. Turn Table	TT100	0401	NA	NA
ADT. Tower	AT100	0401	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
ADT RF Switches BOX	EMH-011	08004	Mar. 26, 2019	Mar. 25, 2020
WOKEN RF cable With 5dB PAD	8D	CABLE-ST4-01	Mar. 26, 2019	Mar. 25, 2020

- 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 Open Site No. 4.
  3. The VCCI Site Registration No. R-11038.
  4. Tested Date: Jun. 18, 2019

### 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 up to 1 GHz.

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



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

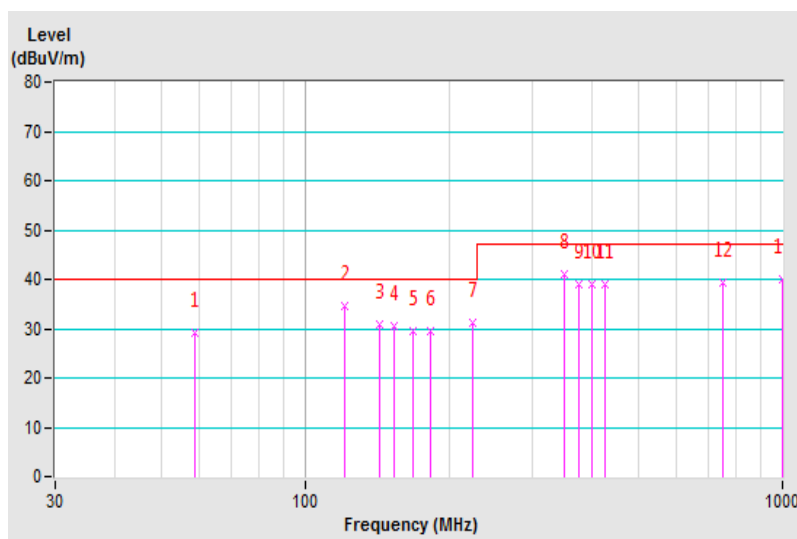
### 6.4 Test Results

<b>Frequency Range</b>	30MHz ~ 1GHz	<b>Detector Function &amp; Bandwidth</b>	Quasi-Peak (QP), 120kHz
<b>Tested by</b>	Adam Chen	<b>Environmental Conditions</b>	30°C, 61%RH
<b>Test Mode</b>	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	58.79	29.23 QP	40.00	-10.77	4.00 H	108	49.08	-19.85
2	121.48	34.69 QP	40.00	-5.31	4.00 H	353	48.71	-14.02
3	143.32	30.79 QP	40.00	-9.21	4.00 H	73	44.74	-13.95
4	153.64	30.53 QP	40.00	-9.47	4.00 H	205	44.89	-14.36
5	168.43	29.59 QP	40.00	-10.41	4.00 H	149	44.82	-15.23
6	183.27	29.54 QP	40.00	-10.46	4.00 H	38	45.11	-15.57
7	225.02	31.28 QP	40.00	-8.72	4.00 H	219	45.86	-14.58
8	350.00	41.05 QP	47.00	-5.95	2.41 H	249	51.61	-10.56
9	375.01	39.13 QP	47.00	-7.87	2.13 H	229	49.11	-9.98
10	400.00	38.82 QP	47.00	-8.18	2.03 H	213	47.84	-9.02
11	425.02	39.08 QP	47.00	-7.92	2.06 H	267	47.23	-8.15
12	750.01	39.43 QP	47.00	-7.57	1.00 H	164	41.06	-1.63
13	999.99	39.97 QP	47.00	-7.03	1.00 H	236	36.33	3.64

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

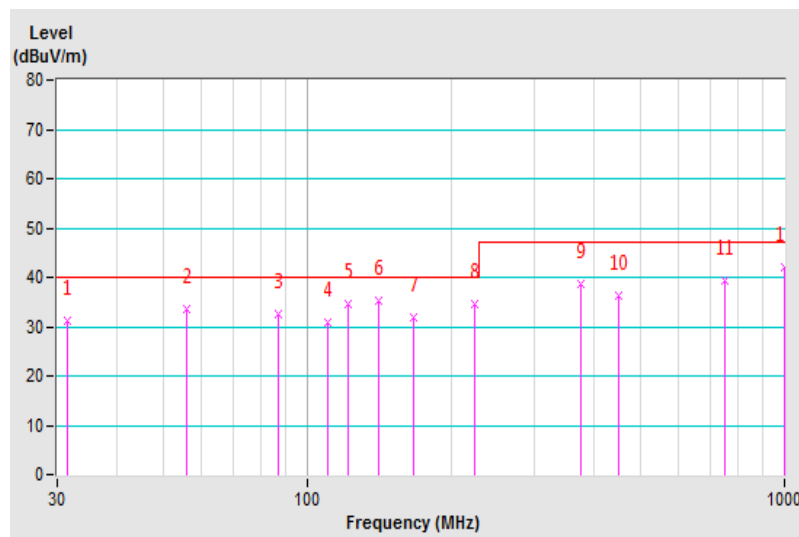


<b>Frequency Range</b>	30MHz ~ 1GHz	<b>Detector Function &amp; Bandwidth</b>	Quasi-Peak (QP), 120kHz
<b>Tested by</b>	Adam Chen	<b>Environmental Conditions</b>	30°C, 61%RH
<b>Test Mode</b>	Mode 1		

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	31.42	31.35 QP	40.00	-8.65	1.28 V	221	40.07	-8.72
2	55.83	33.67 QP	40.00	-6.33	1.59 V	94	53.42	-19.75
3	86.98	32.49 QP	40.00	-7.51	1.67 V	176	49.72	-17.23
4	110.34	30.68 QP	40.00	-9.32	1.00 V	324	45.49	-14.81
5	121.98	34.42 QP	40.00	-5.58	1.00 V	119	48.45	-14.03
<b>6</b>	<b>141.72</b>	<b>35.34 QP</b>	<b>40.00</b>	<b>-4.66</b>	<b>1.00 V</b>	<b>209</b>	<b>49.26</b>	<b>-13.92</b>
7	166.91	31.98 QP	40.00	-8.02	1.00 V	138	47.08	-15.10
8	225.00	34.46 QP	40.00	-5.54	1.00 V	329	49.04	-14.58
9	375.01	38.70 QP	47.00	-8.30	1.00 V	122	48.68	-9.98
10	450.02	36.25 QP	47.00	-10.75	1.00 V	257	44.10	-7.85
11	750.01	39.28 QP	47.00	-7.72	2.65 V	201	40.91	-1.63
12	999.98	42.15 QP	47.00	-4.85	1.98 V	23	38.51	3.64

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 $\mu$ 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 $\mu$ 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 $\mu$ 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

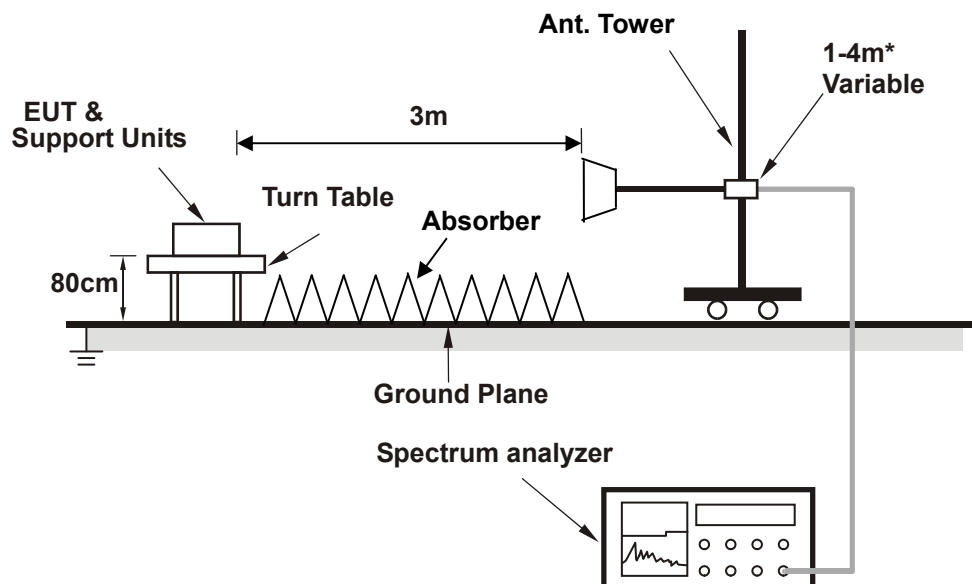
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Agilent Spectrum	E4446A	MY51100009	Jun. 6, 2019	Jun. 5, 2020
Agilent Test Receiver	N9038A	MY50010135	May 29, 2019	May 28, 2020
Agilent Preamplifier	8449B	3008A01924	Feb. 21, 2019	Feb. 20, 2020
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2019	Feb. 20, 2020
EMCI Preamplifier	EMC184045B	980235	Feb. 21, 2019	Feb. 20, 2020
ETS Preamplifier	3117-PA	00215857	Nov. 25, 2018	Nov. 24, 2019
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 25, 2018	Nov. 24, 2019
EMCO Horn Antenna	3115	9312-4192	Nov. 25, 2018	Nov. 24, 2019
Max Full. Turn Table & Tower	MF7802	MF780208103	NA	NA
Software	Radiated_V8.7.08	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF106-18	Cable-CH7-01	Aug. 13, 2018	Aug. 12, 2019
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH7-3.6m	Aug. 13, 2018	Aug. 12, 2019
MICRO-TRONICS Notch filter	BRC50703-01	010	May 30, 2019	May 29, 2020
MICRO-TRONICS Band Pass Filter	BRM17690	005	May 30, 2019	May 29, 2020

- 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 Chamber No. 7.
  3. The VCCI Site Registration No. G-10039
  4. Tested Date: Jun. 19, 2019

### 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.

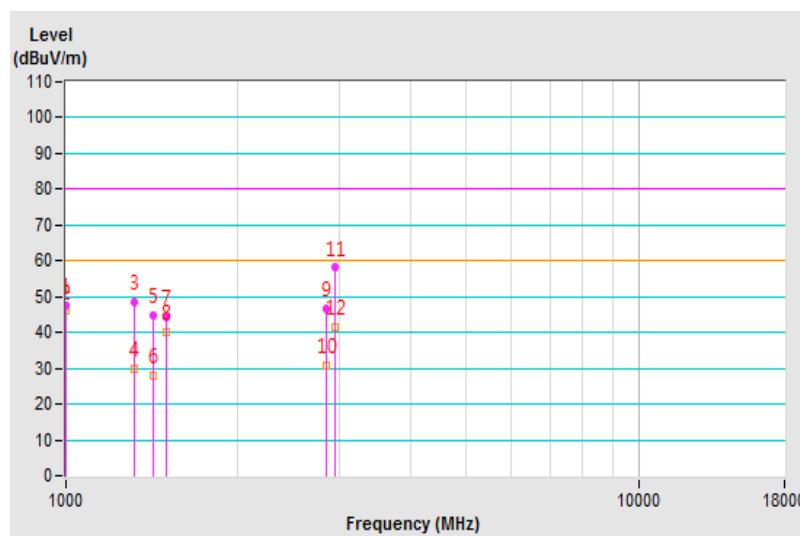
### 7.4 Test Results

<b>Frequency Range</b>	1GHz ~ 5GHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Peak (PK) / Average (AV), 1MHz
<b>Tested by</b>	Chenghan Wu	<b>Environmental Conditions</b>	28°C, 78%RH
<b>Test Mode</b>	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	1000.06	47.55 PK	80.00	-32.45	1.25 H	141	54.61	-7.06
2	1000.06	46.01 AV	60.00	-13.99	1.25 H	141	53.07	-7.06
3	1318.03	48.64 PK	80.00	-31.36	1.30 H	113	54.43	-5.79
4	1318.03	29.78 AV	60.00	-30.22	1.30 H	113	35.57	-5.79
5	1418.14	44.65 PK	80.00	-35.35	1.49 H	200	50.64	-5.99
6	1418.14	27.93 AV	60.00	-32.07	1.49 H	200	33.92	-5.99
7	1499.94	44.41 PK	80.00	-35.59	1.33 H	171	50.25	-5.84
8	1499.94	40.09 AV	60.00	-19.91	1.33 H	171	45.93	-5.84
9	2842.88	46.57 PK	80.00	-33.43	2.18 H	69	48.22	-1.65
10	2842.88	30.70 AV	60.00	-29.30	2.18 H	69	32.35	-1.65
11	2944.21	58.15 PK	80.00	-21.85	2.36 H	100	58.90	-0.75
12	2944.21	41.55 AV	60.00	-18.45	2.36 H	100	42.30	-0.75

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

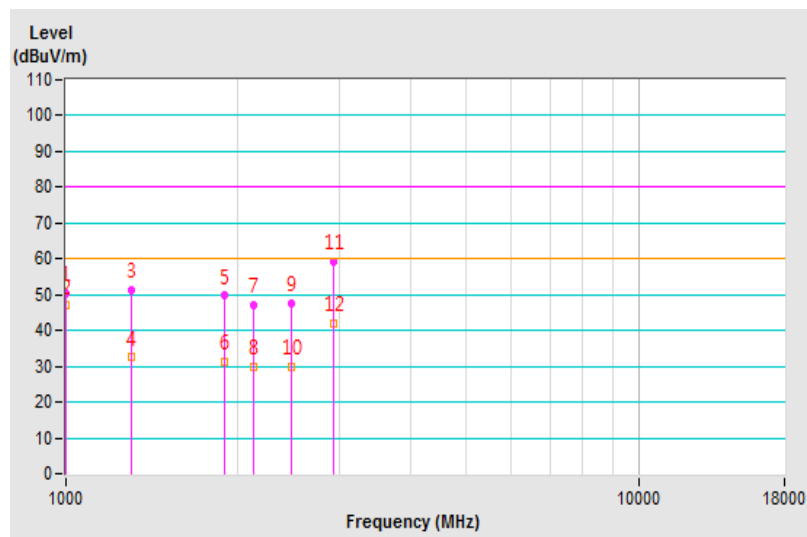


<b>Frequency Range</b>	1GHz ~ 5GHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Peak (PK) / Average (AV), 1MHz
<b>Tested by</b>	Chenghan Wu	<b>Environmental Conditions</b>	28°C, 78%RH
<b>Test Mode</b>	Mode 1		

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	1000.08	50.25 PK	80.00	-29.75	1.15 V	179	57.31	-7.06
<b>2</b>	<b>1000.08</b>	<b>46.89 AV</b>	<b>60.00</b>	<b>-13.11</b>	<b>1.15 V</b>	<b>179</b>	<b>53.95</b>	<b>-7.06</b>
3	1303.99	51.44 PK	80.00	-28.56	1.45 V	119	57.17	-5.73
4	1303.99	32.44 AV	60.00	-27.56	1.45 V	119	38.17	-5.73
5	1893.66	49.75 PK	80.00	-30.25	1.81 V	119	53.64	-3.89
6	1893.66	31.14 AV	60.00	-28.86	1.81 V	119	35.03	-3.89
7	2128.68	47.05 PK	80.00	-32.95	1.13 V	226	50.44	-3.39
8	2128.68	29.96 AV	60.00	-30.04	1.13 V	226	33.35	-3.39
9	2477.84	47.47 PK	80.00	-32.53	1.67 V	181	50.14	-2.67
10	2477.84	29.93 AV	60.00	-30.07	1.67 V	181	32.60	-2.67
11	2939.32	59.28 PK	80.00	-20.72	2.10 V	146	60.08	-0.80
12	2939.32	42.03 AV	60.00	-17.97	2.10 V	146	42.83	-0.80

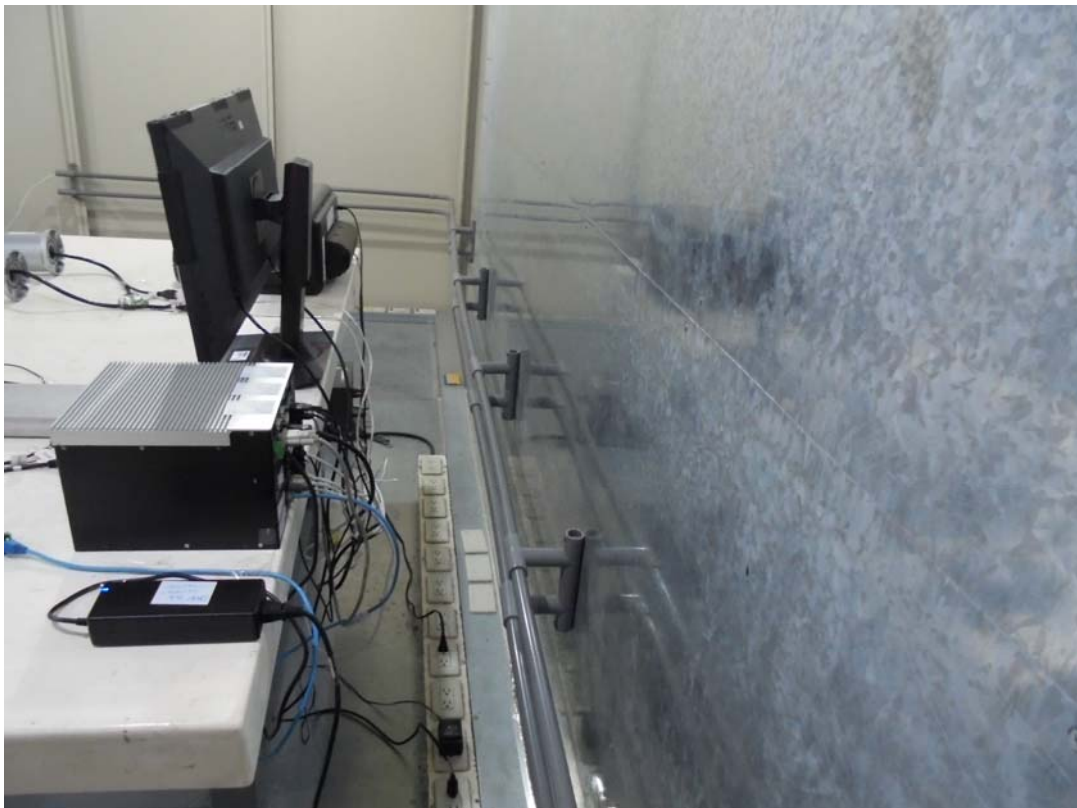
Remarks:

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 of 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.

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

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