VCCI Test Report (VCCI 32-1)

Report No.: V181017D21

Test Model: FD9187-H

Series Model: FD9187-HT

Received Date: Oct. 17, 2018

Test Date: Oct. 19 ~ Nov. 15, 2018

Issued Date: Nov. 16, 2018

Applicant: VIVOTEK INC.

VCCI member No.: 2443

Address: 6F, No.192, Lien-Cheng Rd., Chung-Ho , New Taipei City, 235, Taiwan, R.O.C.

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.)

Certificate #4327.01

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
V181017D21	Original release.	Nov. 16, 2018

1 Certificate of Conformity

Product:	Network Camera
Brand:	VIVOTEK
Test Model:	FD9187-H
Series Model:	FD9187-HT
Sample Status:	Engineering sample
Applicant:	VIVOTEK INC.
Test Date:	Oct. 19 ~ Nov. 15, 2018
Standards:	VCCI-CISPR 32:2016, Class B

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 : Sandra Lin , **Date:** Nov. 16, 2018

Sandra Lin / Specialist

Approved by : Jim Hsiang , **Date:** Nov. 16, 2018

Jim Hsiang / Associate Technical Manager

2 Summary of Test Results

Emission			
Standard	Test Item	Result/Remarks	Verdict
VCCI-CISPR 32:2016	Conducted emission from the AC mains power port	Minimum passing Class B margin is -10.30 dB at 0.36505 MHz	Pass
	Asymmetric mode conducted emission at telecommunication ports	Minimum passing Class B margin is -3.22 dB at 1.48923 MHz	Pass
	Radiated emission 30-1000 MHz	Minimum passing Class B margin is -3.72 dB at 168.01 MHz	Pass
	Radiated emission above 1GHz	Minimum passing Class B margin is -12.24 dB at 2159.98 MHz	Pass
	Disturbance Voltage at the Antenna Terminals Test	Without tuner port of the EUT	N/A

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	2.79 dB	C-1312
Asymmetric mode conducted emission at telecommunication ports using AAN	150kHz ~ 30MHz	3.94 dB	T-11587
Radiated emission, 30MHz ~ 1GHz	30MHz ~ 1GHz	3.97 dB	R-237
Radiated emission, 1GHz ~ 6GHz	Above 1GHz	5.08 dB	G-10427

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Description of EUT

Product	Network Camera
Brand	VIVOTEK
Test Model	FD9187-H
Series Model	FD9187-HT
Model Difference	Refer to note as below
Sample Status	Engineering sample
Operating Software	N/A
Power Supply Rating	Brand: HONOTO Model: ADS-26FSG-12 12018EPCU Input Power: 100-240Vac, 50/60Hz, 0.7A Output Power: 12V, 1A Power cord: AC 2 Pin Non- Shielding DC cable (3.0m)
Accessory Device	Adapter
Data Cable Supplied	N/A

Note:
The EUT is a Network Camera and it has two models, which are identical to each other except for zoom focus only, as follows:

Model	Difference
FD9187-H	Without Zoom Focus
FD9187-HT	With Zoom Focus

During the test, the Model: **FD9187-H** was selected as the representative one for the test and therefore only its test data were recorded in this report.

3.2 Features of EUT

The tests reported herein were performed according to the method specified by VIVOTEK INC., 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 was pre-tested under operating and standby condition and the worst emission level was found under **operating condition**.
2. The EUT consumes power from Adapter, which designed with AC power supply of rating 100-240Vac, 50/60Hz. For radiated emission evaluation, 230Vac/50Hz (for EN 55032 & AS/NZS CISPR 32), 120Vac/60Hz (for FCC Part 15), 100Vac/50Hz & 100Vac/60Hz (for VCCI) had been covered during the pre-test. The worst radiated emission data was found at **230Vac/50Hz** and recorded in the applied test report.
3. EUT has been pre-tested under following test modes, and test **mode 1** was the worst case for final test.

Mode	Test Condition
1	LAN 100Mbps + Adapter
2	LAN 10Mbps + Adapter
3	LAN 100Mbps + PoE

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

Mode	Test Condition	Input power
Conducted emission test		
1	Power from Adapter	100Vac/50Hz & 100Vac/60Hz
Asymmetric Mode Conducted Emission at Telecommunication Ports test		
1	Power from Adapter (LAN Speed: 100Mbps)	100Vac/60Hz*
2	Power from PoE Adapter (LAN Speed: 100Mbps)	48Vdc
1. * Per conducted evaluation input power 100Vac/50Hz & 100Vac/60Hz, the **input power 100Vac/60Hz** was the worst emission level and therefore only its test data was presented in the test report. 2. The idle mode of conducted emission test at telecom port was pre-tested based on the worst case of link mode. Due to emissions of idle mode being very low compared to link mode, only the link mode data were presented in the test report.		
Radiated emission test		
1	Power from Adapter	230Vac/50Hz
2	Power from PoE Adapter (LAN Speed: 100Mbps)	48Vdc

3.4 Test Program Used and Operation Descriptions

a. Connected the EUT with Adapter or PoE adapter.

b. Turned on the power of all equipment.

c. EUT captured video / audio signal to notebook (kept in a remote area) via an UTP LAN cable, then it displayed messages on its screen. ***<For Power from Adapter>***

d. EUT captured video / audio signal to notebook (kept in a remote area) via PoE by an UTP LAN cable, then it displayed messages on its screen. ***<For Power from PoE Adapter>***

e. EUT Save images to SD card.

f. EUT sent 1kHz audio signal to earphone.

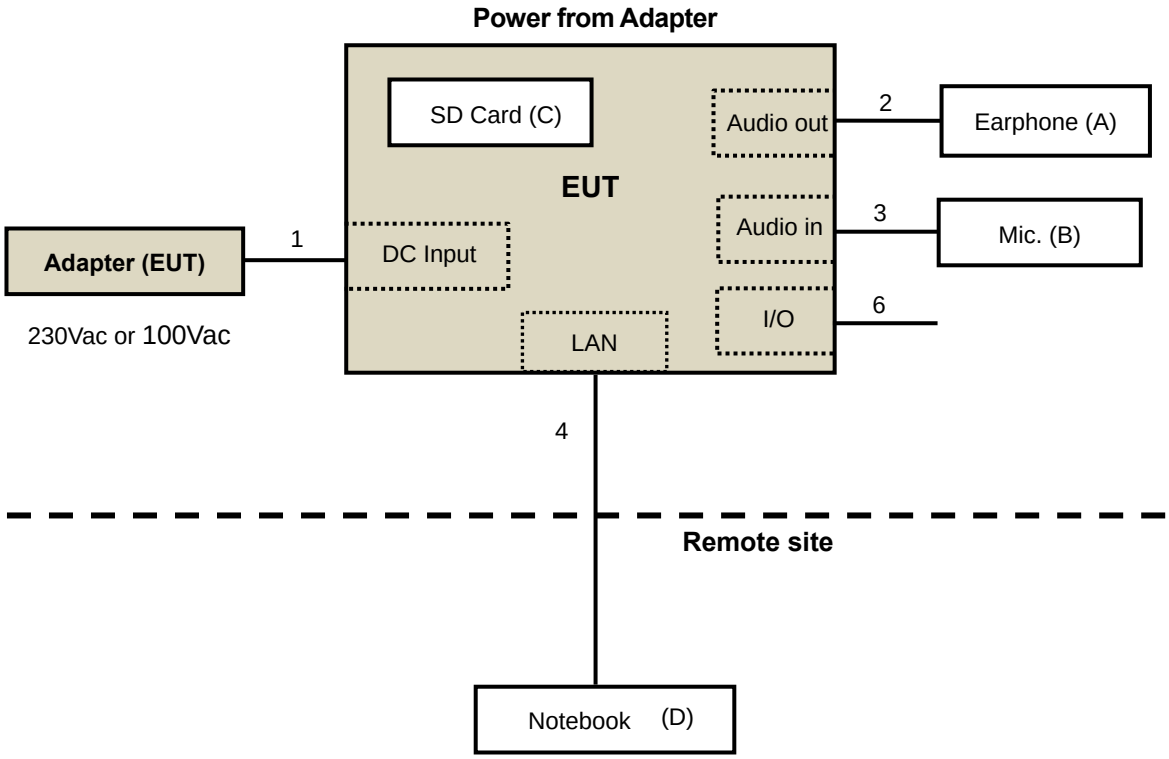
g. Steps c-f were repeated.

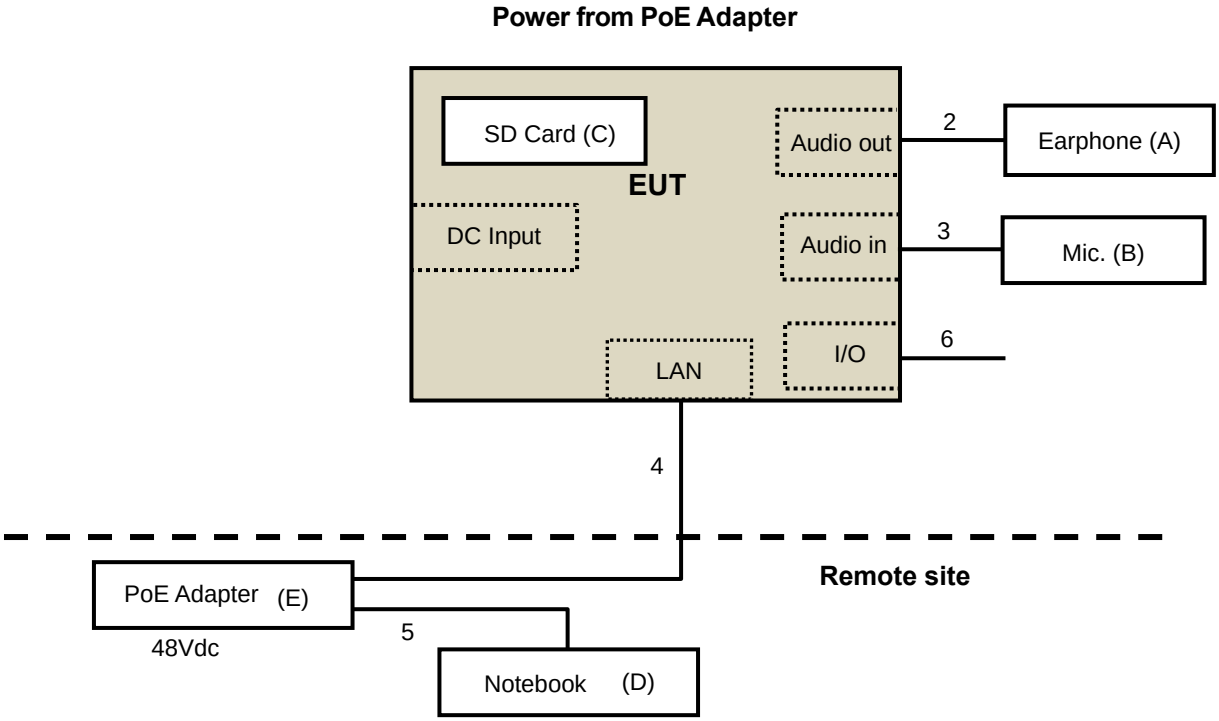
3.5 Primary Clock Frequencies of Internal Source

The highest frequency generated or used within the EUT or on which the EUT operates or tunes is 1866MHz, 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.	Earphone	PHILIPS	SBC HL150	H2010149	N/A	Provided by Lab
B.	Microphone	Labtec	mic-333	N/A	N/A	Provided by Lab
C.	SD Card	Apacer	8GN	N/A	N/A	Provided by Lab
D.	Notebook	DELL	PP27L	8SNZ12S	FCC DoC Approved	Provided by Lab
E.	PoE Adapter	PSE	PSE151	N/A	FCC DoC Approved	Provided by Lab

Note:
1. All power cords of the above support units are non-shielded (1.8m).
2. Items D-E acted as communication partners to transfer data.
3. Rating of item E was listed as below:
   AC I/P: 100-240V, 50/60Hz, 0.4A
   DC O/P: 48V, 16W

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC power cable	1	3.0	N	0	Supplied by client
2.	Audio cable	1	1.2	N	0	Provided by Lab
3.	Audio cable	1	1.8	N	0	Provided by Lab
4.	LAN cable (Cat.5e)	1	10	N	0	Provided by Lab
5.	LAN cable (Cat.5e)	1	1.5	N	0	Provided by Lab
6.	I/O cable	4	1.0	N	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

Frequency range (MHz)	Coupling device	Detector type / bandwidth	Class A limits (dBuV)
0.15 - 0.5	AMN	Quasi-peak / 9kHz	79
0.5 - 30.0			73
0.15 - 0.5		Average / 9kHz	66
0.5 - 30.0			60

Frequency range (MHz)	Coupling device	Detector type / bandwidth	Class B limits (dBuV)
0.15 - 0.5	AMN	Quasi-peak / 9kHz	66 - 56
0.5 - 5			56
5 - 30.0			60
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	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. 3, 2017	Nov. 2, 2018
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: Oct. 20, 2018

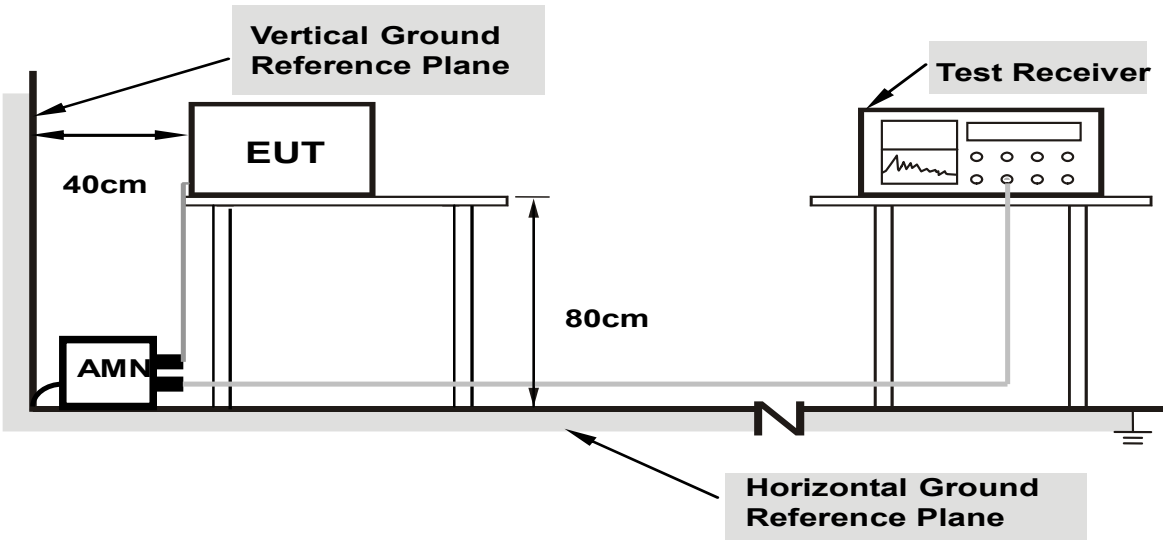
5.3 Test Arrangement

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 an 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.

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

c. 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: 1. Support units were connected to second AMN.
2. The distance specified between EUT/AE and other metallic objects is ≥ 0.8 m in the measurement arrangement for table-top EUT.
3. Cable on the RGP must to be insulated.

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

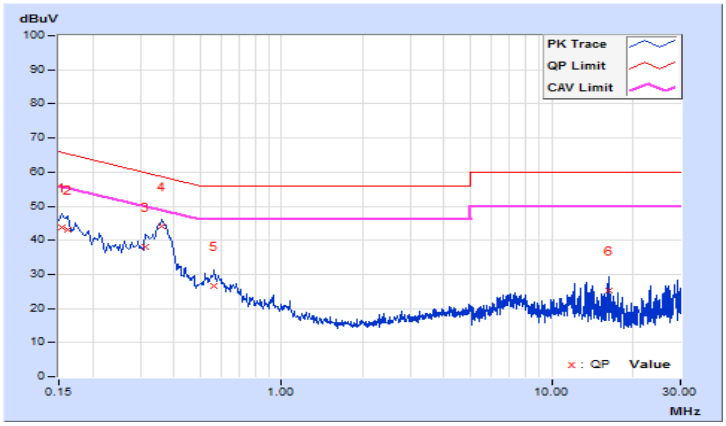
5.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	Environmental Conditions	24℃, 72%RH, 1010mbar
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	33.61	17.80	43.75	27.94	65.79	55.79	-22.04	-27.85
2	0.16173	10.15	33.05	16.26	43.20	26.41	65.37	55.37	-22.17	-28.96
3	0.31422	10.20	27.92	20.93	38.12	31.13	59.86	49.86	-21.74	-18.73
4	0.36048	10.21	33.79	27.92	44.00	38.13	58.72	48.72	-14.72	-10.59
5	0.56256	10.26	16.36	10.60	26.62	20.86	56.00	46.00	-29.38	-25.14
6	16.22952	11.21	14.09	13.36	25.30	24.57	60.00	50.00	-34.70	-25.43

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

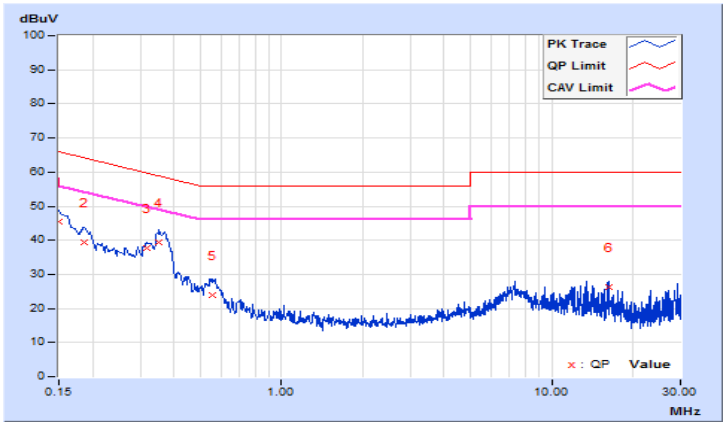


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	**Environmental Conditions**	24℃, 72%RH, 1010mbar
Tested by	Adam Chen		
Test Mode	Mode 1		

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	0.15000	10.14	35.22	18.50	45.36	28.64	66.00	56.00	-20.64	-27.36
2	0.18508	10.17	29.35	16.47	39.52	26.64	64.25	54.25	-24.73	-27.61
3	0.31813	10.20	27.47	19.92	37.67	30.12	59.76	49.76	-22.09	-19.64
4	0.35332	10.20	29.25	19.12	39.45	29.32	58.88	48.88	-19.43	-19.56
5	0.55865	10.25	13.67	7.65	23.92	17.90	56.00	46.00	-32.08	-28.10
6	16.22952	11.09	15.03	14.25	26.12	25.34	60.00	50.00	-33.88	-24.66

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

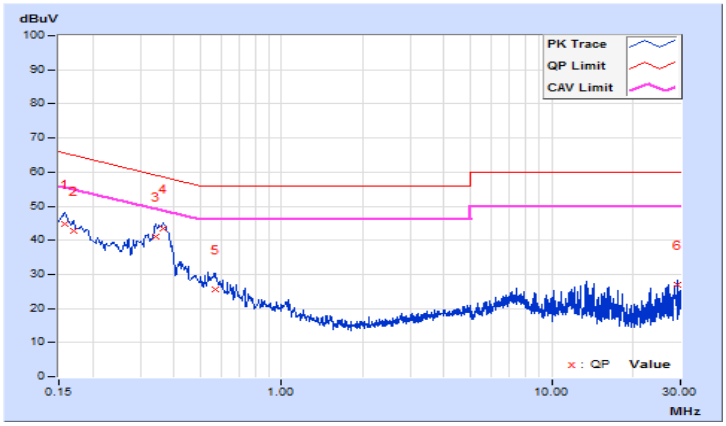


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 60Hz	**Environmental Conditions**	24℃, 72%RH, 1010mbar
Tested by	Adam Chen		
Test Mode	Mode 1		

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	0.15719	10.15	34.57	17.89	44.72	28.04	65.61	55.61	-20.89	-27.57
2	0.16955	10.16	32.59	16.02	42.75	26.18	64.98	54.98	-22.23	-28.80
3	0.34107	10.21	30.89	24.53	41.10	34.74	59.18	49.18	-18.08	-14.44
4	**0.36505**	**10.21**	**33.15**	**28.10**	**43.36**	**38.31**	**58.61**	**48.61**	**-15.25**	**-10.30**
5	0.56647	10.26	15.43	9.85	25.69	20.11	56.00	46.00	-30.31	-25.89
6	29.23418	11.48	15.35	15.31	26.83	26.79	60.00	50.00	-33.17	-23.21

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

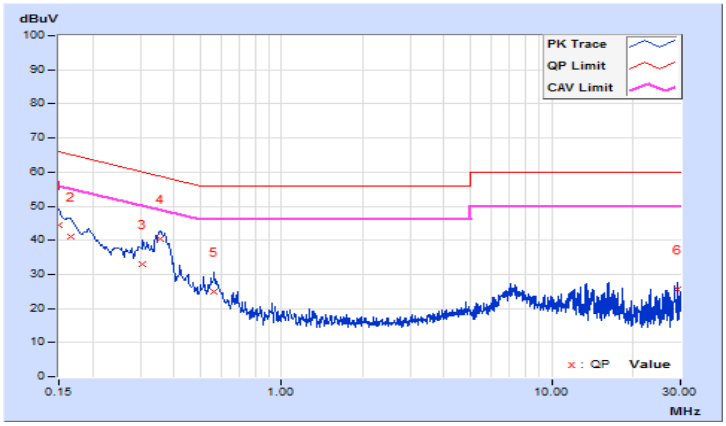


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 60Hz	**Environmental Conditions**	24℃, 72%RH, 1010mbar
Tested by	Adam Chen		
Test Mode	Mode 1		

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	0.15000	10.14	34.26	18.22	44.40	28.36	66.00	56.00	-21.60	-27.64
2	0.16526	10.15	30.77	15.88	40.92	26.03	65.20	55.20	-24.28	-29.17
3	0.30640	10.20	22.93	10.91	33.13	21.11	60.07	50.07	-26.94	-28.96
4	0.35723	10.20	30.28	20.94	40.48	31.14	58.79	48.79	-18.31	-17.65
5	0.56256	10.25	14.66	9.80	24.91	20.05	56.00	46.00	-31.09	-25.95
6	29.23418	10.91	14.72	14.68	25.63	25.59	60.00	50.00	-34.37	-24.41

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 Asymmetric Mode Conducted Emission at Telecommunication Ports

6.1 Limits

For Class A Equipment

Frequency range (MHz)	Coupling device	Detector type / bandwidth	Voltage limits (dBuV)	Current limits (dBuA)
0.15 - 0.5	AAN	Quasi-peak / 9kHz	97 – 87	N/A
0.5 - 30.0			87	
0.15 - 0.5	AAN	Average / 9kHz	84-74	
0.5 - 30.0			74	
0.15 - 0.5	CVP and current probe	Quasi-peak / 9kHz	97 – 87	53 – 43
0.5 - 30.0			87	43
0.15 - 0.5	CVP and current probe	Average / 9kHz	84-74	40 – 30
0.5 - 30.0			74	30
0.15 - 0.5	Current Probe	Quasi-peak / 9kHz	N/A	53 – 43
0.5 - 30.0				43
0.15 - 0.5	Current Probe	Average / 9kHz		40 – 30
0.5 - 30.0				30

For Class B Equipment

Frequency range (MHz)	Coupling device	Detector type / bandwidth	Voltage limits (dBuV)	Current limits (dBuA)
0.15 - 0.5	AAN	Quasi-peak / 9kHz	84 – 74	N/A
0.5 - 30.0			74	
0.15 - 0.5	AAN	Average / 9kHz	74-64	
0.5 - 30.0			64	
0.15 - 0.5	CVP and current probe	Quasi-peak / 9kHz	84 – 74	40 – 30
0.5 - 30.0			74	30
0.15 - 0.5	CVP and current probe	Average / 9kHz	74-64	30 – 20
0.5 - 30.0			64	20
0.15 - 0.5	Current Probe	Quasi-peak / 9kHz	N/A	40 – 30
0.5 - 30.0				30
0.15 - 0.5	Current Probe	Average / 9kHz		30 – 20
0.5 - 30.0				20

6.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESR3	102413	Feb. 08, 2018	Feb. 07, 2019
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 06, 2017	Dec. 05, 2018
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 06, 2017	Dec. 05, 2018
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Nov. 03, 2017	Nov. 02, 2018
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
Software	ISN_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO)	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
FCC ISN	F-071115-1057-1	20651	Feb. 12, 2018	Feb. 11, 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. T-11587
4. Tested Date: Oct. 20, 2018

6.3 Test Arrangement

Method of Using AANs:

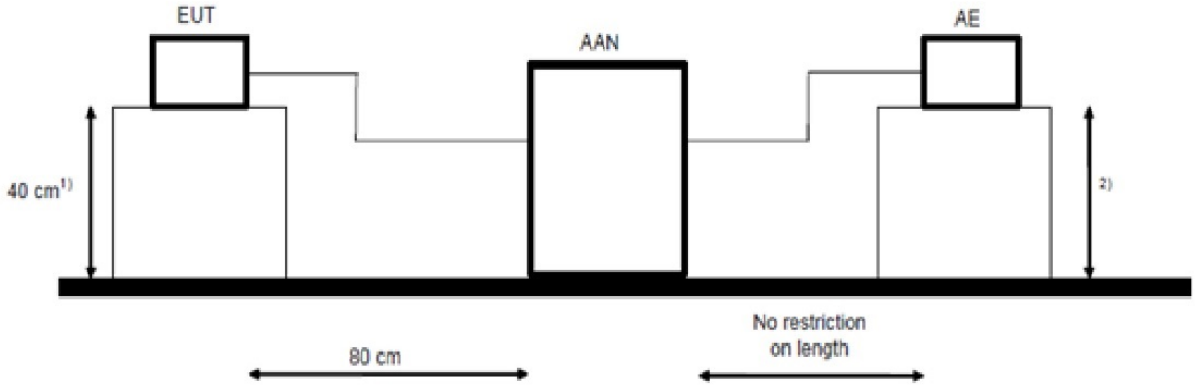
a. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to AAN directly to reference ground plane.

b. If voltage measurement is used, measure voltage at the measurement port of the AAN, correct the reading by adding the AAN voltage division factor, and compare to the voltage limit.

c. It is not necessary to apply the voltage and the current limit if a AAN is used.

d. The test results of disturbance at telecommunication 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.



1) Distance to the reference groundplane (vertical or horizontal).
2) Distance to the reference groundplane is not critical.

Note: Cable on the RGP must to be insulated.

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

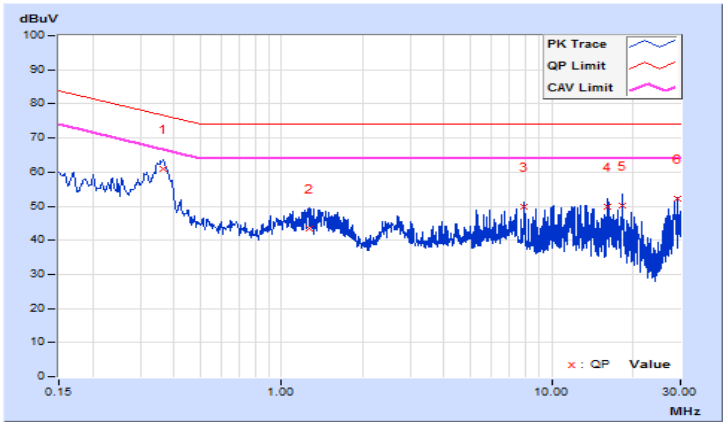
6.4 Test Results

Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 60Hz	**Environmental Conditions**	24℃, 72%RH, 1010mbar
Tested by	Adam Chen		
Test Mode	Mode 1 - RJ45 TELECOM PORT (100Mbps) (TFGEN + PING)		

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	0.36505	9.56	51.38	45.31	60.94	54.87	76.61	66.61	-15.67	-11.74
2	1.26636	9.39	34.09	29.39	43.48	38.78	74.00	64.00	-30.52	-25.22
3	7.92468	9.38	40.58	39.86	49.96	49.24	74.00	64.00	-24.04	-14.76
4	16.16696	9.72	40.05	39.17	49.77	48.89	74.00	64.00	-24.23	-15.11
5	18.24317	9.81	40.44	39.38	50.25	49.19	74.00	64.00	-23.75	-14.81
6	29.23418	10.44	41.90	41.89	52.34	52.33	74.00	64.00	-21.66	-11.67

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

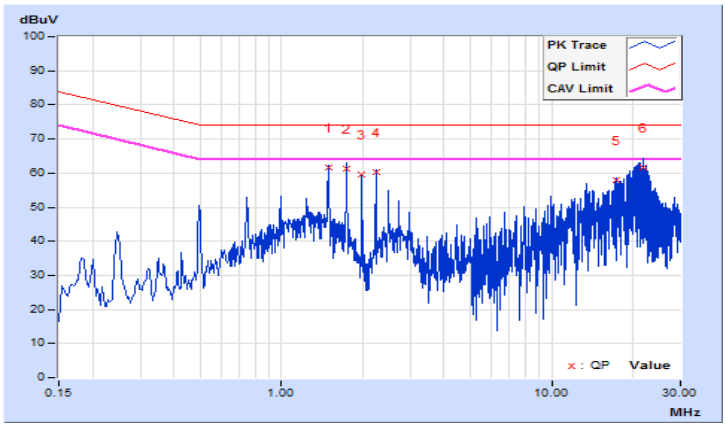


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	48Vdc	**Environmental Conditions**	24℃, 72%RH, 1010mbar
Tested by	Adam Chen		
Test Mode	Mode 2 - RJ45 TELECOM PORT (100Mbps) (TFGEN + PING)		

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	**1.48923**	**9.38**	**52.17**	**51.40**	**61.55**	**60.78**	**74.00**	**64.00**	**-12.45**	**-3.22**
2	1.73947	9.36	51.81	51.03	61.17	60.39	74.00	64.00	-12.83	-3.61
3	1.98580	9.34	50.30	46.57	59.64	55.91	74.00	64.00	-14.36	-8.09
4	2.23604	9.34	50.95	49.94	60.29	59.28	74.00	64.00	-13.71	-4.72
5	17.38688	9.77	48.23	45.44	58.00	55.21	74.00	64.00	-16.00	-8.79
6	21.85861	10.00	51.77	50.09	61.77	60.09	74.00	64.00	-12.23	-3.91

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



7 Radiated Emission at Frequencies up to 1GHz

7.1 Limits

For Class A Equipment

Frequency range (MHz)	Distance (m)	Limits (dBuV/m)
30 - 230	10	40
230 - 1000		47
30 - 230	3	50
230 - 1000		57

For Class B Equipment

Frequency range (MHz)	Distance (m)	Limits (dBuV/m)
30 - 230	10	30
230 - 1000		37
30 - 230	3	40
230 - 1000		47

7.2 Test Instruments

Mode 1

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, 2017	Oct. 24, 2018
Pacific RF cable With 5dB PAD	8D	CABLE-ST2-01	Oct. 25, 2017	Oct. 24, 2018

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: Oct. 19, 2018

Mode 2

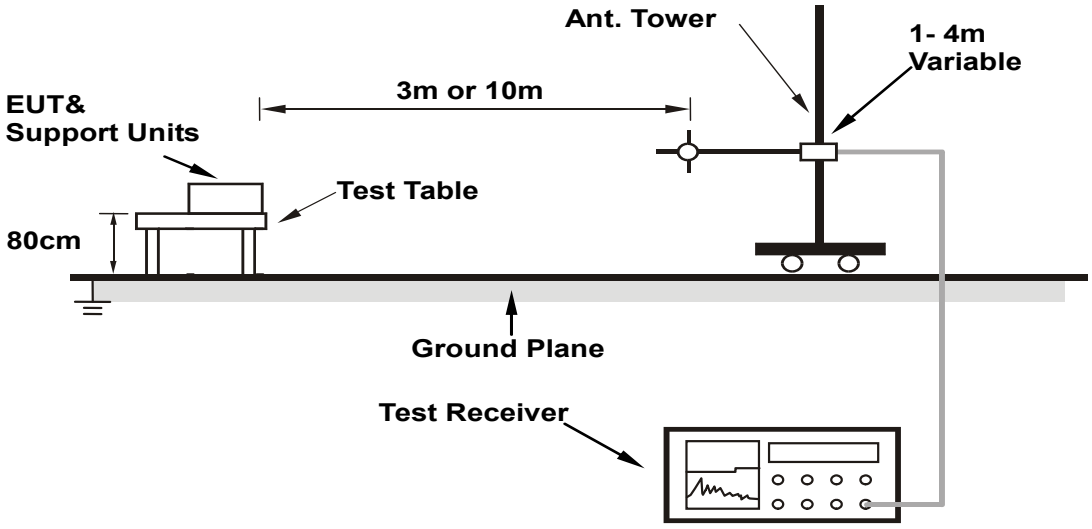
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100027	Dec. 4, 2017	Dec. 3, 2018
Schwarzbeck Bilog Antenna	VULB9168	9168-303	Nov. 29, 2017	Nov. 28, 2018
Agilent Preamplifier	8447D	2944A08119	Feb. 21, 2018	Feb. 20, 2019
ADT. Turn Table	TT100	0205	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. 15, 2018

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 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 up to 1 GHz.

Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.
2. 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.

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

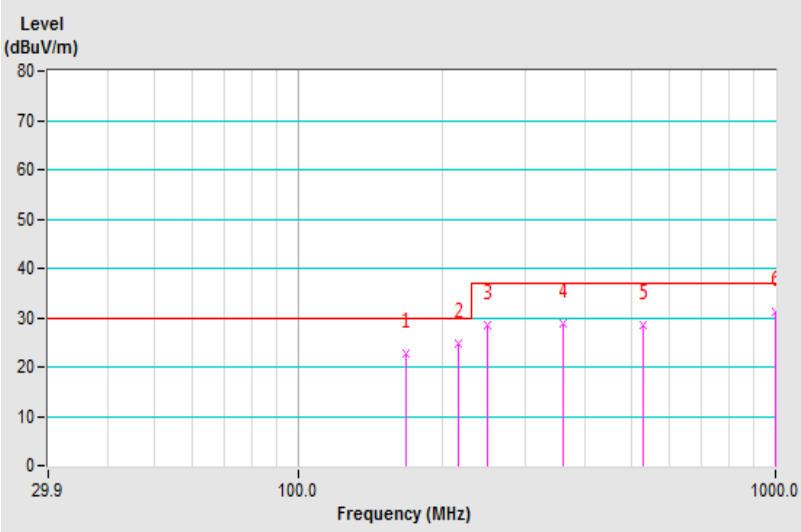
7.4 Test Results

Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Tested by	Vic Lin	Environmental Conditions	22℃, 78%RH, 1010mbar
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	168.00	22.80 QP	30.00	-7.20	4.00 H	72	31.95	-9.15
2	216.60	24.80 QP	30.00	-5.20	4.00 H	169	36.88	-12.08
3	249.97	28.47 QP	37.00	-8.53	3.00 H	251	38.84	-10.37
4	360.05	28.66 QP	37.00	-8.34	2.00 H	169	35.56	-6.90
5	527.50	28.43 QP	37.00	-8.57	1.98 H	223	31.50	-3.07
6	1000.00	31.14 QP	37.00	-5.86	1.00 H	57	27.01	4.13

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

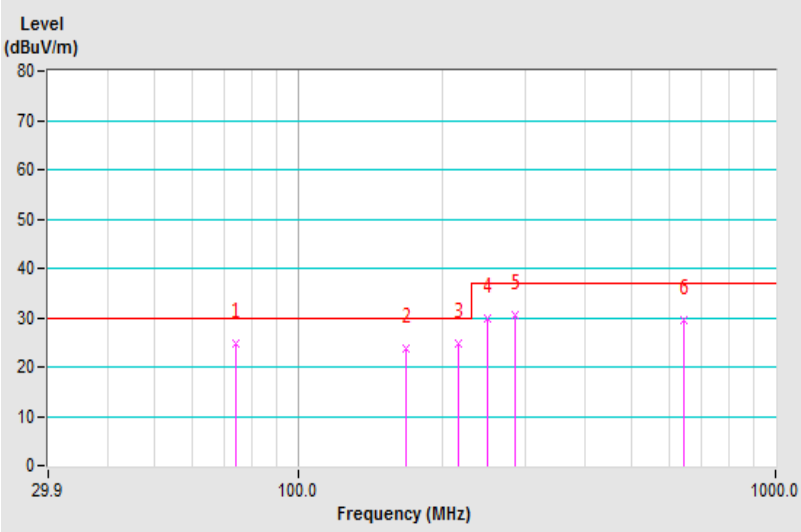


Frequency Range	30MHz ~ 1GHz	**Detector Function & Bandwidth**	Quasi-Peak (QP), 120kHz
Tested by	Vic Lin	**Environmental Conditions**	22℃, 78%RH, 1010mbar
Test Mode	Mode 1		

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	74.06	24.74 QP	30.00	-5.26	1.00 V	180	36.63	-11.89
2	167.90	23.82 QP	30.00	-6.18	1.00 V	153	32.96	-9.14
3	216.28	24.71 QP	30.00	-5.29	1.00 V	230	36.79	-12.08
4	249.97	29.88 QP	37.00	-7.12	1.00 V	119	40.25	-10.37
5	284.82	30.59 QP	37.00	-6.41	1.00 V	217	39.43	-8.84
6	643.75	29.53 QP	37.00	-7.47	1.99 V	248	30.32	-0.79

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

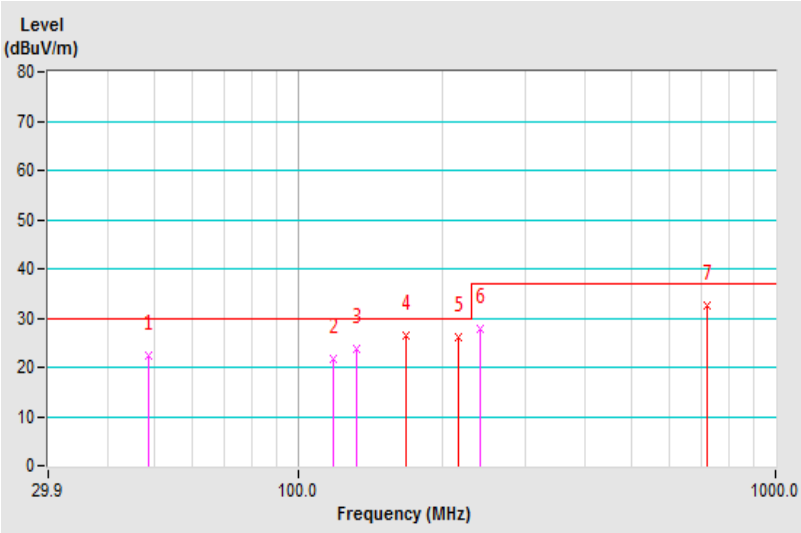


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Tested by	Vincent Lin	Environmental Conditions	22℃, 72%RH, 1009mbar
Test Mode	Mode 2		

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	48.62	22.53 QP	30.00	-7.47	4.00 H	75	31.30	-8.77
2	118.65	21.86 QP	30.00	-8.14	4.00 H	173	33.08	-11.22
3	132.52	23.67 QP	30.00	-6.33	4.00 H	315	33.54	-9.87
4	**168.01**	**26.28 QP**	**30.00**	**-3.72**	**4.00 H**	**69**	**35.38**	**-9.10**
5	215.99	26.19 QP	30.00	-3.81	4.00 H	43	38.31	-12.12
6	240.10	27.90 QP	37.00	-9.10	3.15 H	206	38.38	-10.48
7	720.01	32.52 QP	37.00	-4.48	1.37 H	192	31.87	0.65

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

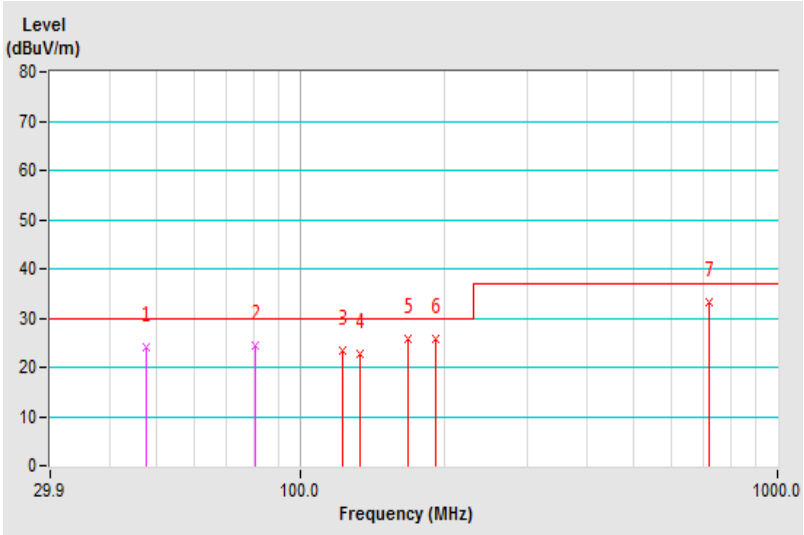


Frequency Range	30MHz ~ 1GHz	**Detector Function & Bandwidth**	Quasi-Peak (QP), 120kHz
Tested by	Vincent Lin	**Environmental Conditions**	22℃, 72%RH, 1009mbar
Test Mode	Mode 2		

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	47.52	23.95 QP	30.00	-6.05	1.00 V	5	32.72	-8.77
2	80.69	24.38 QP	30.00	-5.62	1.00 V	92	38.09	-13.71
3	122.84	23.55 QP	30.00	-6.45	1.00 V	351	34.28	-10.73
4	133.15	22.76 QP	30.00	-7.24	1.00 V	204	32.59	-9.83
5	168.00	25.86 QP	30.00	-4.14	1.00 V	152	34.96	-9.10
6	191.99	25.80 QP	30.00	-4.20	1.00 V	17	37.56	-11.76
7	720.01	33.12 QP	37.00	-3.88	2.61 V	61	32.47	0.65

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 Radiated Emission at Frequencies above 1GHz

8.1 Limits

For Class A Equipment

Frequency range (MHz)	Distance (m)	Detector type	Limits (dBuV/m)
1000 - 3000	3	Average	56
3000 - 6000			60
1000 - 3000		Peak	76
3000 - 6000			80

For Class B Equipment

Frequency range (MHz)	Distance (m)	Detector type	Limits (dBuV/m)
1000 - 3000	3	Average	50
3000 - 6000			54
1000 - 3000		Peak	70
3000 - 6000			74

Required highest frequency for radiated measurement

Highest internal frequency (F_x)	Highest measured frequency
$F_x \leqq$ 108 MHz	1 GHz
108 MHz $<$ $F_x \leqq$ 500 MHz	2 GHz
500 MHz $<$ $F_x \leqq$ 1 GHz	5 GHz
$F_x >$ 1 GHz	5 x 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.

8.2 Test Instruments

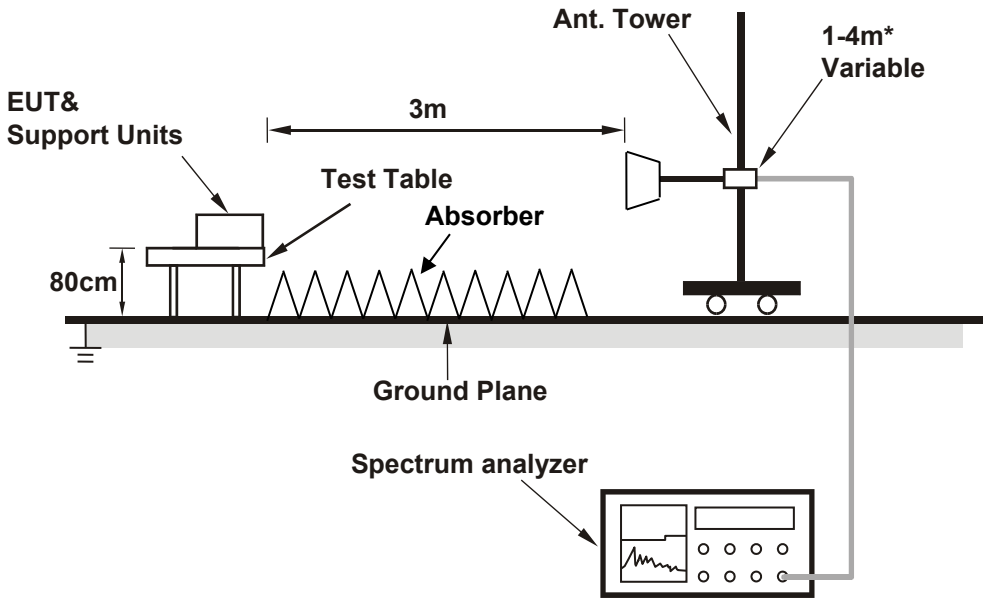
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Agilent Spectrum	E4446A	MY51100009	Jun. 4, 2018	Jun. 3, 2019
Agilent Test Receiver	N9038A	MY51210137	Jun. 19, 2018	Jun. 18, 2019
Agilent Preamplifier	8449B	3008A01292	Feb. 22, 2018	Feb. 21, 2019
MITEQ Preamplifier	AMF-6F-260400-33-8P	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
EMCO Horn Antenna	3115	6714	Dec. 12, 2017	Dec. 11, 2018
Max Full. Turn Table	MF7802	MF780208216	NA	NA
Software	Radiated_V8.7.08	NA	NA	NA
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH10-3.6m	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 3dB beamwidth of the horn antenna is minimum 41degree (or w = 2.24m 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-10427
6. Tested Date: Oct. 20 ~ Nov. 15, 2018

8.3 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. 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.
d. 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.
e. 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:
1. 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.
2. 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.

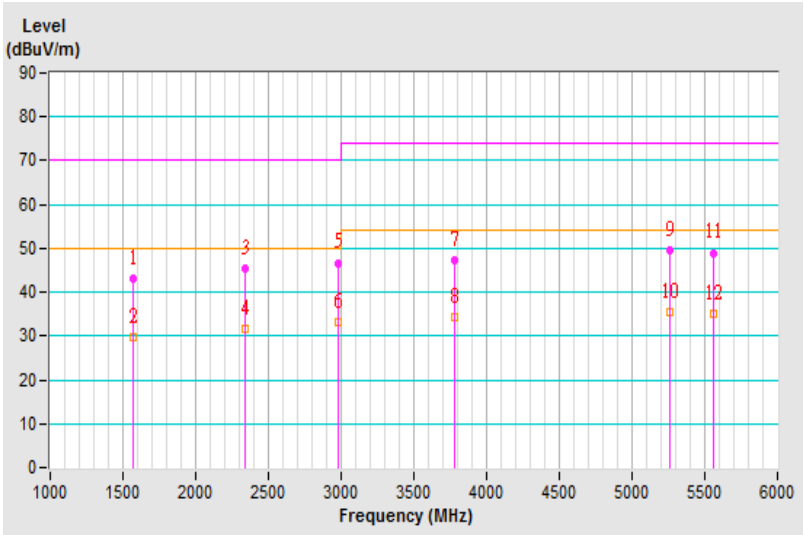
8.4 Test Results

Frequency Range	1GHz ~ 6GHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested by	Vincent Chen	Environmental Conditions	23℃, 77%RH, 1010mbar
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	1573.12	42.93 PK	70.00	-27.07	1.63 H	256	45.76	-2.83
2	1573.12	29.68 AV	50.00	-20.32	1.63 H	256	32.51	-2.83
3	2338.12	45.31 PK	70.00	-24.69	1.54 H	279	45.28	0.03
4	2338.12	31.69 AV	50.00	-18.31	1.54 H	279	31.66	0.03
5	2976.75	46.68 PK	70.00	-23.32	2.23 H	125	44.88	1.80
6	2976.75	33.25 AV	50.00	-16.75	2.23 H	125	31.45	1.80
7	3775.75	47.30 PK	74.00	-26.70	1.89 H	67	42.48	4.82
8	3775.75	34.16 AV	54.00	-19.84	1.89 H	67	29.34	4.82
9	5259.75	49.45 PK	74.00	-24.55	1.22 H	297	42.27	7.18
10	5259.75	35.43 AV	54.00	-18.57	1.22 H	297	28.25	7.18
11	5557.50	49.00 PK	74.00	-25.00	1.05 H	306	41.54	7.46
12	5557.50	35.12 AV	54.00	-18.88	1.05 H	306	27.66	7.46

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

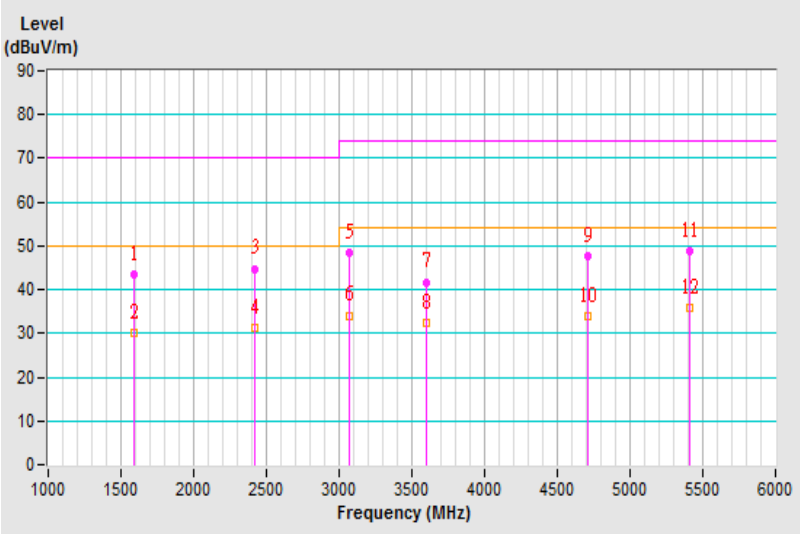


Frequency Range	1GHz ~ 6GHz	**Detector Function & Bandwidth**	Peak (PK) / Average (AV), 1MHz
Tested by	Vincent Chen	**Environmental Conditions**	23℃, 77%RH, 1010mbar
Test Mode	Mode 1		

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	1586.62	43.45 PK	70.00	-26.55	1.32 V	297	46.20	-2.75
2	1586.62	30.08 AV	50.00	-19.92	1.32 V	297	32.83	-2.75
3	2421.00	44.80 PK	70.00	-25.20	1.06 V	155	44.74	0.06
4	2421.00	31.23 AV	50.00	-18.77	1.06 V	155	31.17	0.06
5	3066.25	48.49 PK	74.00	-25.51	1.85 V	175	46.11	2.38
6	3066.25	34.12 AV	54.00	-19.88	1.85 V	175	31.74	2.38
7	3600.11	41.73 PK	74.00	-32.27	1.66 V	209	37.85	3.88
8	3600.11	32.32 AV	54.00	-21.68	1.66 V	209	28.44	3.88
9	4711.50	47.74 PK	74.00	-26.26	2.32 V	19	42.18	5.56
10	4711.50	34.04 AV	54.00	-19.96	2.32 V	19	28.48	5.56
11	5414.75	48.89 PK	74.00	-25.11	1.74 V	124	41.49	7.40
12	5414.75	35.68 AV	54.00	-18.32	1.74 V	124	28.28	7.40

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

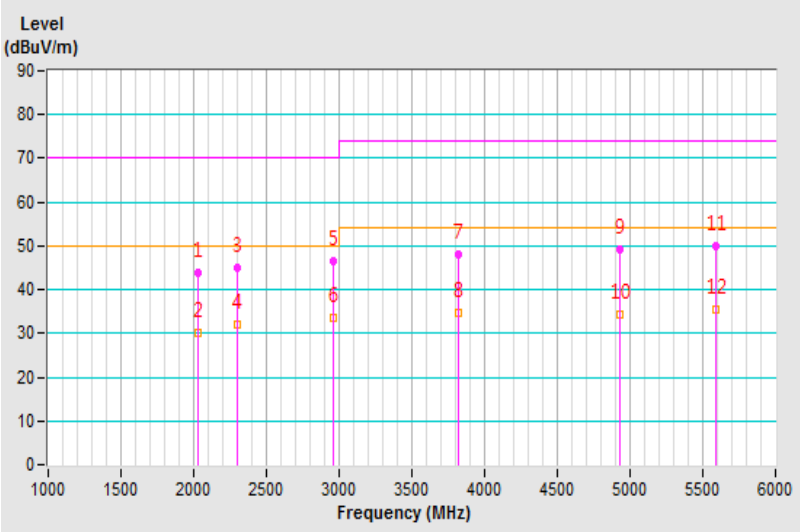


Frequency Range	1GHz ~ 6GHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested by	Chin-Wen Wang	Environmental Conditions	19℃, 70%RH, 1009mbar
Test Mode	Mode 2		

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	2028.37	43.86 PK	70.00	-26.14	2.41 H	342	44.99	-1.13
2	2028.37	30.06 AV	50.00	-19.94	2.41 H	342	31.19	-1.13
3	2299.25	44.98 PK	70.00	-25.02	1.95 H	263	45.13	-0.15
4	2299.25	32.14 AV	50.00	-17.86	1.95 H	263	32.29	-0.15
5	2959.37	46.35 PK	70.00	-23.65	1.32 H	26	44.74	1.61
6	2959.37	33.48 AV	50.00	-16.52	1.32 H	26	31.87	1.61
7	3822.37	47.90 PK	74.00	-26.10	2.10 H	160	42.80	5.10
8	3822.37	34.59 AV	54.00	-19.41	2.10 H	160	29.49	5.10
9	4931.00	49.28 PK	74.00	-24.72	1.05 H	360	42.98	6.30
10	4931.00	34.36 AV	54.00	-19.64	1.05 H	360	28.06	6.30
11	5592.37	49.94 PK	74.00	-24.06	1.00 H	158	42.50	7.44
12	5592.37	35.50 AV	54.00	-18.50	1.00 H	158	28.06	7.44

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

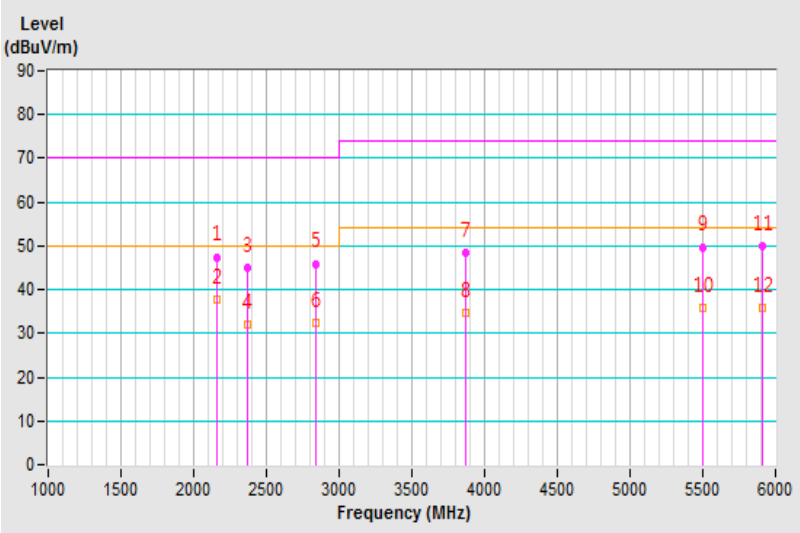


Frequency Range	1GHz ~ 6GHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested by	Chin-Wen Wang	Environmental Conditions	19℃, 70%RH, 1009mbar
Test Mode	Mode 2		

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	2159.98	47.46 PK	70.00	-22.54	1.57 V	68	48.28	-0.82
2	**2159.98**	**37.76 AV**	**50.00**	**-12.24**	**1.57 V**	**68**	**38.58**	**-0.82**
3	2369.87	45.05 PK	70.00	-24.95	1.02 V	8	44.95	0.10
4	2369.87	32.17 AV	50.00	-17.83	1.02 V	8	32.07	0.10
5	2840.87	45.93 PK	70.00	-24.07	1.86 V	296	45.08	0.85
6	2840.87	32.32 AV	50.00	-17.68	1.86 V	296	31.47	0.85
7	3866.87	48.50 PK	74.00	-25.50	2.37 V	317	43.02	5.48
8	3866.87	34.70 AV	54.00	-19.30	2.37 V	317	29.22	5.48
9	5497.00	49.73 PK	74.00	-24.27	1.20 V	360	42.35	7.38
10	5497.00	35.74 AV	54.00	-18.26	1.20 V	360	28.36	7.38
11	5913.37	49.81 PK	74.00	-24.19	1.00 V	79	42.29	7.52
12	5913.37	35.90 AV	54.00	-18.10	1.00 V	79	28.38	7.52

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



9 Pictures of Test Arrangements

9.1 Conducted Emission from the AC Mains Power Port

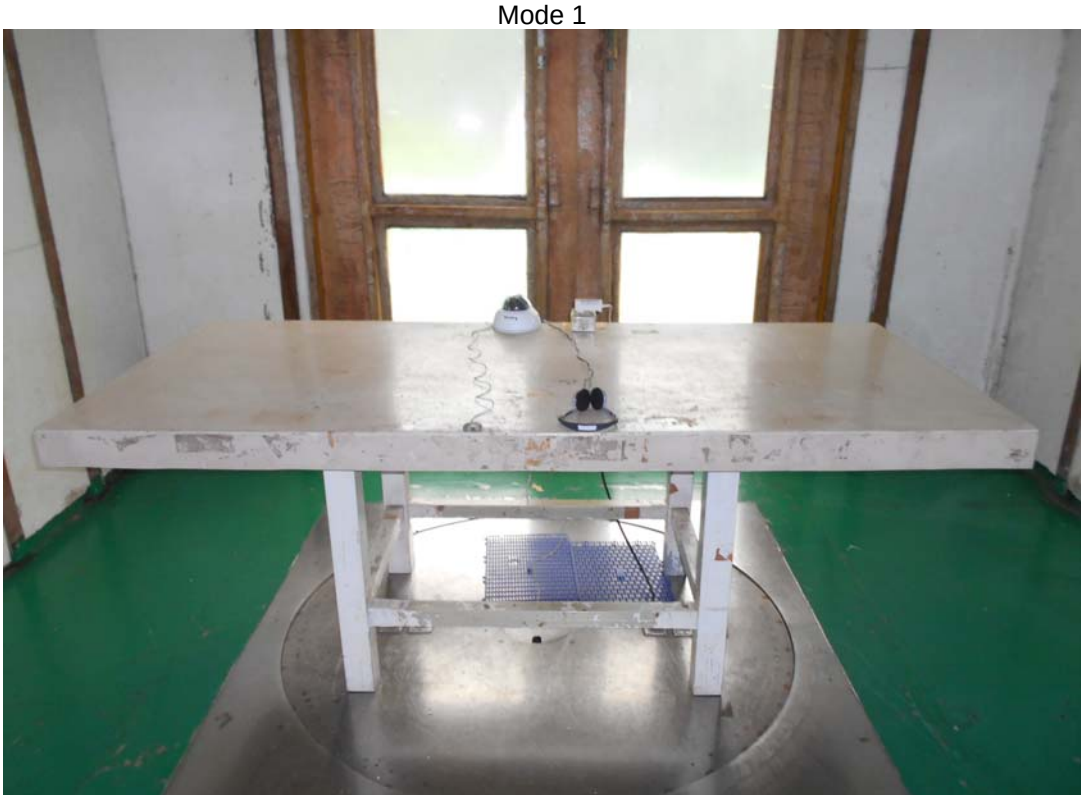
9.2 Asymmetric Mode Conducted Emission at Telecommunication Ports

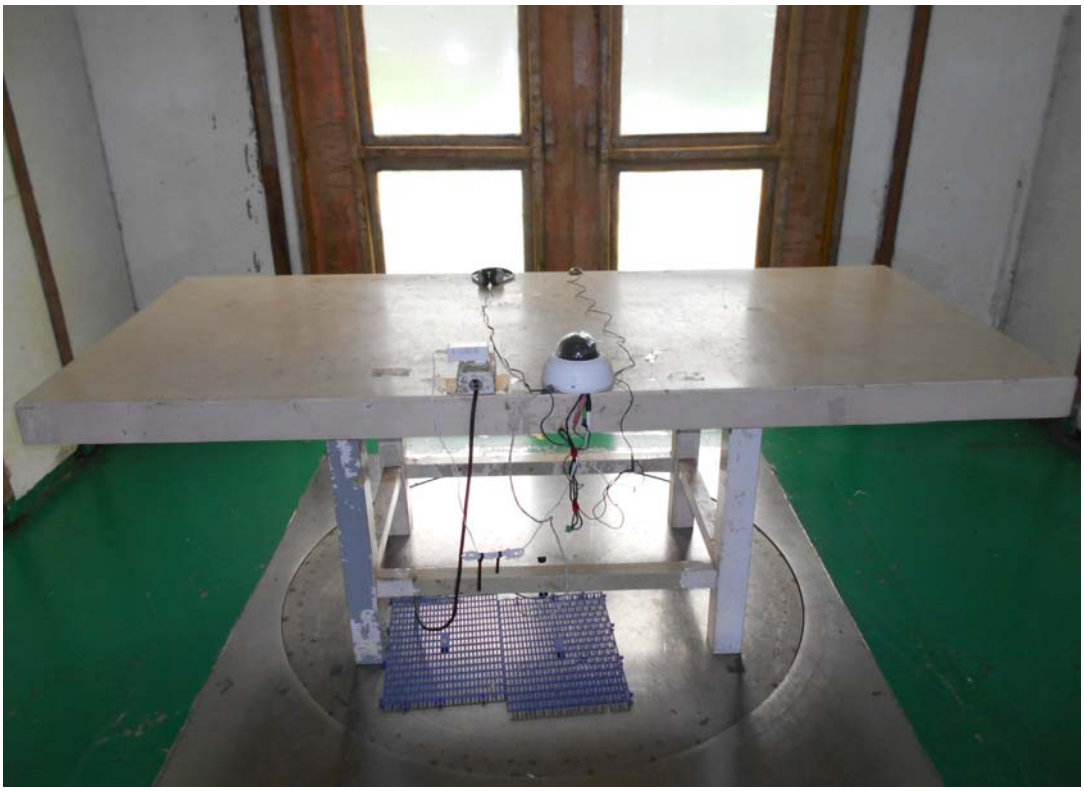
For Mode 1

For Mode 2

9.3 Radiated Emission at Frequencies up to 1GHz

Mode 1

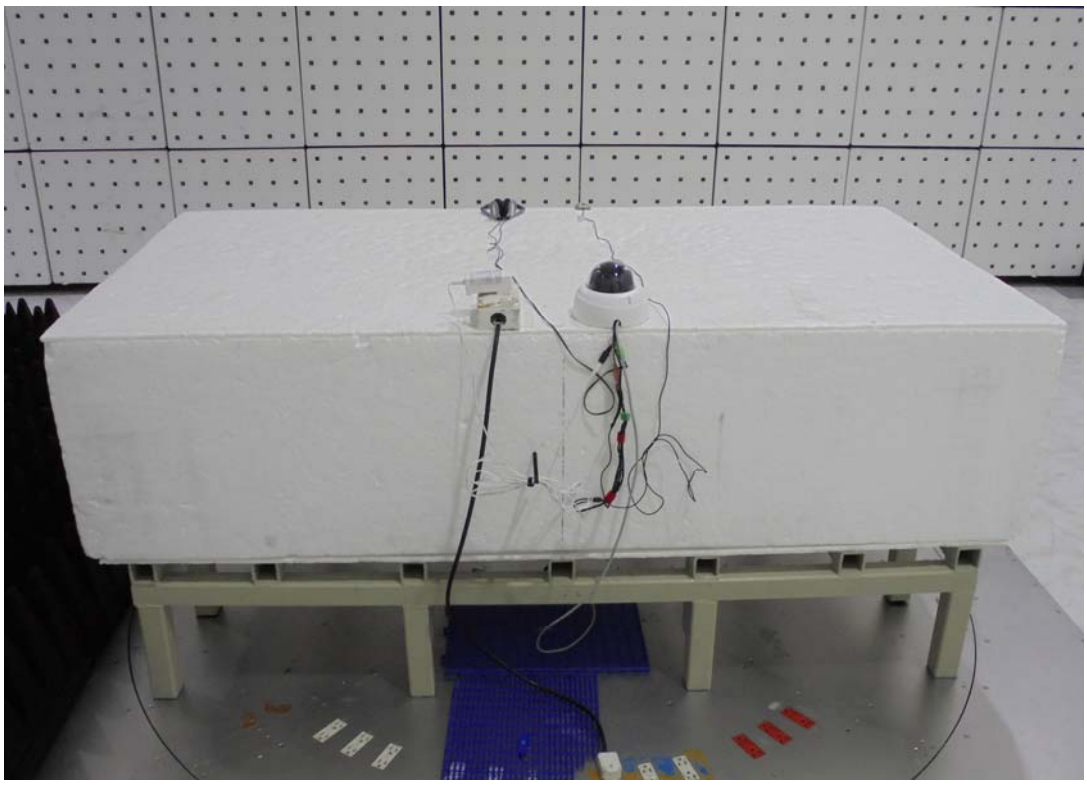




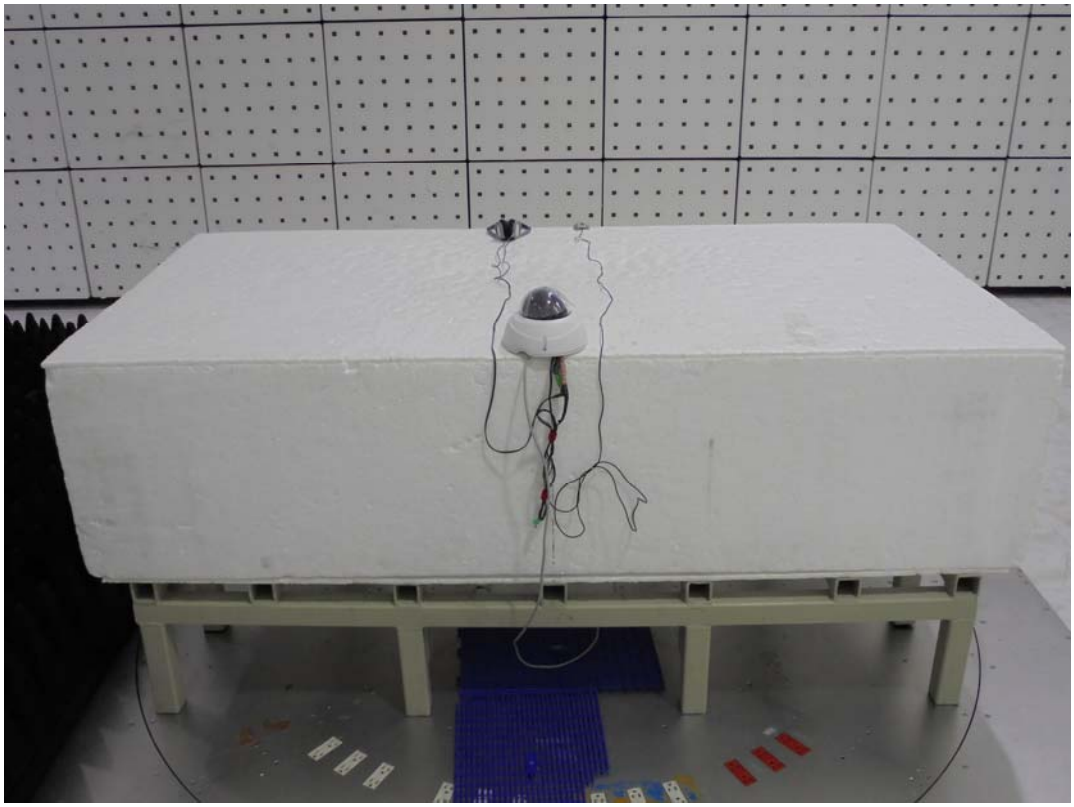
Mode 2

9.4 Radiated Emission at Frequencies above 1GHz

Mode 1



Mode 2



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:

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 ---