

VCCI Test Report (VCCI 32-1)

Report No.: V161118D04

Test Model: IP8160-W

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Test Date: Nov. 25 ~ 28, 2016

Issued Date: Dec. 6, 2016

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Release Control Record

Issue No.	Description	Date Issued
V161118D04	Original release.	Dec. 6, 2016

2 Summary of Test Results

Emission				
Standard	Clause	Test Item	Result/Remarks	Verdict
VCCI-CISPR 32:2016	A.3	Conducted emission from the AC mains power port	Minimum passing Class B margin is -14.17 dB at 0.46250 MHz	Pass
VCCI-CISPR 32:2016	A.3	Asymmetric mode conducted emission at telecommunication ports	Without telecom port of the EUT	N/A
VCCI-CISPR 32:2016	A.2	Radiated emission 30-1000 MHz	Minimum passing Class B margin is -4.01 dB at 102.95 MHz	Pass
VCCI-CISPR 32:2016	A.2	Radiated emission above 1GHz	Minimum passing Class B margin is -15.38 dB at 2791.25 MHz	Pass

Note:

1. There is no deviation to the applied test methods and requirements covered by the scope of this report.
2. N/A: Not Applicable

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) (±)	Facility No. Registered to VCCI
Conducted disturbance at mains ports	150kHz ~ 30MHz	2.77 dB	C-1312
Radiated disturbance up to 1 GHz	30MHz ~ 1GHz	3.99 dB	R-237
Radiated disturbance above 1 GHz	Above 1GHz	4.92 dB	G-427

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 {applicant}, for detailed feature description, please refer to the manufacturer's specifications or user's manual.

3.2 General Description of EUT

Product	Network Camera
Brand	VIVOTEK
Model No.	IP8160-W
Sample Status	Engineering sample
Operating Software	N/A
Power Supply	Refer to table as below
Accessory Device	Adapter
Data Cable Supplied	N/A

Note:

1. The EUT is a Network Camera with built-in a wireless module.

2. The EUT uses following adapters.

Adapter 1	
Brand	HONOTO
Model	ADS-12EA-05 05010E
Input Power	100-240V, 50/60Hz, 0.3A
Output Power	5V, 2.0A
Power Line	AC 2 Pin Shielded USB cable (1.2m)
Adapter 2	
Brand	Zzu
Model	ZZU1001-200050U
Input Power	100-240V, 50-60Hz, 0.5A
Output Power	5V, 2.0A
Power Line	AC 2 Pin Shielded USB cable (1.2m)

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

1. The EUT was pre-tested under operating and standby condition and the worst emission level was found under **operating condition**.
2. The EUT is consumes DC power from AC adapter, which designed with AC power supply of rating 100-240Vac, 50/60Hz. For radiated emission evaluation, 230Vac/50Hz & 110Vac/60Hz (for EN 55032 & AS/NZS CISPR 32), 100Vac/50Hz (for VCCI), 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 100Vac/50Hz.
3. EUT has been pre-tested under following test modes, and test Pre-test mode 1 was the worst case for final test.

Pre-test Mode	Test Condition
1	EUT with adapter 1
2	EUT with adapter 2

4. Test modes are presented in the report as below.

Mode	Test Condition	Input Power
Conducted emission test		
1	EUT with adapter 1 + wireless function	100Vac/50Hz
2	EUT with adapter 2 + wireless function	100Vac/50Hz
Radiated emission test		
1	EUT with adapter 1 + wireless function	230Vac/50Hz

3.4 Test Program Used and Operation Descriptions

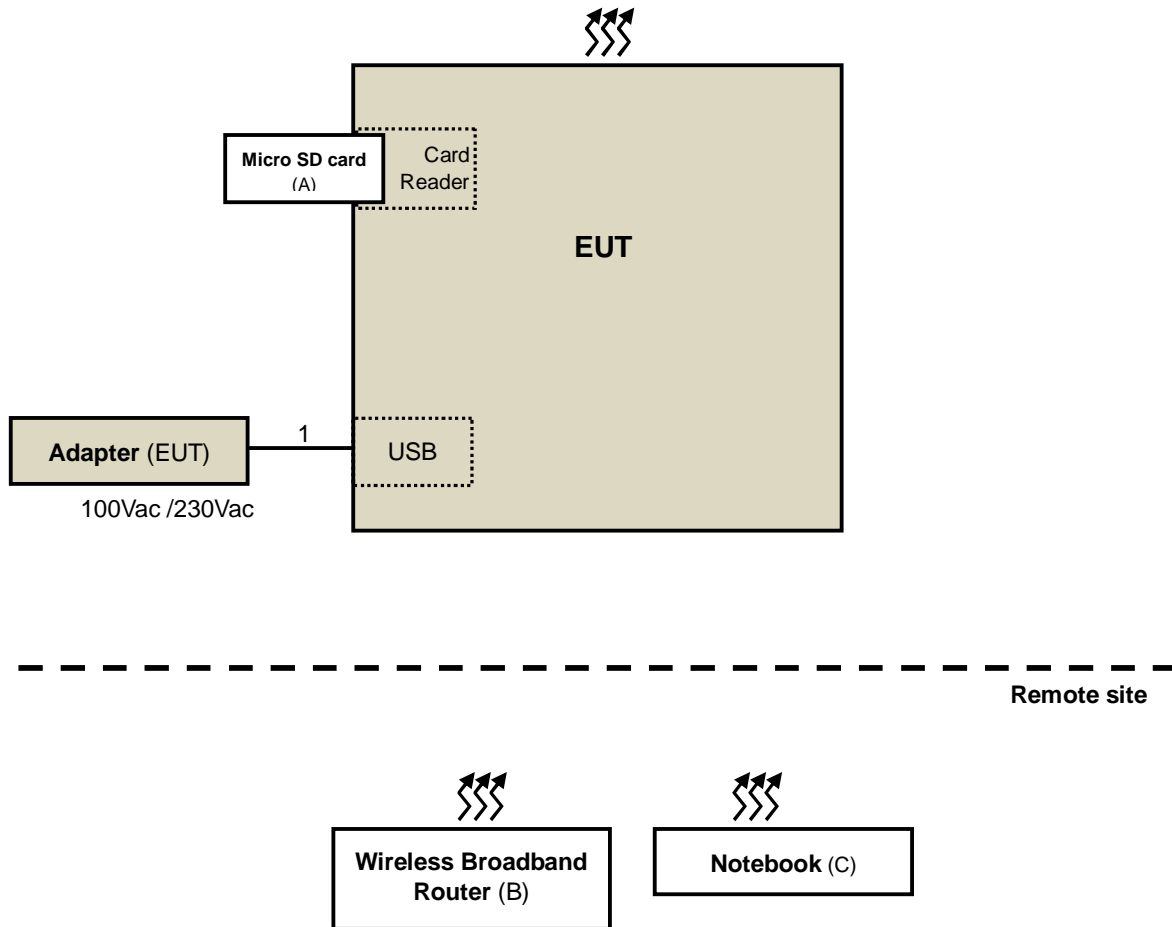
- a. Connected the EUT with AC adapter.
- b. Turned on the power of all equipment.
- c. EUT captured video signal.
- d. EUT captured video signal to notebook (kept in a remote area) then it displayed messages on its screen simultaneously via Wireless Broadband Router.
- e. Steps c-d were repeated.

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 2500 MHz, provided by VIVOTEK INC., 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.	Micro SD Card	SP	SPCTMV1W 16G	SP016GBSTH004V81	N/A	Provided by Lab
B.	Wireless Broadband Router	Netgear	D7000	4BC156B300005	N/A	Supplied by client
C.	Notebook PC	DELL	P41G	6BZY242	FCC DoC Approved	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	1.2	Y	0	Supplied by client

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

5 Conducted Emission from the AC Mains Power Port

5.1 Limits

VCCI-CISPR 32 Table clause	Frequency range (MHz)	Coupling device	Detector type / bandwidth	Class A limits (dBuV)
A9.1	0.15 - 0.5	AMN	Quasi-peak / 9kHz	79
	0.5 - 30.0			73
A9.2	0.15 - 0.5		Average / 9kHz	66
	0.5 - 30.0			60

VCCI-CISPR 32 Table clause	Frequency range (MHz)	Coupling device	Detector type / bandwidth	Class B limits (dBuV)
A10.1	0.15 - 0.5	AMN	Quasi-peak / 9kHz	66 - 56
	0.5 - 5			56
	5 - 30.0			60
A10.2	0.15 - 0.5		Average / 9kHz	56 - 46
	0.5 - 5			46
	5 - 30.0			50

5.2 Test Instruments

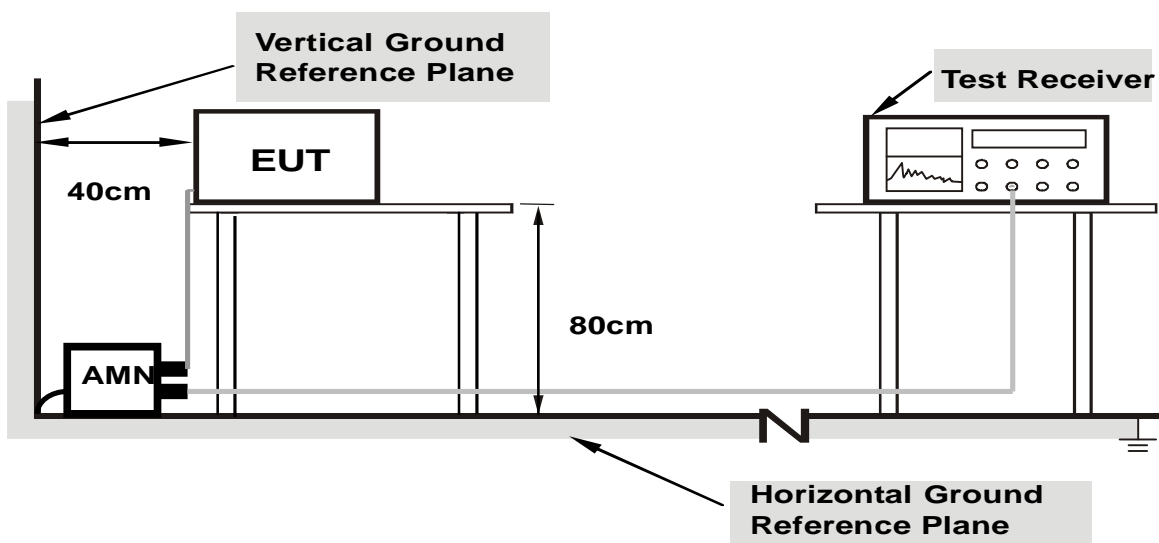
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100290	Dec. 24, 2015	Dec. 23, 2016
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 07, 2015	Dec. 06, 2016
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 07, 2015	Dec. 06, 2016
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 27, 2016	Oct. 26, 2017
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 04, 2016	May 03, 2017
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C09.01	Feb. 23, 2016	Feb. 22, 2017
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 12, 2016	May 11, 2017
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 08, 2016	Nov. 07, 2017
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 08, 2016	Nov. 07, 2017

- 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. 25, 2016.

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 Artificial Mains Network (AMN). Other support units were connected to the power mains through another AMN. The two AMNs 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 AMN.
 - The distance specified between EUT/AE and other metallic objects is ≥ 0.8 m in the measurement arrangement for table-top EUT.

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

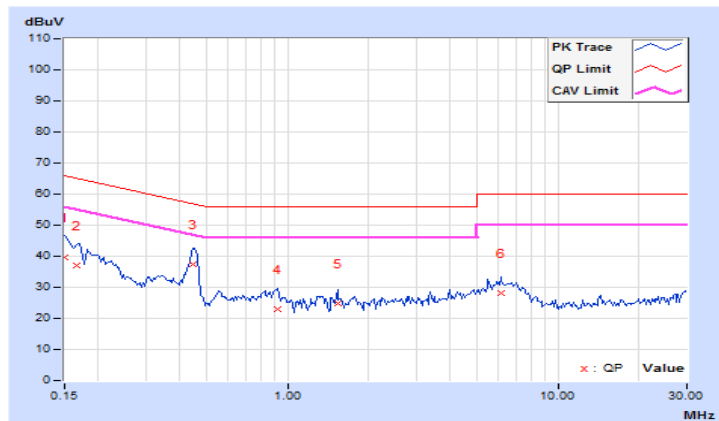
5.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	Environmental Conditions	24°C, 73%RH, 1005mbar
Tested by	ED. Lin		
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	0.15000	10.24	29.46	11.43	39.70	21.67	66.00	56.00	-26.30	-34.33
2	0.16562	10.25	26.88	10.90	37.13	21.15	65.18	55.18	-28.05	-34.03
3	0.44943	10.26	27.33	19.62	37.59	29.88	56.89	46.89	-19.30	-17.01
4	0.92344	10.35	12.54	5.73	22.89	16.08	56.00	46.00	-33.11	-29.92
5	1.53516	10.43	14.34	7.02	24.77	17.45	56.00	46.00	-31.23	-28.55
6	6.13672	10.77	17.23	6.99	28.00	17.76	60.00	50.00	-32.00	-32.24

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

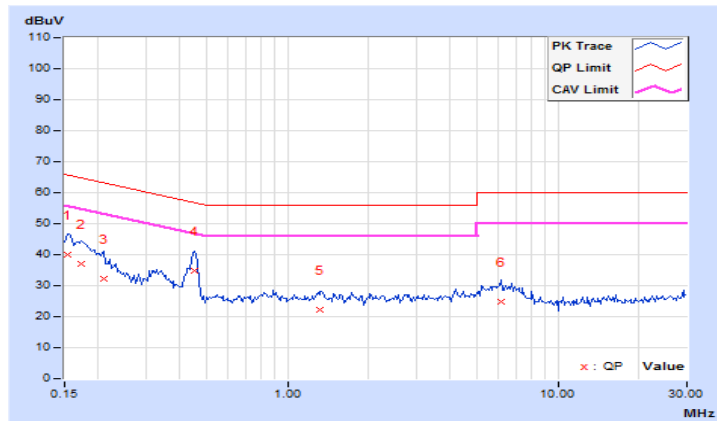


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	Environmental Conditions	24°C, 73%RH, 1005mbar
Tested by	ED. Lin		
Test Mode	Mode 1		

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	10.26	29.92	10.73	40.18	20.99	65.79	55.79	-25.61	-34.80
2	0.17344	10.25	26.73	8.61	36.98	18.86	64.79	54.79	-27.81	-35.93
3	0.20859	10.23	21.89	5.72	32.12	15.95	63.26	53.26	-31.14	-37.31
4	0.45078	10.21	24.76	19.06	34.97	29.27	56.86	46.86	-21.89	-17.59
5	1.32031	10.33	12.04	3.36	22.37	13.69	56.00	46.00	-33.63	-32.31
6	6.13672	10.74	14.10	6.27	24.84	17.01	60.00	50.00	-35.16	-32.99

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

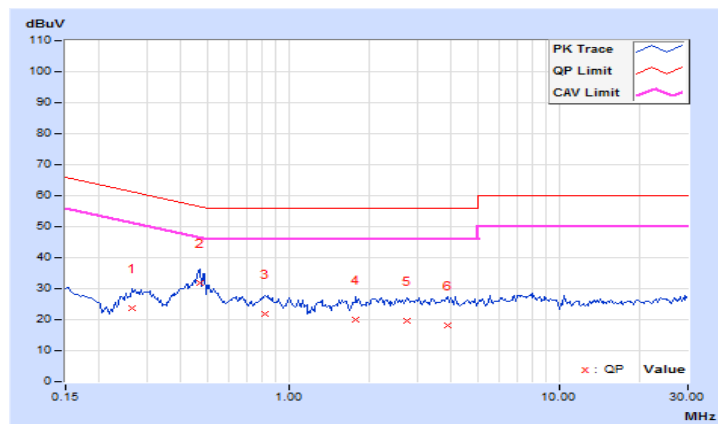


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	Environmental Conditions	24°C, 73%RH, 1005mbar
Tested by	ED. Lin		
Test Mode	Mode 2		

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	0.26328	10.27	13.51	8.85	23.78	19.12	61.33	51.33	-37.55	-32.21
2	0.47031	10.26	21.71	14.76	31.97	25.02	56.51	46.51	-24.54	-21.49
3	0.81406	10.33	11.36	6.22	21.69	16.55	56.00	46.00	-34.31	-29.45
4	1.76953	10.47	9.48	3.29	19.95	13.76	56.00	46.00	-36.05	-32.24
5	2.73828	10.56	9.02	1.59	19.58	12.15	56.00	46.00	-36.42	-33.85
6	3.87500	10.65	7.64	2.21	18.29	12.86	56.00	46.00	-37.71	-33.14

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

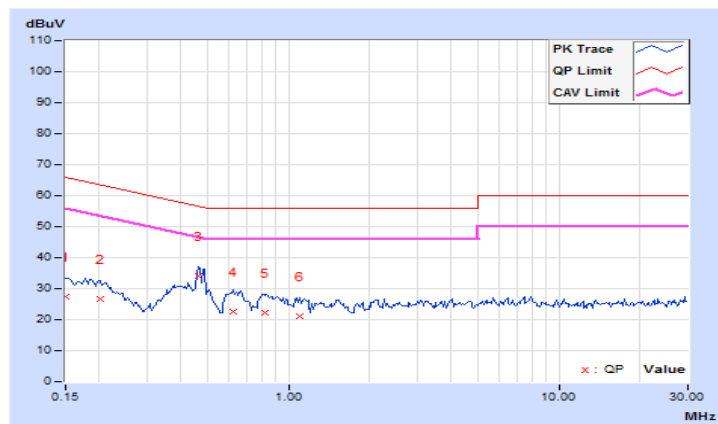


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	Environmental Conditions	24°C, 73%RH, 1005mbar
Tested by	ED. Lin		
Test Mode	Mode 2		

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	0.15001	10.26	17.10	10.07	27.36	20.33	66.00	56.00	-38.64	-35.67
2	0.20078	10.23	16.52	10.51	26.75	20.74	63.58	53.58	-36.83	-32.84
3	0.46250	10.21	23.70	22.27	33.91	32.48	56.65	46.65	-22.74	-14.17
4	0.62266	10.23	12.52	8.19	22.75	18.42	56.00	46.00	-33.25	-27.58
5	0.81797	10.26	12.13	7.96	22.39	18.22	56.00	46.00	-33.61	-27.78
6	1.10156	10.30	10.66	5.85	20.96	16.15	56.00	46.00	-35.04	-29.85

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 Emission at Frequencies up to 1GHz

6.1 Limits

For Class A Equipment

VCCI-CISPR 32 Table clause	Frequency range (MHz)	Distance (m)	Limits (dBuV/m)
A2.1	30 - 230	10	40
	230 - 1000		47
A2.2	30 - 230	3	50
	230 - 1000		57

For Class B Equipment

VCCI-CISPR 32 Table clause	Frequency range (MHz)	Distance (m)	Limits (dBuV/m)
A4.1	30 - 230	10	30
	230 - 1000		37
A4.2	30 - 230	3	40
	230 - 1000		47

6.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	845552/004	Sep. 19, 2016	Sep. 18, 2017
Schaffner Bilog Antenna	CBL6111D	22262	Jan. 07, 2016	Jan. 06, 2017
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	Feb. 15, 2016	Feb. 14, 2017
Pacific RF cable With 5dB PAD	8D	CABLE-ST2-01	Feb. 15, 2016	Feb. 14, 2017

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

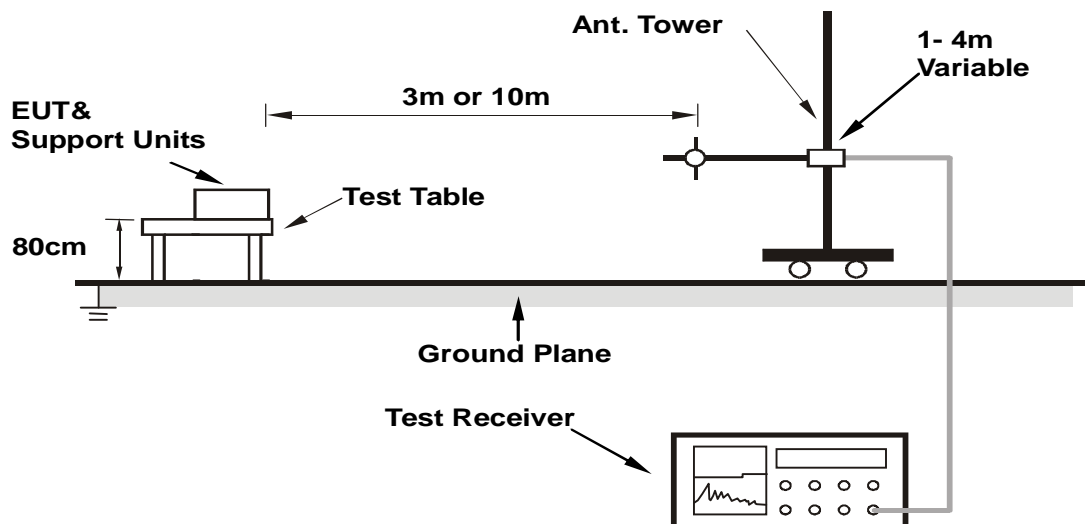
2. The test was performed in Open Site No. 2.
3. The VCCI Site Registration No. R-237.
4. The FCC Site Registration No. 90424.
5. Tested Date: Nov. 25, 2016.

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.
- The measurement distance is the shortest horizontal distance between an imaginary circular periphery just encompassing this arrangement and the calibration point of the antenna.



Note: Cable on the RGP must be insulated.

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

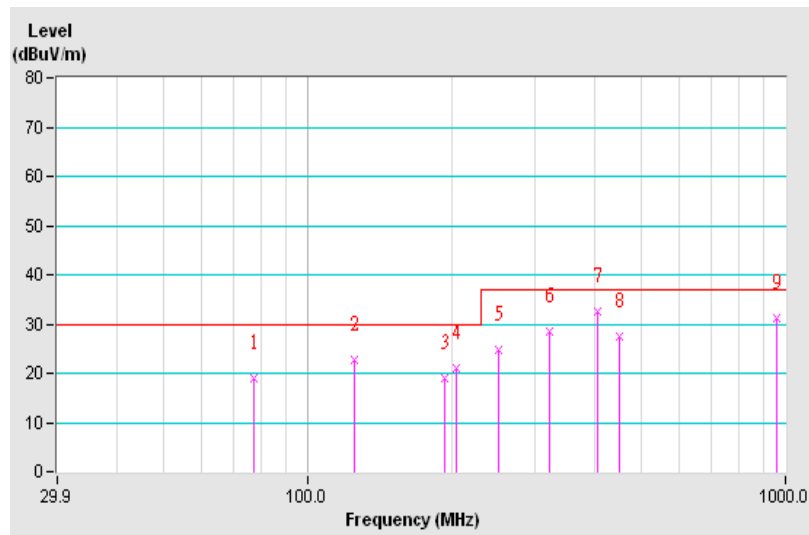
6.4 Test Results

Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Tested by	Vincent Lin	Environmental Conditions	25°C, 75%RH, 1005mbar
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	76.98	19.07 QP	30.00	-10.93	4.00 H	246	35.79	-16.72
2	125.43	22.73 QP	30.00	-7.27	4.00 H	260	34.38	-11.65
3	192.80	19.07 QP	30.00	-10.93	4.00 H	94	32.81	-13.74
4	204.20	21.18 QP	30.00	-8.82	4.00 H	189	34.60	-13.42
5	249.99	24.65 QP	37.00	-12.35	4.00 H	222	34.09	-9.44
6	320.08	28.48 QP	37.00	-8.52	4.00 H	322	36.74	-8.26
7	405.52	32.53 QP	37.00	-4.47	1.73 H	1	38.02	-5.49
8	450.25	27.49 QP	37.00	-9.51	1.73 H	62	32.53	-5.04
9	960.00	31.03 QP	37.00	-5.97	1.00 H	272	26.14	4.89

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



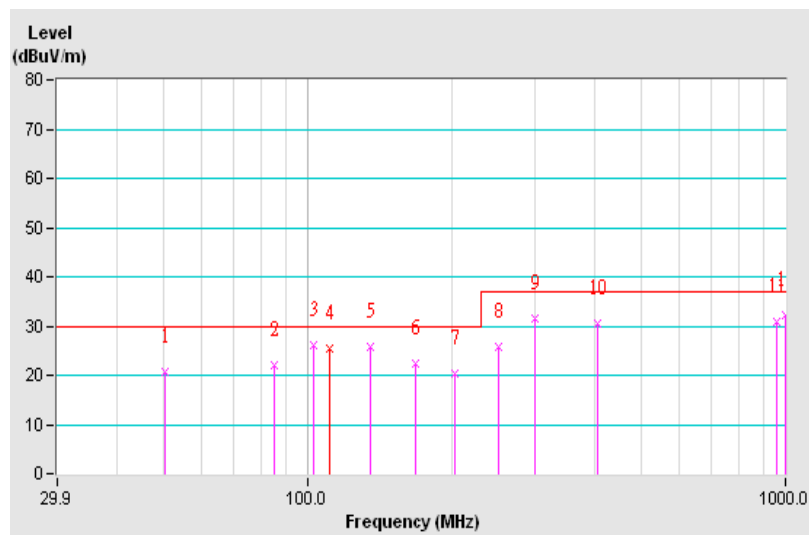
Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Tested by	Vincent Lin	Environmental Conditions	25°C, 75%RH, 1005mbar
Test Mode	Mode 1		

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	50.16	20.54 QP	30.00	-9.46	1.00 V	180	36.23	-15.69
2	84.95	22.15 QP	30.00	-7.85	1.00 V	97	37.81	-15.66
3	102.95	25.99 QP	30.00	-4.01	1.00 V	274	39.11	-13.12
4	110.80	25.56 QP	30.00	-4.44	1.00 V	124	38.14	-12.58
5	135.63	25.68 QP	30.00	-4.32	1.00 V	348	37.32	-11.64
6	167.68	22.22 QP	30.00	-7.78	1.00 V	211	35.43	-13.21
7	203.36	20.25 QP	30.00	-9.75	1.00 V	22	33.67	-13.42
8	250.00	25.69 QP	37.00	-11.31	1.00 V	49	35.13	-9.44
9	300.00	31.45 QP	37.00	-5.55	1.00 V	189	39.98	-8.53
10	405.51	30.38 QP	37.00	-6.62	3.68 V	95	35.87	-5.49
11	959.99	30.86 QP	37.00	-6.14	2.62 V	180	25.97	4.89
12	1000.00	32.33 QP	37.00	-4.67	2.97 V	298	27.24	5.09

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 Emission at Frequencies above 1GHz

7.1 Limits

For Class A Equipment

VCCI-CISPR 32 Table clause	Frequency range (MHz)	Distance (m)	Detector type	Limits (dBuV/m)
A3.1	1000 - 3000	3	Average	56
	3000 - 6000			60
A3.2	1000 - 3000		Peak	76
	3000 - 6000			80

For Class B Equipment

VCCI-CISPR 32 Table clause	Frequency range (MHz)	Distance (m)	Detector type	Limits (dBuV/m)
A5.1	1000 - 3000	3	Average	50
	3000 - 6000			54
A5.2	1000 - 3000		Peak	70
	3000 - 6000			74

Required highest frequency for radiated measurement

CISPR 32 Table clause	Highest internal frequency (F_x)	Highest measured frequency
1	$F_x \leq 108$ MHz	1 GHz
	$108 \text{ MHz} < F_x \leq 500$ MHz	2 GHz
	$500 \text{ MHz} < F_x \leq 1$ GHz	5 GHz
	$F_x > 1$ GHz	$5 \times F_x$ up to a maximum of 6 GHz

NOTE 1 For FM and TV broadcast receivers, F_x is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.

NOTE 2 F_x is highest fundamental frequency generated or used within the EUT or highest frequency at which it operates.

Where F_x is unknown, the radiated emission measurements shall be performed up to 6 GHz.

7.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Agilent Spectrum	E4446A	MY51100009	May 30, 2016	May 29, 2017
Agilent Test Receiver	N9038A	MY51210137	Jul. 27, 2016	Jul. 26, 2017
Agilent Preamplifier	8449B	3008A01292	Feb. 26, 2016	Feb. 25, 2017
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2016	Feb. 28, 2017
EMCI Preamplifier	EMC184045B	980235	Mar. 01, 2016	Feb. 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Jan. 08, 2016	Jan. 07, 2017
EMCO Horn Antenna	3115	6714	Jan. 19, 2016	Jan. 18, 2017
Max Full. Turn Table	MF7802	MF780208216	NA	NA
Software	Radiated_V8.7.08	NA	NA	NA
SUHNER RF cable With 3dB PAD	SF102	Cable-CH10-3.6m	Aug. 15, 2016	Aug. 14, 2017

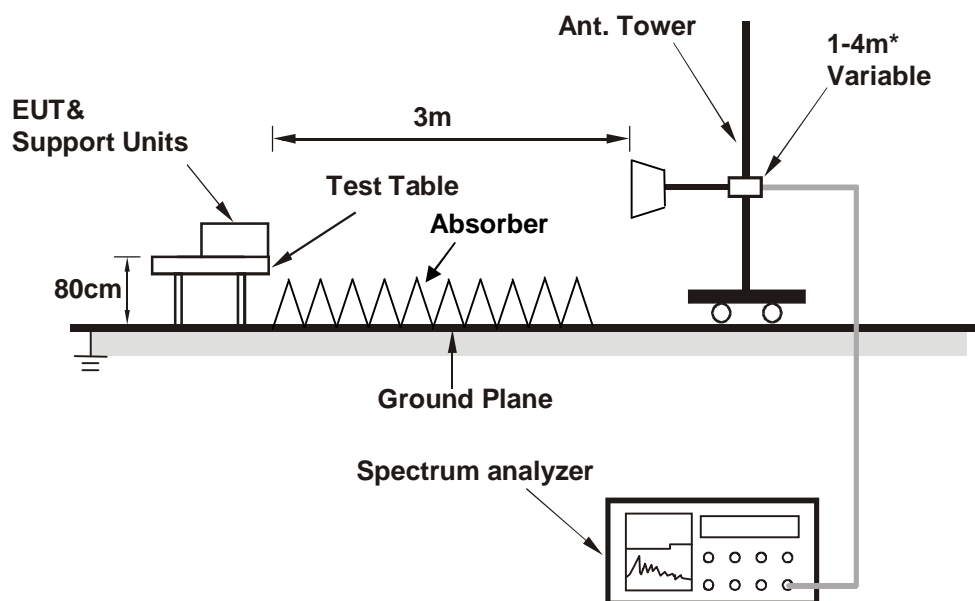
- Notes:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The 3dB beamwidth of the horn antenna is minimum 30 degree (or $w = 1.6m$ at 3m distance) for 1~6 GHz.
 3. The test was performed in Chamber No. 10.
 4. The Industry Canada Reference No. IC 7450E-11.
 5. The VCCI Site Registration No. G-427
 6. The FCC Site Registration No. 367016
 7. Tested Date: Nov. 28, 2016.

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.
- The measurement distance is the shortest horizontal distance between an imaginary circular periphery just encompassing this arrangement and the calibration point of the antenna.



Note: Cable on the RGP must to be insulated.

* :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.

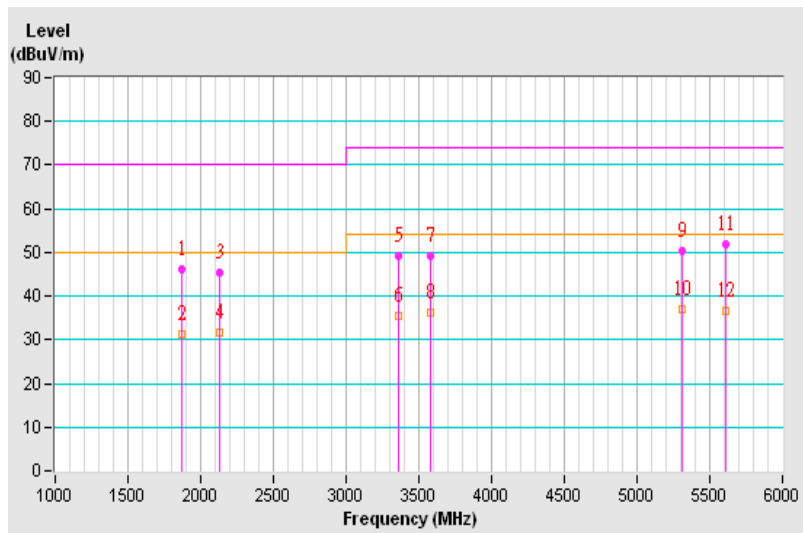
7.4 Test Results

Frequency Range	1GHz ~ 6GHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested by	Kobe Lu	Environmental Conditions	23°C, 72%RH, 1013mbar
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	1865.75	46.12 PK	70.00	-23.88	1.15 H	171	47.00	-0.88
2	1865.75	31.21 AV	50.00	-18.79	1.15 H	171	32.09	-0.88
3	2134.37	45.32 PK	70.00	-24.68	1.00 H	183	45.24	0.08
4	2134.37	31.48 AV	50.00	-18.52	1.00 H	183	31.40	0.08
5	3359.62	49.32 PK	74.00	-24.68	1.10 H	175	44.75	4.57
6	3359.62	35.35 AV	54.00	-18.65	1.10 H	175	30.78	4.57
7	3583.00	49.23 PK	74.00	-24.77	1.89 H	349	43.77	5.46
8	3583.00	36.17 AV	54.00	-17.83	1.89 H	349	30.71	5.46
9	5306.25	50.48 PK	74.00	-23.52	1.47 H	327	41.52	8.96
10	5306.25	36.88 AV	54.00	-17.12	1.47 H	327	27.92	8.96
11	5611.87	51.80 PK	74.00	-22.20	1.04 H	100	42.62	9.18
12	5611.87	36.71 AV	54.00	-17.29	1.04 H	100	27.53	9.18

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

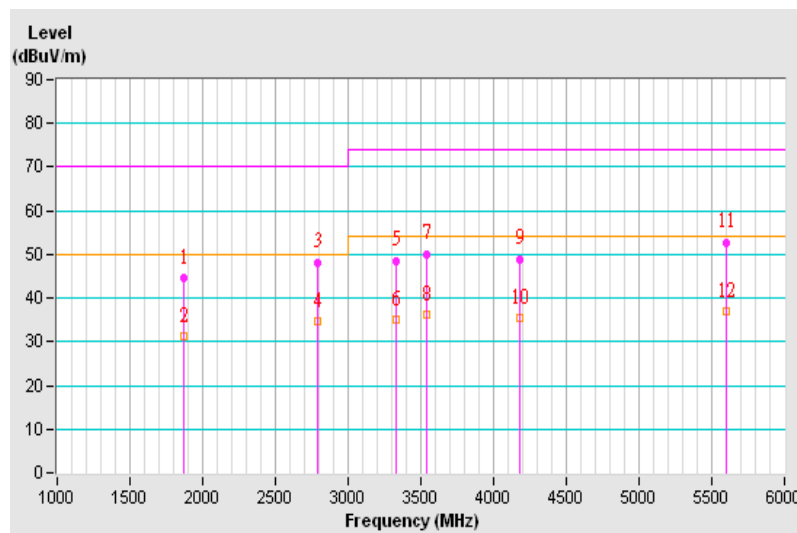


Frequency Range	1GHz ~ 6GHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested by	Kobe Lu	Environmental Conditions	23°C, 72%RH, 1013mbar
Test Mode	Mode 1		

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	1867.12	44.70 PK	70.00	-25.30	1.00 V	16	45.58	-0.88
2	1867.12	31.11 AV	50.00	-18.89	1.00 V	16	31.99	-0.88
3	2791.25	48.24 PK	70.00	-21.76	1.71 V	35	45.64	2.60
4	2791.25	34.62 AV	50.00	-15.38	1.71 V	35	32.02	2.60
5	3334.75	48.59 PK	74.00	-25.41	1.94 V	302	44.09	4.50
6	3334.75	35.23 AV	54.00	-18.77	1.94 V	302	30.73	4.50
7	3540.62	50.11 PK	74.00	-23.89	1.78 V	360	44.75	5.36
8	3540.62	36.10 AV	54.00	-17.90	1.78 V	360	30.74	5.36
9	4180.25	48.99 PK	74.00	-25.01	1.95 V	102	42.31	6.68
10	4180.25	35.44 AV	54.00	-18.56	1.95 V	102	28.76	6.68
11	5600.75	52.78 PK	74.00	-21.22	1.87 V	188	43.59	9.19
12	5600.75	36.84 AV	54.00	-17.16	1.87 V	188	27.65	9.19

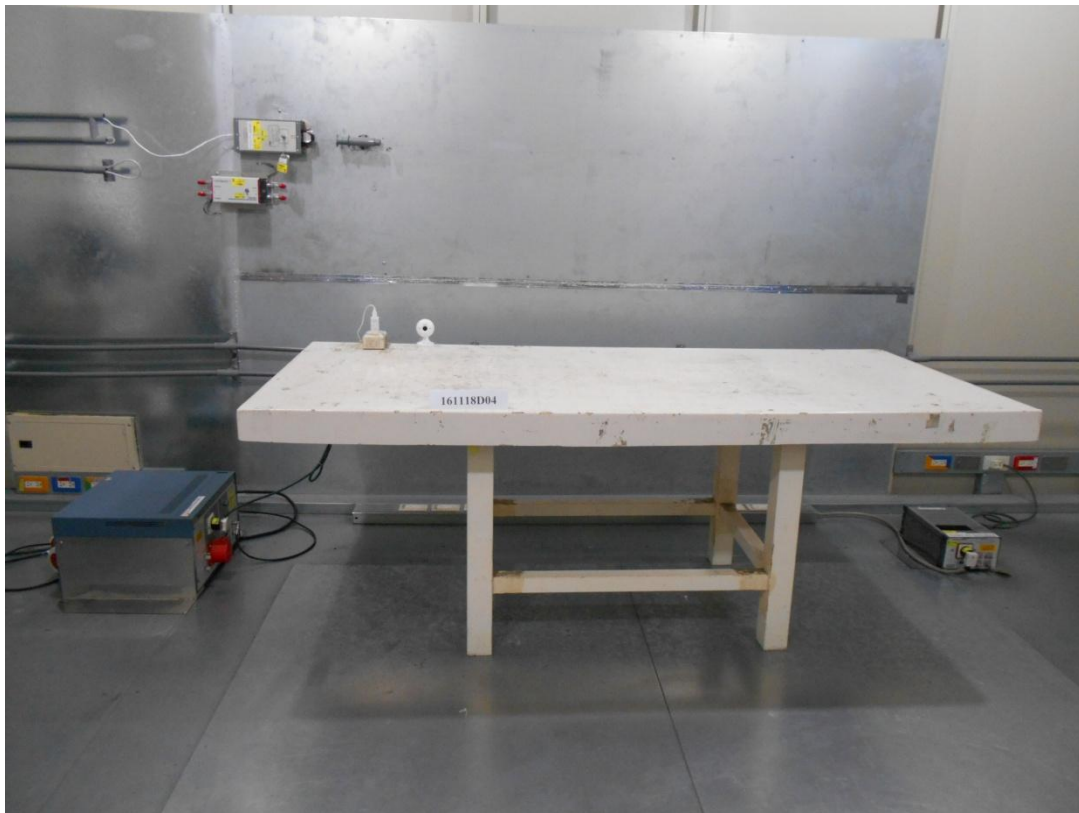
Remarks:

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

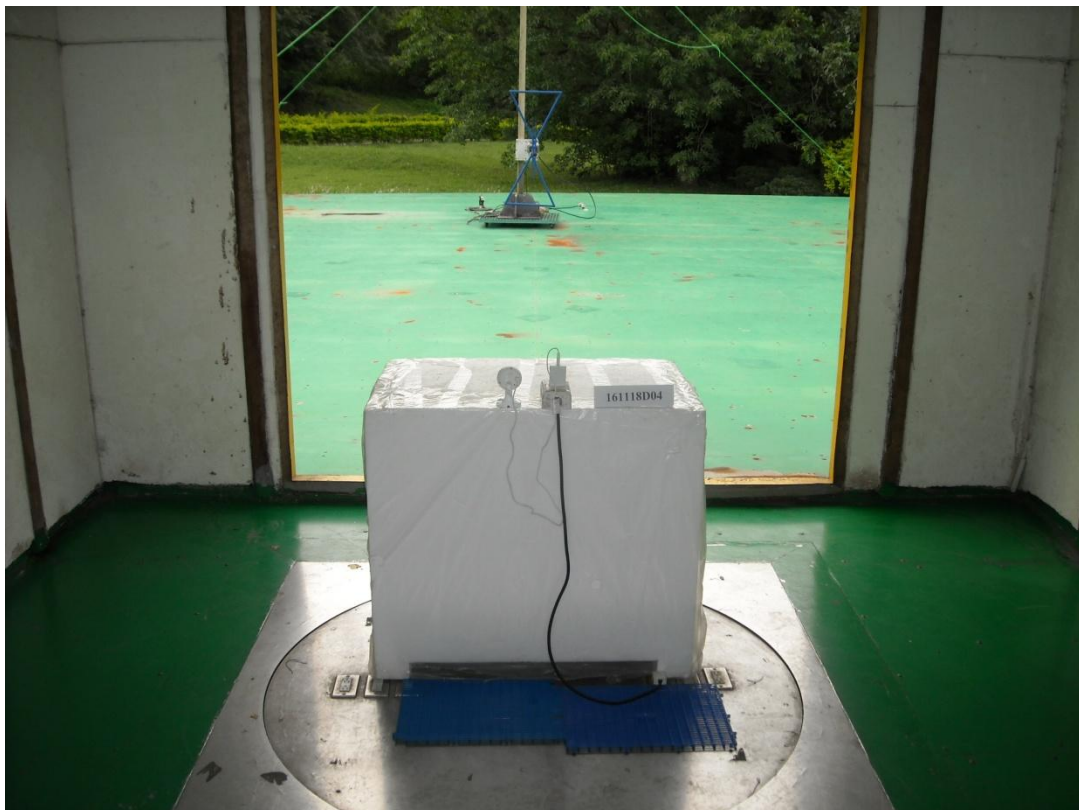
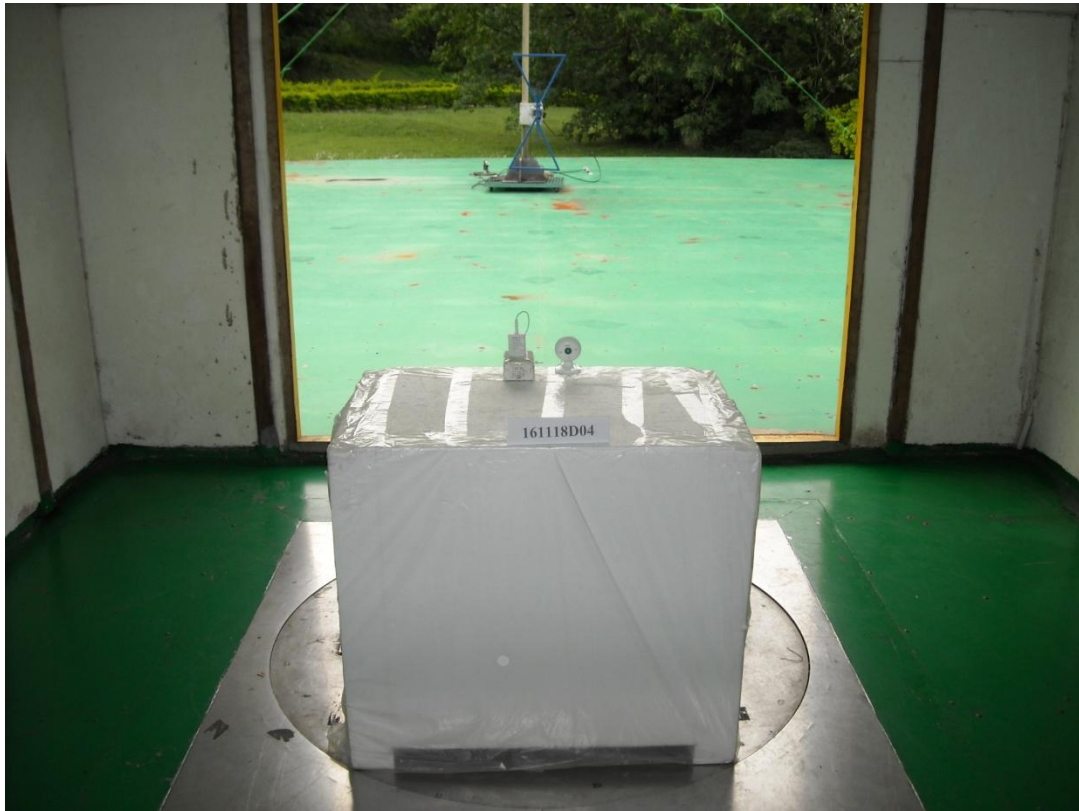


8 Pictures of Test Arrangements

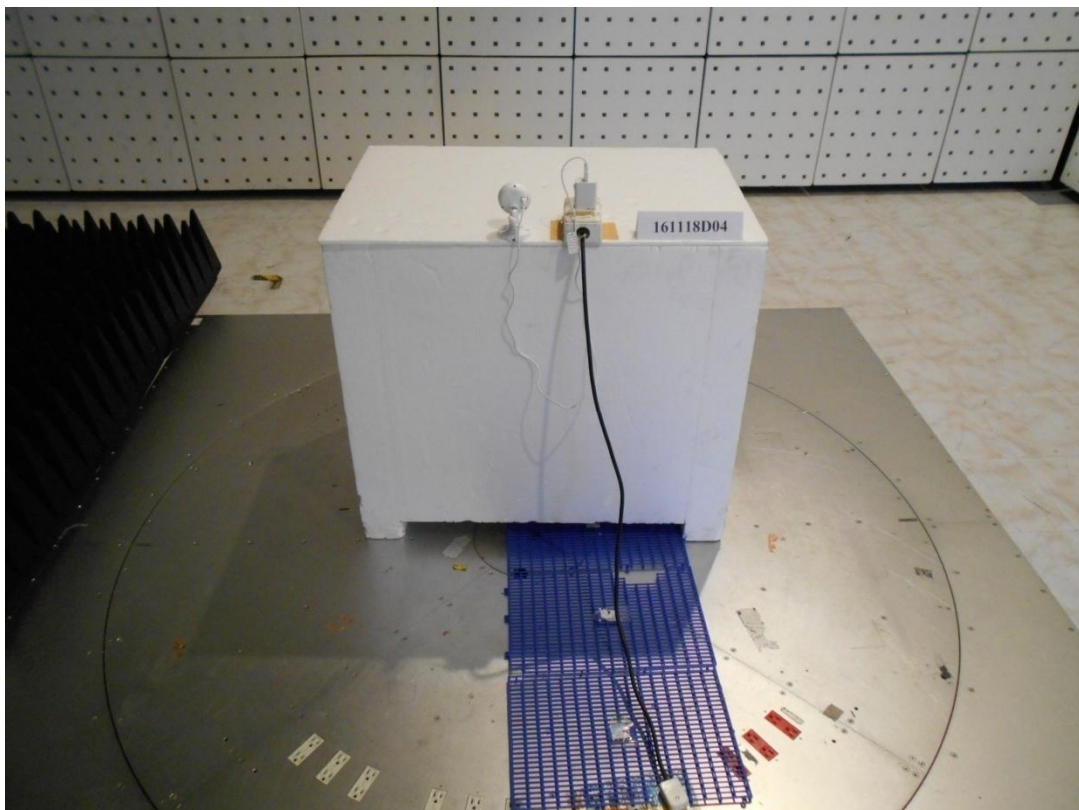
8.1 Conducted Emission from the AC Mains Power Port



8.2 Radiated Emission at Frequencies up to 1GHz



8.3 Radiated Emission at Frequencies above 1GHz



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 accredited and approved according to ISO/IEC 17025.

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

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Web Site: www.bureauVeritas-adt.com

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

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