TEST REPORT

CERTIFICATE OF CONFORMITY

Standards:	**VCCI-CISPR 32:2016, Class A**
Report No.:	VBDAS-WTW-P21110259
Model No.:	ODS-HTQe
Received Date:	Nov. 08, 2021
Test Date:	Jan. 20 ~ Mar. 16, 2022
Issued Date:	Apr. 29, 2022
Applicant:	Radware Ltd.
Address:	22 Raoul Wallenberg St, Tel Aviv 6971917 Israel
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab. VCCI Member No.:	0395
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN

Approved by : _____ , **Date:** **Apr. 29, 2022**

Ace Wu / Project Engineer

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Prepared by : Jasmine Hung / Specialist

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Release Control Record

Issue No.	Description	Date Issued
VBDAS-WTW-P21110259	Original release.	Apr. 29, 2022

1 Certification

Product:	On Demand Switch
Brand:	RADWARE
Test Model:	ODS-HTQe
Sample Status:	Engineering sample
Applicant:	Radware Ltd.
Test Date:	Jan. 20 ~ Mar. 16, 2022
Standards:	VCCI-CISPR 32:2016, Class A
Measurement procedure:	CISPR 32: 2015 (Edition 2.0)

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.

2 Summary of Test Results

Standard	Test Item	Result	Remarks
VCCI-CISPR 32	Conducted Emissions from Power Ports	Pass	Minimum passing Class A margin is -7.73 dB at 0.20600 MHz
VCCI-CISPR 32	Conducted Emissions from Wired Network Ports	Pass	Minimum passing Class A margin is -16.11 dB at 1.56600 MHz
VCCI-CISPR 32	Radiated Emissions up to 1 GHz	Pass	Minimum passing Class A margin is -6.31 dB at 127.005 MHz
	Radiated Emissions above 1 GHz	Pass	Minimum passing Class A margin is -8.88 dB at 1333.41 MHz

Note: 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 as specified in CISPR 16-4-2:

Measurement	Expanded Uncertainty (k=2) (±)	Maximum allowable uncertainty (±)
Conducted Emissions from Power Ports	2.79 dB	3.4 dB (U_{cispr})
Conducted Emissions from Wired Network Ports	4.28 dB	5.0 dB (U_{cispr})
Radiated Emissions up to 1 GHz	3.87 dB	6.3 dB (U_{cispr})
Radiated Emissions above 1 GHz	5.04 dB	5.2 dB (U_{cispr})

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 Description of EUT

Product	On Demand Switch
Brand	RADWARE
Test Model	ODS-HTQe
Sample Status	Engineering sample
Operating Software	N/A
EUT Input Rating	100-240Vac or -42 ~ -72Vdc
Power supply	AC Power, Zippy: PSS2-5A00V3V (Included two power modules PSS-2A00V) DC Power, Zippy: DPSS2-5A00V3V (Included two power modules DPSS-2A00V)
Accessory Device	N/A
Data Cable Supplied	N/A

3.2 Primary Clock Frequencies of Internal Source

The highest frequency generated or used within the EUT or on which the EUT operates or tunes is 3 GHz, provided by Radware Ltd., for detailed internal source, please refer to the manufacturer's specifications.

3.3 Features of EUT

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

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

The EUT is designed with adapter of rating 100-120Vac, 50-60Hz.

Radiated emission up to 1GHz test has been pre-tested under following test modes, and test mode 1 was the worst case for final test.

Mode	Test Condition
1	EUT + LAN Link + Fiber Loop + RS232 cable + Flash load + AC PSU*2
2	EUT + LAN Link + Fiber Loop + RS232 cable + Flash load + DC PSU*2
Note: 1. There are both standby mode and normal mode to be pre-tested then normal mode has the highest emission value. 2. There are both 100Vac/50Hz, 100Vac/60Hz and 60Vdc to be pre-tested then 100Vac/50Hz has the highest emission value.	

Conducted emission test has been pre-tested under following test mode.

Mode	Test Condition
1	EUT + LAN Link + Fiber Loop + RS232 cable + Flash load + AC PSU*2
Note: There are both 100Vac/50Hz, 100Vac/60Hz to be pre-tested then 100Vac/50Hz has the highest emission value.	

Test modes are presented in the report as below according to original worst case mode.

Mode	Test Condition
Conducted emission test	
-	EUT + LAN Link + Fiber Loop + RS232 cable + Flash load + AC PSU*2
Conducted emission from wired network ports test	
-	EUT + **LAN 1Gbps Link** + Fiber Loop + RS232 cable + Flash load + AC PSU*2, 100Vav/50Hz
	EUT + **LAN 1Gbps Link** + Fiber Loop + RS232 cable + Flash load + DC PSU*2, 60Vdc
Note: The idle mode of conducted emission test at wired network ports test 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 up to 1GHz test	
-	EUT + LAN Link + Fiber Loop + RS232 cable + Flash load + AC PSU*2
Radiated emission above 1GHz test	
-	EUT + LAN Link + Fiber Loop + RS232 cable + Flash load + AC PSU*2

3.5 Test Program Used and Operation Descriptions

Mode A

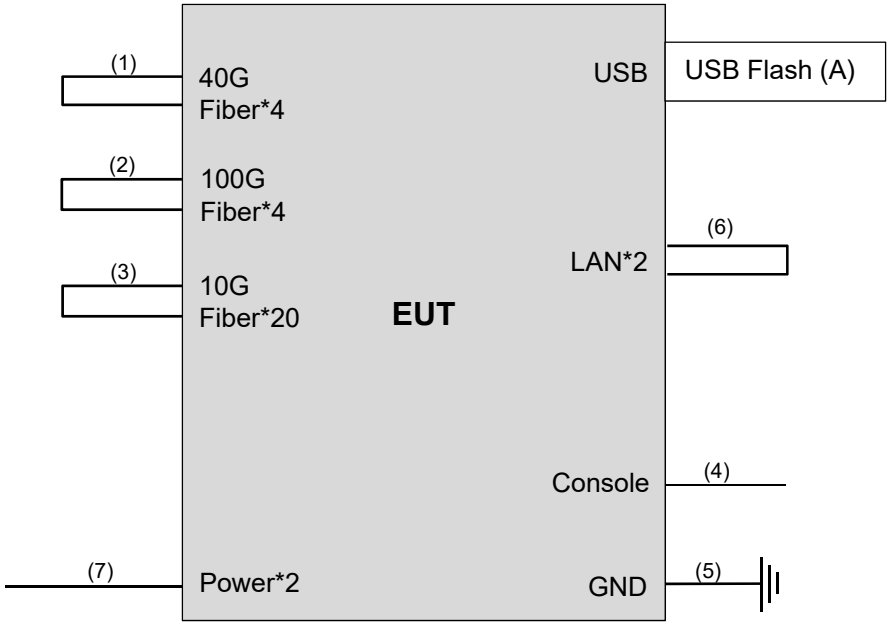
a. The EUT was charged from AC Power source.
b. The EUT's fiber optic cable and LAN cable have their own loops.
c. The EUT read and wrote data with Flash.

Mode B

a. The EUT was charged from DC Power source.
b. The EUT's fiber optic cable and LAN cable have their own loops.
c. The EUT read and wrote data with Flash.

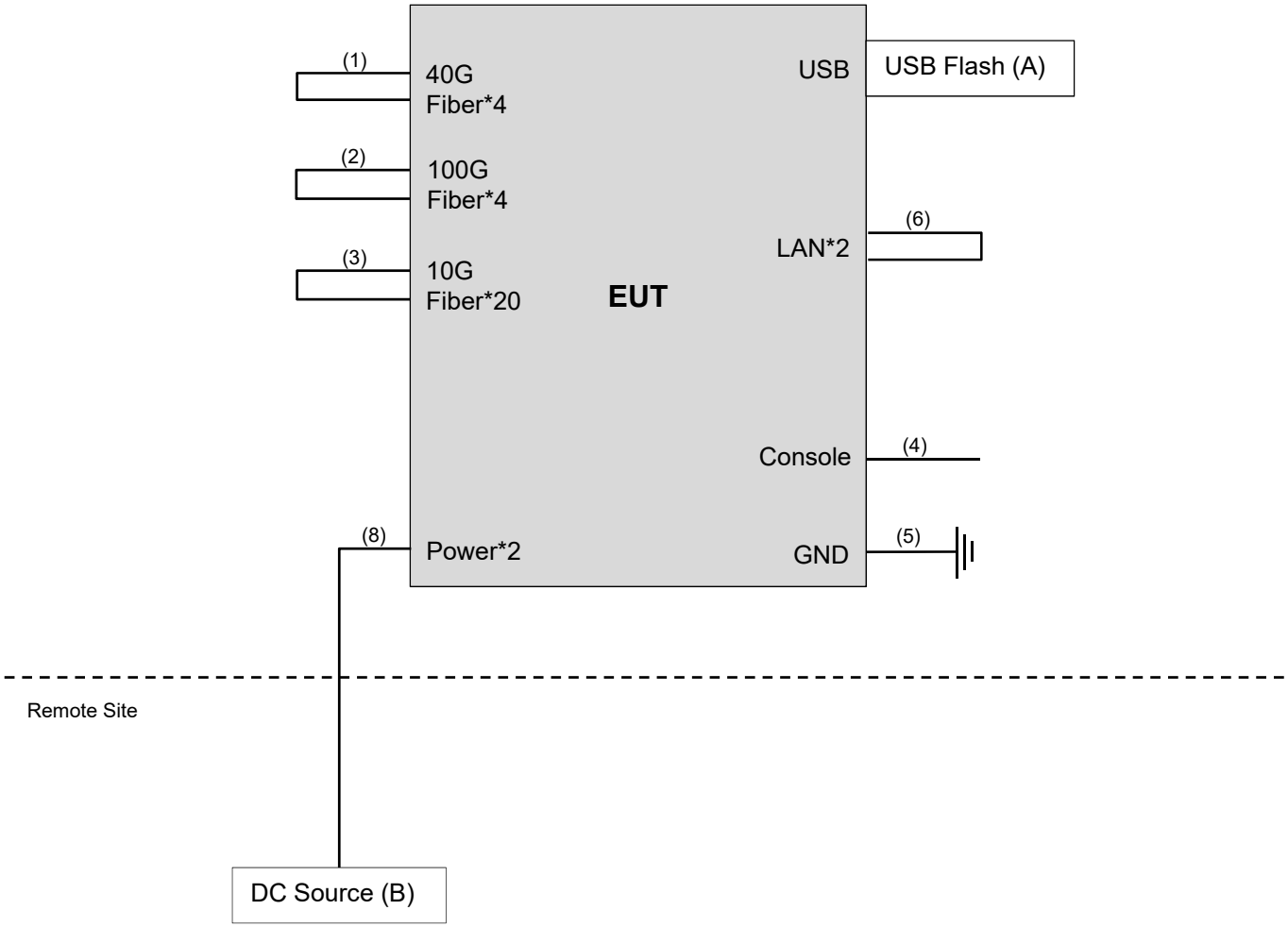
3.6 Connection Diagram of EUT and Peripheral Devices

Mode A



Remote Site

Mode B


(1)
40G
Fiber*4
(2)
100G
Fiber*4
(3)
10G
Fiber*20
EUT
USB
USB Flash (A)
(6)
LAN*2
Console
(4)
(8)
Power*2
GND
(5)
Remote Site
DC Source (B)

3.7 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	USB Flash	Transcend	8GB	N/A	N/A	Supplied by applicant
B.	DC Source	Inspower	DC60-60D	212005	N/A	--

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

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Fiber Cable	2	2.8	N	0	Supplied by applicant
2.	Fiber Cable	2	2.8	N	0	Supplied by applicant
3.	Fiber Cable	10	2.8	N	0	Supplied by applicant
4.	Console Cable	1	2	N	0	Supplied by applicant
5.	GND Cable	1	2	N	0	Supplied by applicant
6.	LAN Cable	1	3	N	0	RJ45 Cat.5e, Provided by Lab
7.	AC Power Cable	2	1.8	N	0	--
8.	DC Power Cable	2	10	N	0	--

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

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Conducted Emissions from Power Ports

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Jan. 22, 2022	Jan. 21, 2023
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2021	Sep. 03, 2022
AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Sep. 17, 2021	Sep. 16, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The test was performed in HwaYa Shielded Room 2 (Conduction 2).
2. The VCCI Site Registration No. is C-12047.
3. Test Date: 2022/03/11.

4.2 Conducted Emissions from Wired Network Ports

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Jan. 22, 2022	Jan. 21, 2023
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2021	Sep. 03, 2022
AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Sep. 17, 2021	Sep. 16, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA
ISN/AAN	ISN T200A	38321	Jul. 21, 2021	Jul. 20, 2022
ISN/AAN	FCC-TLISN-T4-02-09	091435	May 18, 2021	May 17, 2022
ISN/AAN	ISN T800	53451	Apr. 11, 2021	Apr. 10, 2022
Impedance-stabilization-network TESEQ	ISN ST08	41211	Sep. 23, 2021	Sep. 22, 2022
Impedance-stabilization-network TESEQ	ISN S751	40600	Sep. 23, 2021	Sep. 22, 2022

Note: 1. The test was performed in HwaYa Shielded Room 2 (Conduction 2).
2. The VCCI Site Registration No. is T-11654.
3. Test Date: 2022/03/16.

4.3 Radiated Emissions up to 1 GHz

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Antenna Tower BVADT	AT100	AT93021702	NA	NA
Attenuator Mini-Circuits	BW-N4W5+	PAD-CH3-03	Jul. 24, 2021	Jul. 23, 2022
BandPass Filter MICRO-TRONICS	BRM17690-01	002	Sep. 04, 2021	Sep. 03, 2022
	BRM50716-01	G010	Sep. 04, 2021	Sep. 03, 2022
Boresight antenna tower fixture BV	BAF-02	3	NA	NA
Controller BVADT	SC100	SC93021702	NA	NA
Software BVADT	ADT_Radiated_V8.7 .08	NA	NA	NA
Turn Table BVADT	TT100	TT93021702	NA	NA
Horn Antenna Schwarzbeck	BBHA 9120 D	209	Nov. 14, 2021	Nov. 13, 2022
Pre_Amplifier Agilent	8449B	3008A02465	Mar. 22, 2021	Mar. 21, 2022
PXA KEYSIGHT	N9030A	MY54490561	Jul. 28, 2021	Jul. 27, 2022
RF Coaxial Cable HUBER+SUHNER&EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3- 03(309224+170907)	Jul. 24, 2021	Jul. 23, 2022

Note: 1. The test was performed in HwaYa Chamber 3 (966 Chamber 2).
2. The VCCI Site Registration No. is R-20132.
3. Test Date: 2022/03/01.

4.4 Radiated Emissions above 1 GHz

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer Agilent	E4446A	MY51100039	Dec. 07, 2021	Dec. 06, 2022
PXA S Analyzer KEYSIGHT	N9030B	MY57141885	Jun. 07, 2021	Jun. 06, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-149	Oct. 29, 2021	Oct. 28, 2022
RF signal cable (with 5dB PAD) Times	LMR-400 (18M)	CABLE-CH2-01	Mar. 22, 2021	Mar. 21, 2022
HORN Antenna (with 4dB PAD) SCHWARZBECK	BBHA 9120 D	9120D-405	Nov. 14, 2021	Nov. 13, 2022
Pre-Amplifier Agilent (Above 1GHz)	8449B	3008A01961	Sep. 04, 2021	Sep. 03, 2022
Software BV ADT	BV ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Controller BV ADT	SC100	SC93021702	NA	NA
BandPass Filter (2.4G) MICRO-TRONICS	BRM17690-01	003	Sep. 04, 2021	Sep. 03, 2022
BandPass Filter (5G) MICRO-TRONICS	BRM50716-01	G011	Sep. 04, 2021	Sep. 03, 2022
RF Coaxial Cable EMCI	EMC102-KM-KM-1000	170819	Sep. 04, 2021	Sep. 03, 2022
RF Coaxial Cable Rosnol	K1K50-UP0279-K1K50-3000	181129-1	Sep. 04, 2021	Sep. 03, 2022
RF Coaxial Cable JUNFLON+EMC	JUNFLON+EMC104-SM-SM-6000	Cable-CH2-02(MWX3221308G003+130710)	Jan. 15, 2022	Jan. 14, 2023
Fix tool for Boresight antenna	BAF-01	2	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 04, 2021	Sep. 03, 2022
HORN Antenna (with 3dB PAD) SCHWARZBECK	BBHA 9170	148	Nov. 14, 2021	Nov. 13, 2022

Note: 1. The test was performed in HwaYa Chamber 2 (966 Chamber 1).
2. The VCCI Site Registration No. is G-10018.
3. The 3dB beamwidth of the horn antenna is minimum 30 degree (or w = 1.6m at 3m distance) for 1~6 GHz.
4. Test Date: 2022/01/21.

5 Limits of Test Items

5.1 Conducted Emissions from Power Ports

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.5 - 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 Conducted Emissions from Wired Network Ports

Frequency (MHz)	Coupling Device	Class A				Class B			
		Voltage Limit (dBuV)		Current limits (dBuA)		Voltage Limit (dBuV)		Current limits (dBuA)	
		Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	Using AAN	97-87	84-74	-	-	84-74	74-64	-	-
0.5-30		87	74	-	-	74	64	-	-
0.15-0.5	Using CVP and Current probe	97-87	84-74	53-43	40-30	84-74	74-64	40-30	30-20
0.5-30		87	74	43	30	74	64	30	20
0.15-0.5	Using a 150 Ω load	-	-	53-43	40-30	-	-	40-30	30-20
0.5-30		-	-	43	30	-	-	30	20

Note: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

5.3 Radiated Emissions up to 1 GHz

Frequency (MHz)	Class A Quasi-peak (dBuV/m)		Class B Quasi-peak (dBuV/m)	
	at 3m	at 10m	at 3m	at 10m
30 - 230	50	40	40	30
230 - 1000	57	47	47	37

Notes: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.4 Radiated Disturbance above 1 GHz

Frequency (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Average	Peak	Average	Peak
1 to 3	56	76	50	70
3 to 6	60	80	54	74

Notes: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

Frequency Range of Radiated Measurement (For unintentional radiators)

Highest internal frequency (*Fx*) (MHz)	Highest measurement frequency (*FM*) (GHz)
Fx *≤ 108 MHz*	1
108 MHz < ***Fx*** ≤ 500 MHz	2
500 MHz < ***Fx*** ≤ 1 GHz	5
Fx *> 1 GHz*	5 x ***Fx*** up to a maximum of 6 GHz
Fx is the highest fundamental frequency generated and/or used in the ITE or digital apparatus under test.	

6 Test Arrangements

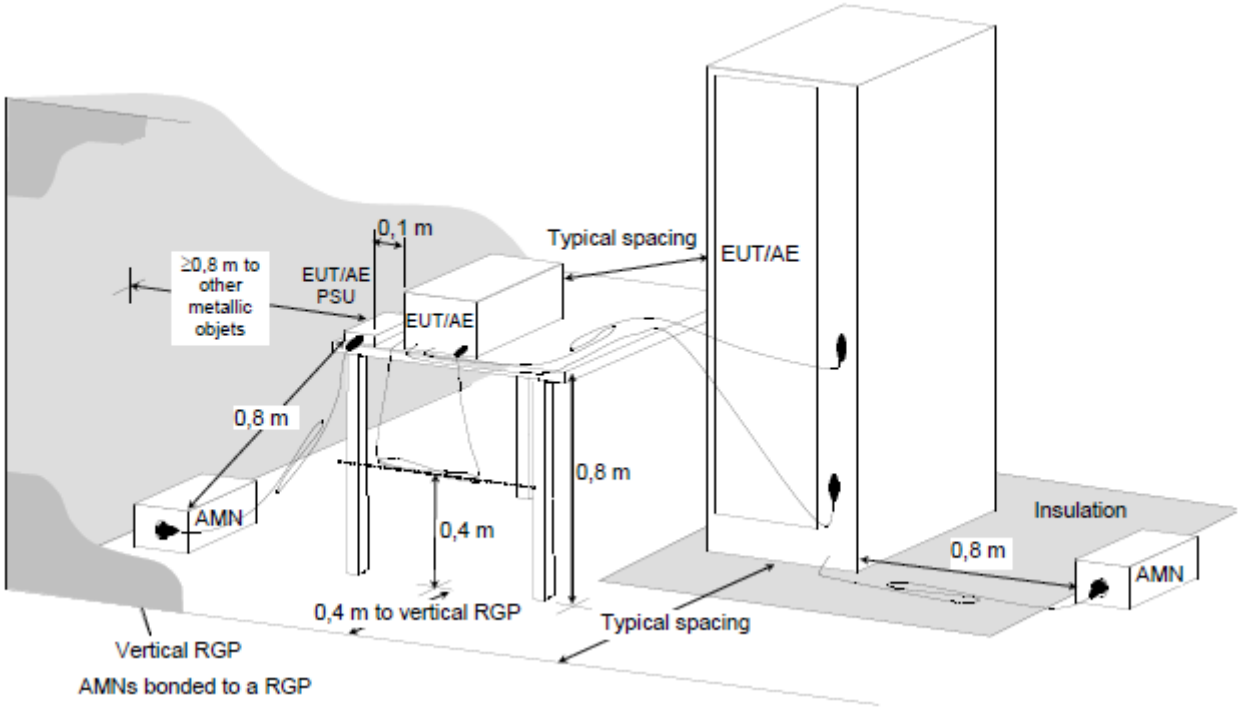
6.1 Conducted Emissions from Power Ports

a. The EUT is 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), or an Artificial Network (AN) as specified in CISPR 25 if uses in a vehicle. Other support units are connected to the power mains through another LISN and/or AN. They provide 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.



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

6.2 Conducted Emissions from Wired Network Ports

Method of Using AANs:

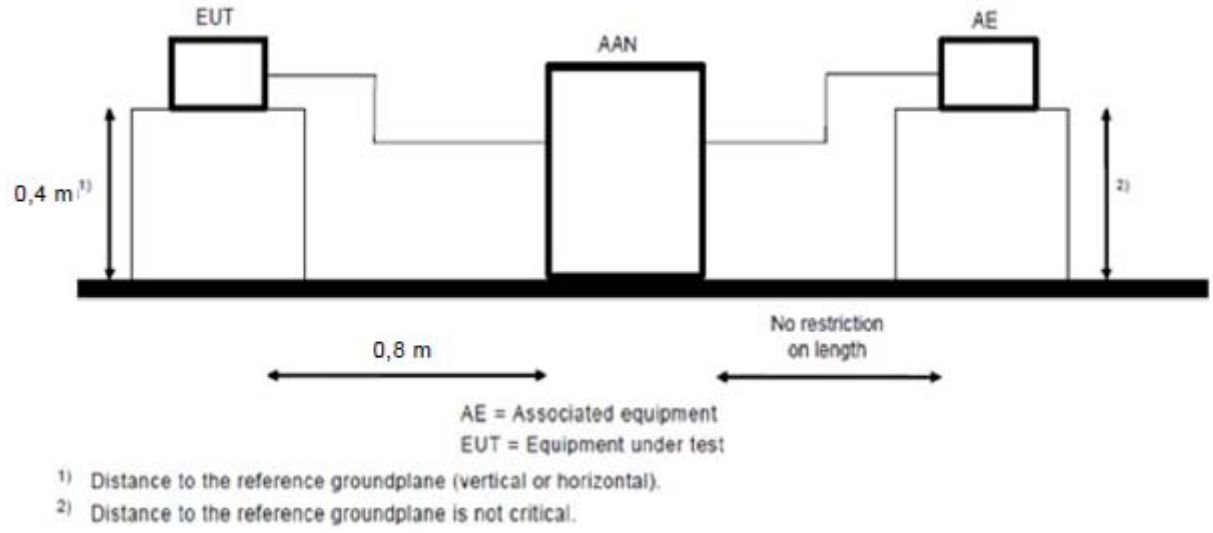
a. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to AAN directly to reference ground plane.

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 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.



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

Method of Using a 150 Ω load to the outside surface of the shielding cable:

a. Breaks the external protective insulation (exposing the shield) and connect a 150Ω resistor from the outside surface of the shield to ground.

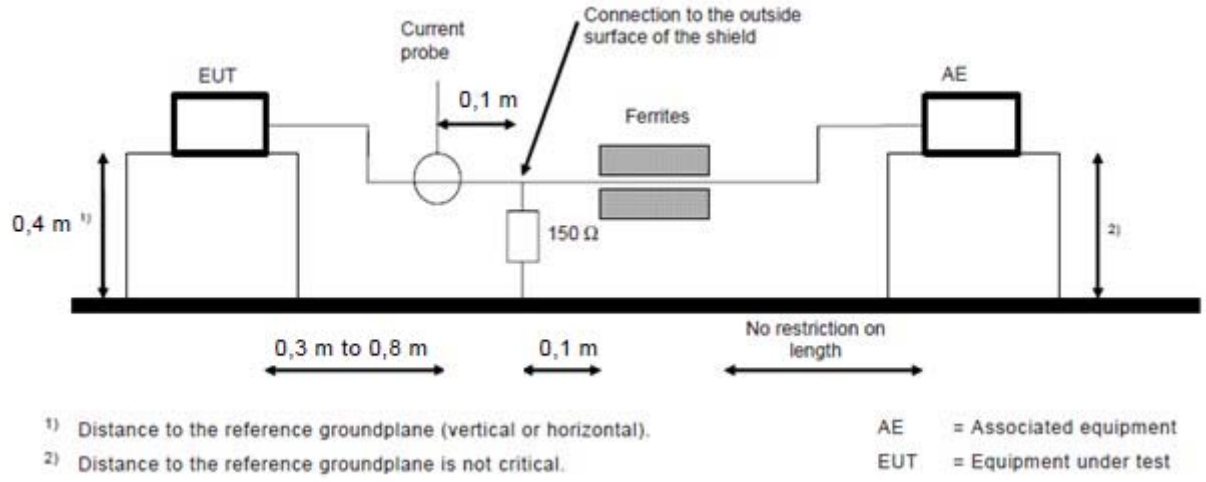
b. A current probe shall be placed at 0.1 m from the 150Ω resistor. The current probe to EUT horizontal distance is between 0.3 m to 0.8 m.

c. If current measurement is used, measure current at the measurement port of the current probe, correct the reading by adding the current probe division factor, and compare to the current limit.

d. It is not necessary to apply the voltage limit if a current probe is used.

e. 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.



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

Method of Using a combination of current probe and capacitive voltage probe:

a. Measure current with a current probe.

b. Compare the measured current with the applicable current limit.

c. Measure voltage with a capacitive voltage probe as specified in 5.2.2 of CISPR 16-1-2.

d. Adjust the measured voltage as follows:

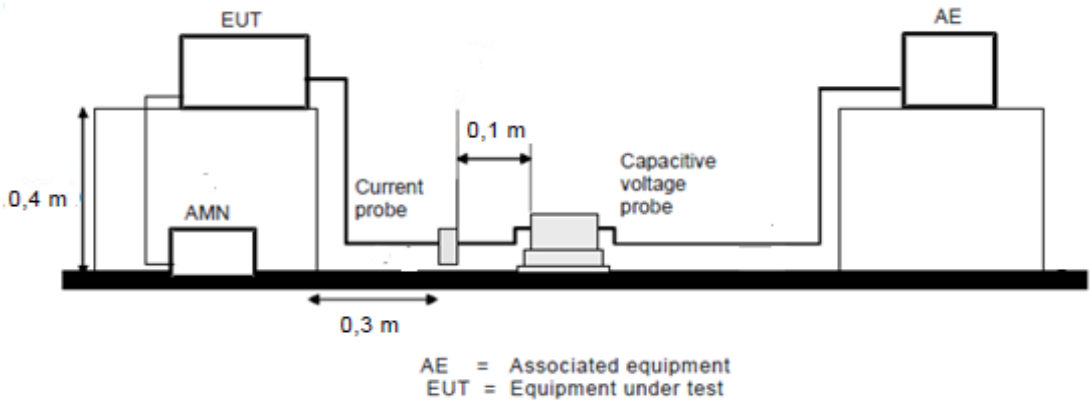
- current margin ≤ 6 dB – subtract the actual current margin from measured voltage;
- current margin > 6 dB – subtract 6 dB from measured voltage.

e. Compare adjusted voltage with the applicable voltage limit

f. Both the measured current and the adjusted voltage shall be below the applicable

g. 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.

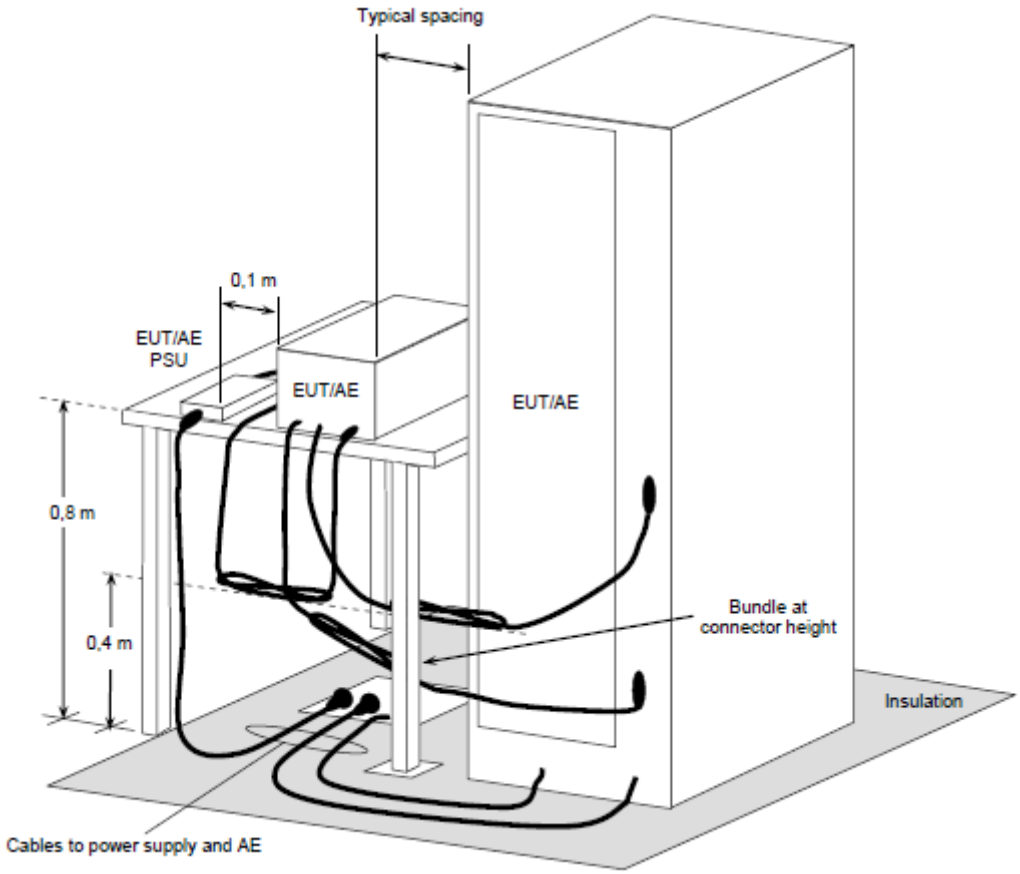


For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.3 Radiated Emissions up to 1 GHz

a. For the table-top EUT is placed on a 0.8 meter to the top of rotating table; for the the floor standing EUT shall be insulated (by insulation of maximum thickness of 150 mm) from the horizontal reference ground plane. The rotating table is rotated 360 degrees to determine the position of the highest radiation. If the equipment requires a dedicated ground connection, this shall be provided and bonded to the RGP.
b. The EUT is set 10 meters away from the interference-receiving antenna, which is 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 is arranged to its worst case and then the antenna is tuned to heights from 1 m to 4 m and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system is 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.

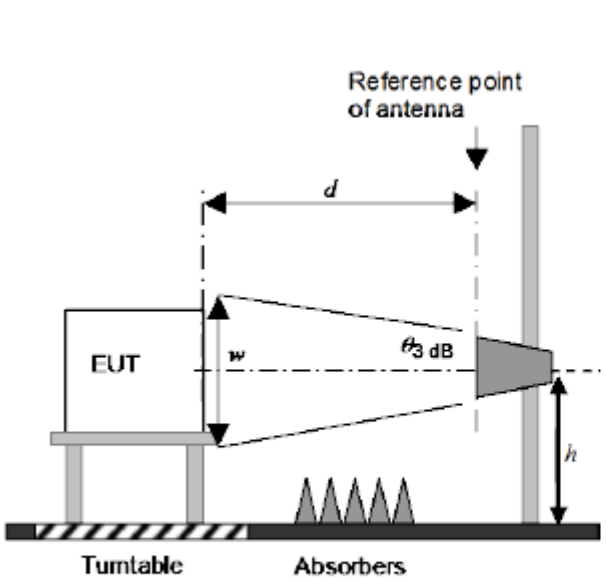


For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

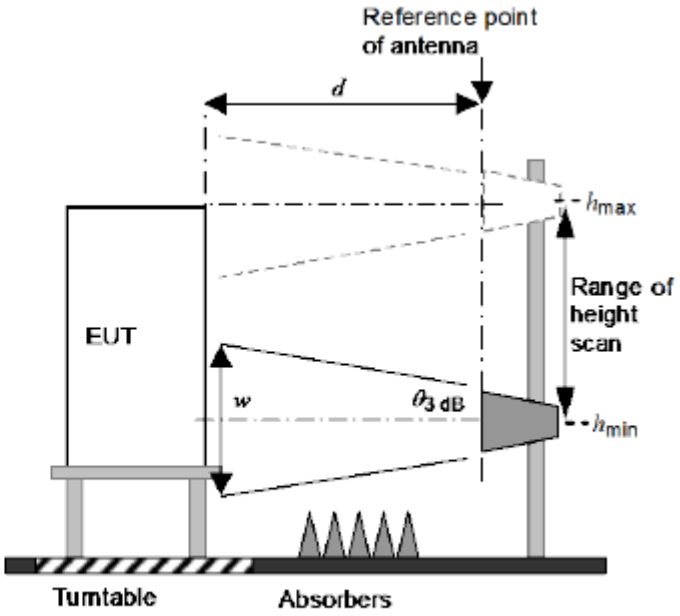
6.4 Radiated Emissions above 1 GHz

a. For the table-top EUT is placed on a 0.8 meter to the top of rotating table; for the the floor standing EUT shall be insulated (by insulation of maximum thickness of 150 mm) from the horizontal reference ground plane. The rotating table is rotated 360 degrees to determine the position of the highest radiation. If the equipment requires a dedicated ground connection, this shall be provided and bonded to the RGP.
b. The EUT was set *d* = 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 detects 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.



a) *w* encompasses EUT height
(fixed-height measurement)



b) *w* does not encompass EUT height
(height scan required)

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

7 Test Results

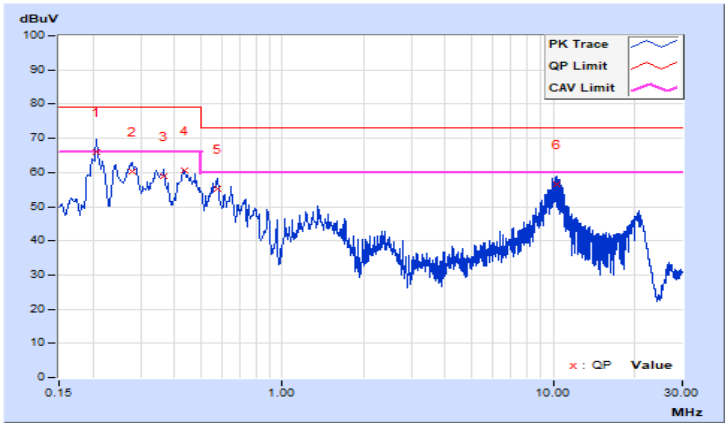
7.1 Conducted Emissions from Power Ports

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	Environmental Conditions	20℃, 68%RH
Tested by	Slash Huang		

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	**0.20600**	**10.16**	**55.91**	**48.11**	**66.07**	**58.27**	**79.00**	**66.00**	**-12.93**	**-7.73**
2	0.27786	10.19	50.02	42.66	60.21	52.85	79.00	66.00	-18.79	-13.15
3	0.36600	10.23	48.75	40.18	58.98	50.41	79.00	66.00	-20.02	-15.59
4	0.43400	10.24	50.48	43.34	60.72	53.58	79.00	66.00	-18.28	-12.42
5	0.57400	10.26	44.97	39.03	55.23	49.29	73.00	60.00	-17.77	-10.71
6	10.30600	10.46	46.06	41.35	56.52	51.81	73.00	60.00	-16.48	-8.19

Remarks:

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

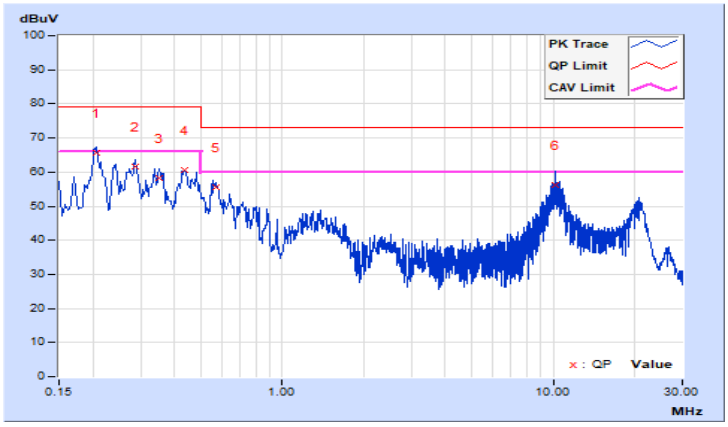


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	Environmental Conditions	20℃, 68%RH
Tested by	Slash Huang		

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	0.20600	10.19	55.36	47.99	65.55	58.18	79.00	66.00	-13.45	-7.82
2	0.28600	10.22	51.44	44.64	61.66	54.86	79.00	66.00	-17.34	-11.14
3	0.35000	10.24	47.94	39.47	58.18	49.71	79.00	66.00	-20.82	-16.29
4	0.43484	10.26	50.30	43.18	60.56	53.44	79.00	66.00	-18.44	-12.56
5	0.56770	10.27	45.21	39.07	55.48	49.34	73.00	60.00	-17.52	-10.66
6	10.23800	10.51	45.79	41.06	56.30	51.57	73.00	60.00	-16.70	-8.43

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



7.2 Conducted Emissions from Wired Network Ports

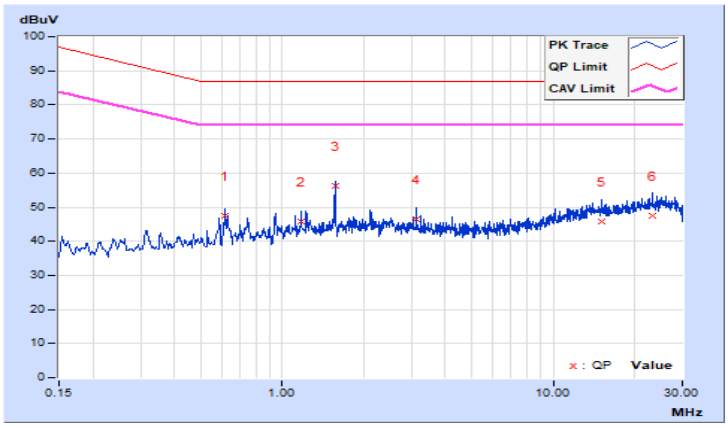
LAN Port, 1Gbps

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	100Vac, 50Hz	Environmental Conditions	20℃, 68%RH
Tested by	Slash Huang		

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	0.61400	9.70	37.80	35.32	47.50	45.02	87.00	74.00	-39.50	-28.98
2	1.17400	9.63	36.16	31.92	45.79	41.55	87.00	74.00	-41.21	-32.45
3	1.56600	9.61	46.75	45.78	56.36	55.39	87.00	74.00	-30.64	-18.61
4	3.13400	9.56	36.82	32.89	46.38	42.45	87.00	74.00	-40.62	-31.55
5	15.06600	9.62	36.14	30.00	45.76	39.62	87.00	74.00	-41.24	-34.38
6	23.19400	9.78	37.67	31.48	47.45	41.26	87.00	74.00	-39.55	-32.74

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



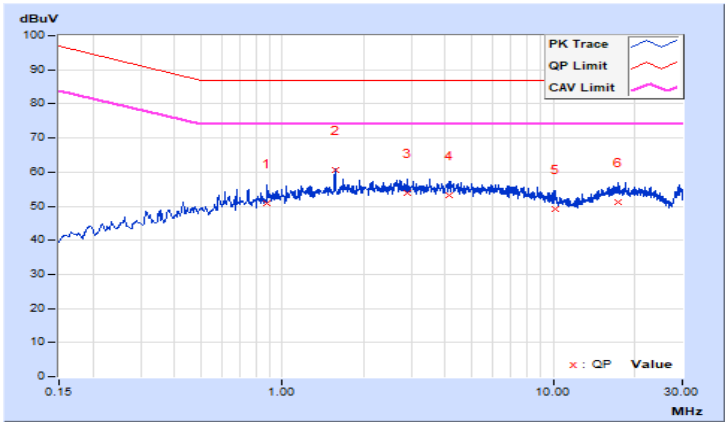
LAN Port, 1Gbps

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	60Vdc	Environmental Conditions	25℃, 72%RH
Tested by	Slash Huang		

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	0.88200	9.65	41.36	35.26	51.01	44.91	87.00	74.00	-35.99	-29.09
2	**1.56600**	**9.61**	**50.90**	**48.28**	**60.51**	**57.89**	**87.00**	**74.00**	**-26.49**	**-16.11**
3	2.89000	9.57	44.17	37.98	53.74	47.55	87.00	74.00	-33.26	-26.45
4	4.14600	9.55	43.68	37.59	53.23	47.14	87.00	74.00	-33.77	-26.86
5	10.15400	9.54	39.59	33.44	49.13	42.98	87.00	74.00	-37.87	-31.02
6	17.46600	9.65	41.59	35.37	51.24	45.02	87.00	74.00	-35.76	-28.98

Remarks:

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



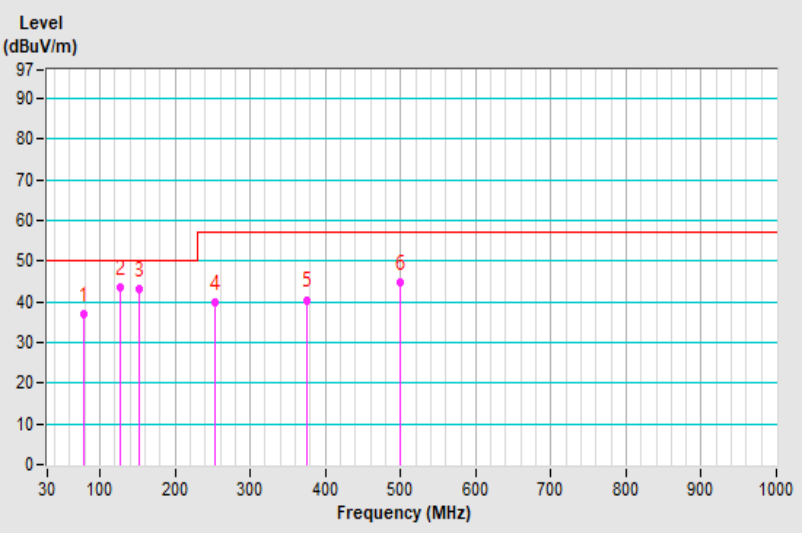
7.3 Radiated Emissions up to 1 GHz

Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Tested By	Kai Chu	Environmental Conditions	21℃, 75%RH

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	78.696	37.09 QP	50.00	-12.91	4.00 H	254	50.22	-13.13
2	**127.005**	**43.69 QP**	**50.00**	**-6.31**	**3.00 H**	**110**	**54.12**	**-10.43**
3	152.323	43.24 QP	50.00	-6.76	2.50 H	120	51.88	-8.64
4	253.208	39.94 QP	57.00	-17.06	1.00 H	240	49.08	-9.14
5	374.998	40.43 QP	57.00	-16.57	1.00 H	313	45.82	-5.39
6	499.988	44.79 QP	57.00	-12.21	1.00 H	5	47.17	-2.38

Remarks:

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

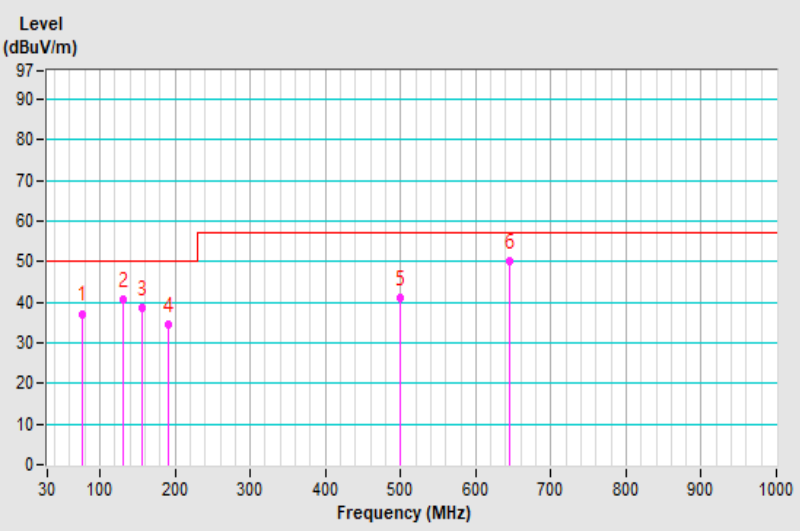


Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Tested By	Kai Chu	Environmental Conditions	21℃, 75%RH

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	77.047	37.15 QP	50.00	-12.85	1.00 V	249	49.99	-12.84
2	131.710	40.67 QP	50.00	-9.33	1.50 V	90	50.59	-9.92
3	155.815	38.49 QP	50.00	-11.51	1.00 V	117	47.10	-8.61
4	190.349	34.36 QP	50.00	-15.64	1.00 V	360	45.59	-11.23
5	499.988	40.97 QP	57.00	-16.03	1.00 V	325	43.35	-2.38
6	644.526	50.02 QP	57.00	-6.98	1.00 V	325	48.84	1.18

Remarks:

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



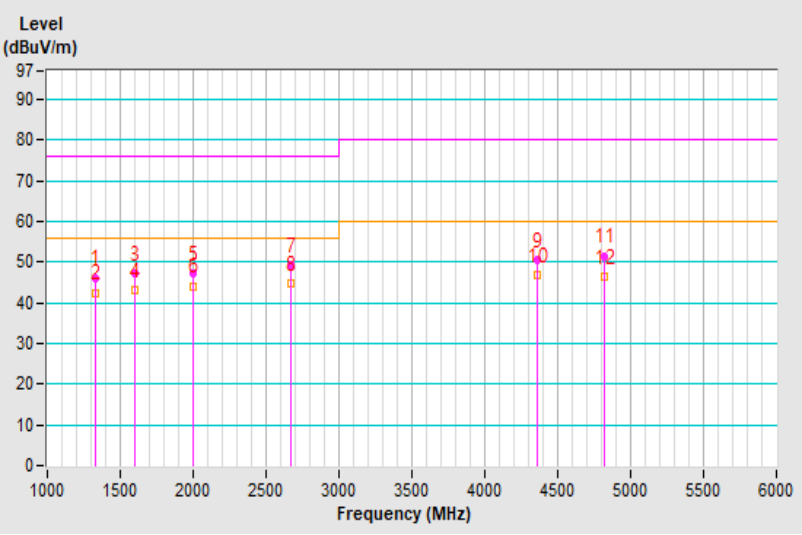
7.4 Radiated Emissions above 1 GHz

Frequency Range	1GHz ~ 6GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested By	Fox Chang	Environmental Conditions	23℃, 68%RH

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	1333.37	46.19 PK	76.00	-29.81	1.27 H	322	48.05	-1.86
2	1333.37	42.52 AV	56.00	-13.48	1.27 H	322	44.38	-1.86
3	1599.97	47.26 PK	76.00	-28.74	1.61 H	77	49.44	-2.18
4	1599.97	43.21 AV	56.00	-12.79	1.61 H	77	45.39	-2.18
5	2000.17	47.22 PK	76.00	-28.78	1.00 H	271	46.98	0.24
6	2000.17	44.14 AV	56.00	-11.86	1.00 H	271	43.90	0.24
7	2666.80	49.31 PK	76.00	-26.69	1.00 H	37	46.15	3.16
8	2666.80	44.88 AV	56.00	-11.12	1.00 H	37	41.72	3.16
9	4357.34	50.69 PK	80.00	-29.31	1.20 H	204	42.63	8.06
10	4357.34	46.69 AV	60.00	-13.31	1.20 H	204	38.63	8.06
11	4818.83	51.52 PK	80.00	-28.48	1.00 H	151	42.16	9.36
12	4818.83	46.45 AV	60.00	-13.55	1.00 H	151	37.09	9.36

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

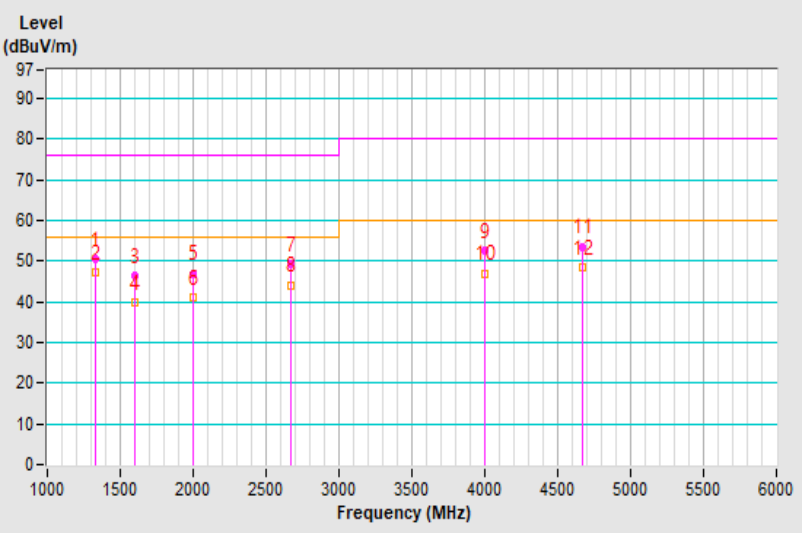


Frequency Range	1GHz ~ 6GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested By	Fox Chang	Environmental Conditions	23℃, 68%RH

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	1333.41	50.57 PK	76.00	-25.43	1.44 V	257	52.43	-1.86
2	**1333.41**	**47.12 AV**	**56.00**	**-8.88**	**1.44 V**	**257**	**48.98**	**-1.86**
3	1600.00	46.39 PK	76.00	-29.61	1.23 V	339	48.57	-2.18
4	1600.00	39.72 AV	56.00	-16.28	1.23 V	339	41.90	-2.18
5	2000.14	47.00 PK	76.00	-29.00	1.60 V	20	46.76	0.24
6	2000.14	41.16 AV	56.00	-14.84	1.60 V	20	40.92	0.24
7	2666.46	49.38 PK	76.00	-26.62	1.27 V	120	46.22	3.16
8	2666.46	44.13 AV	56.00	-11.87	1.27 V	120	40.97	3.16
9	4000.20	52.66 PK	80.00	-27.34	1.37 V	340	45.36	7.30
10	4000.20	47.04 AV	60.00	-12.96	1.37 V	340	39.74	7.30
11	4666.83	53.63 PK	80.00	-26.37	1.00 V	96	44.61	9.02
12	4666.83	48.35 AV	60.00	-11.65	1.00 V	96	39.33	9.02

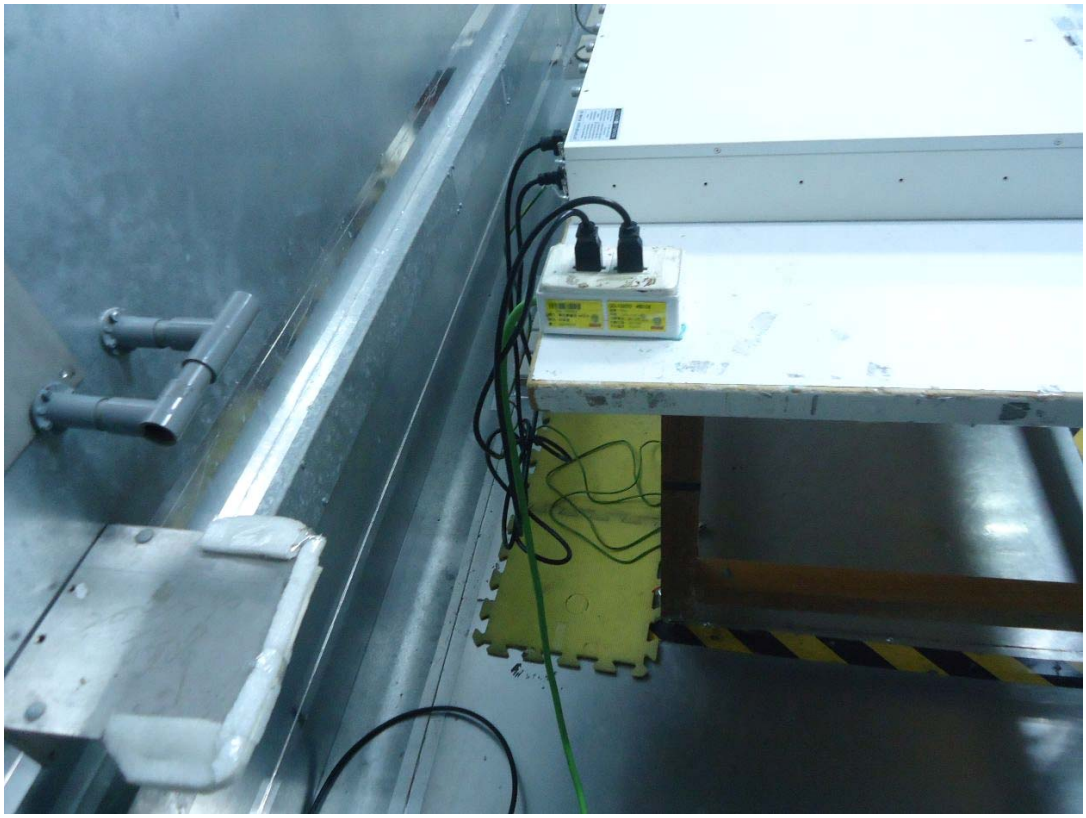
Remarks:

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

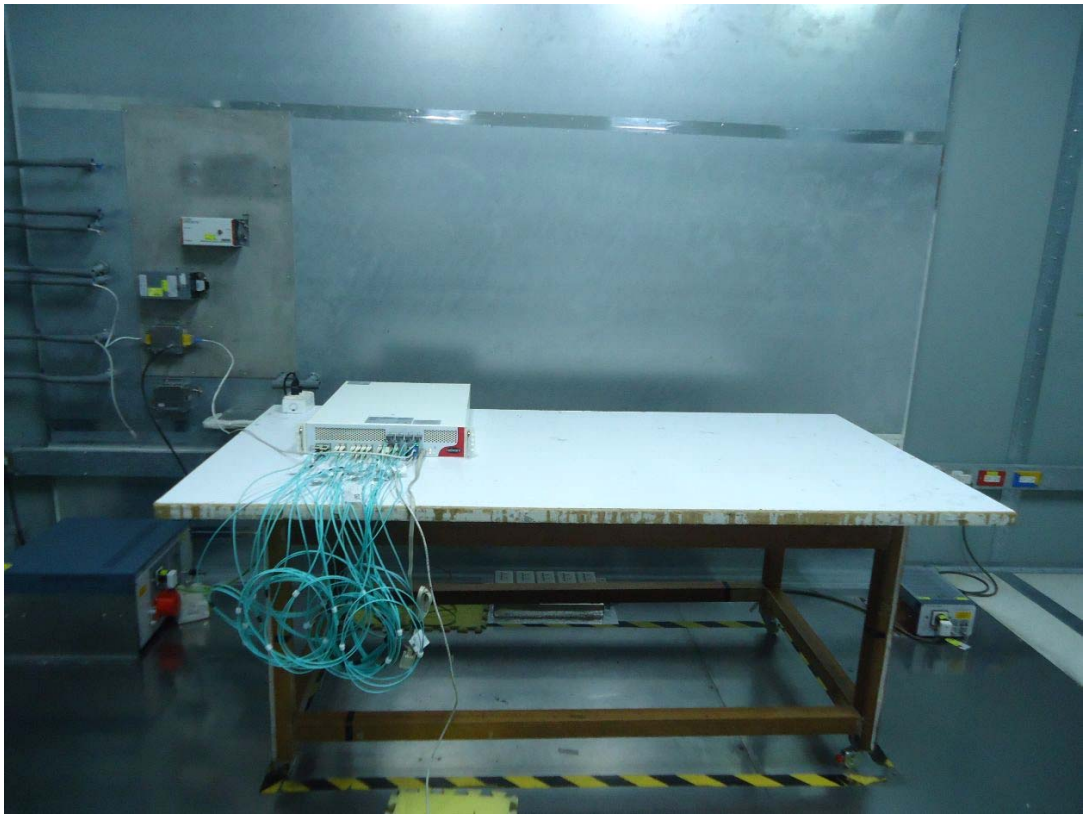


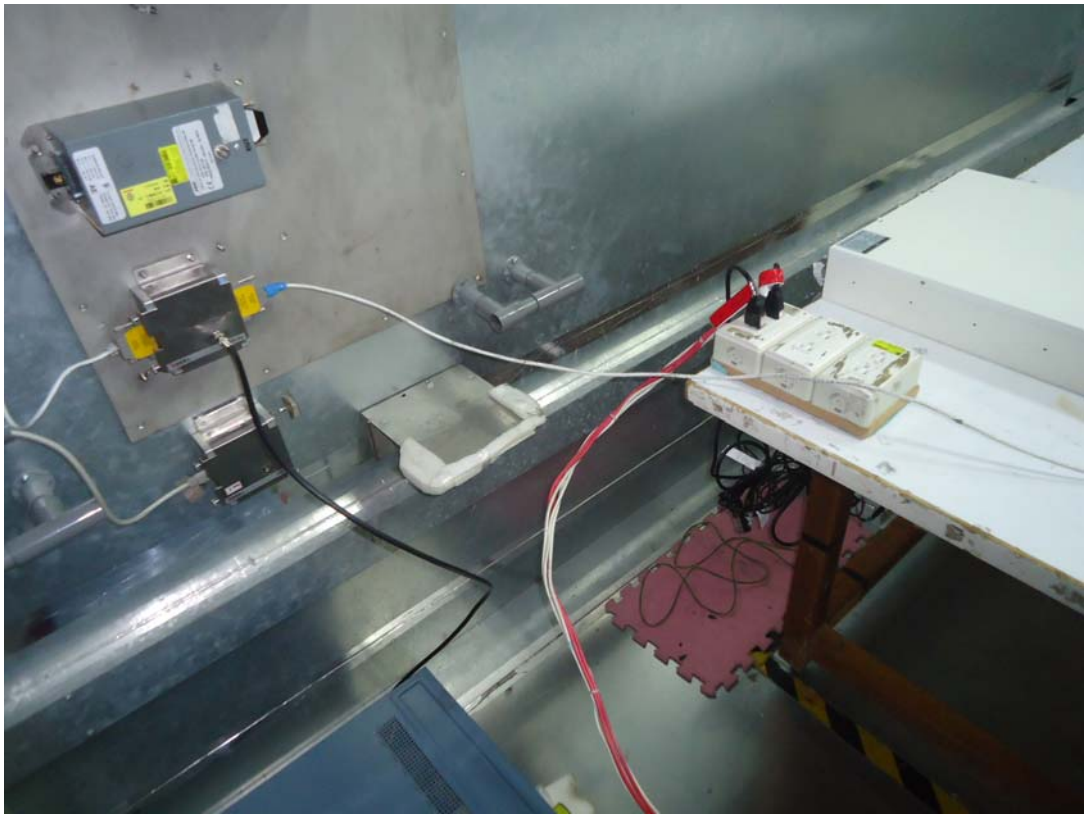
8 Pictures of Test Arrangements

8.1 Conducted Emissions from Power Ports

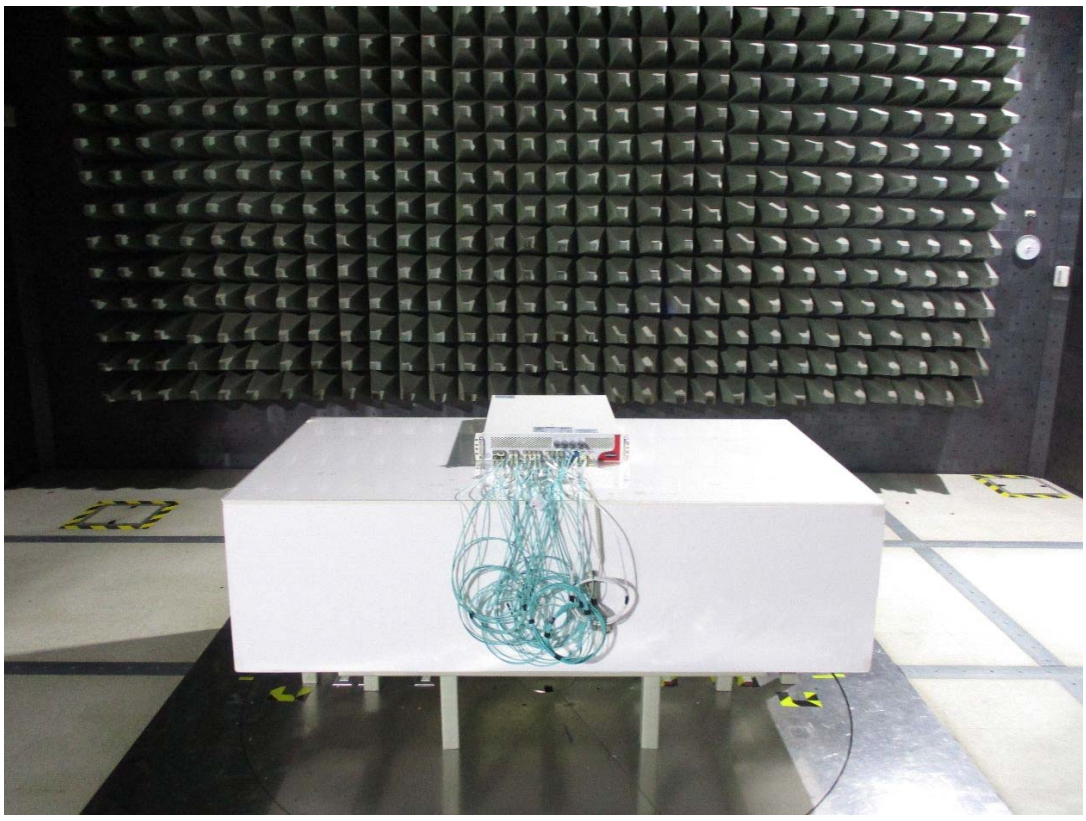


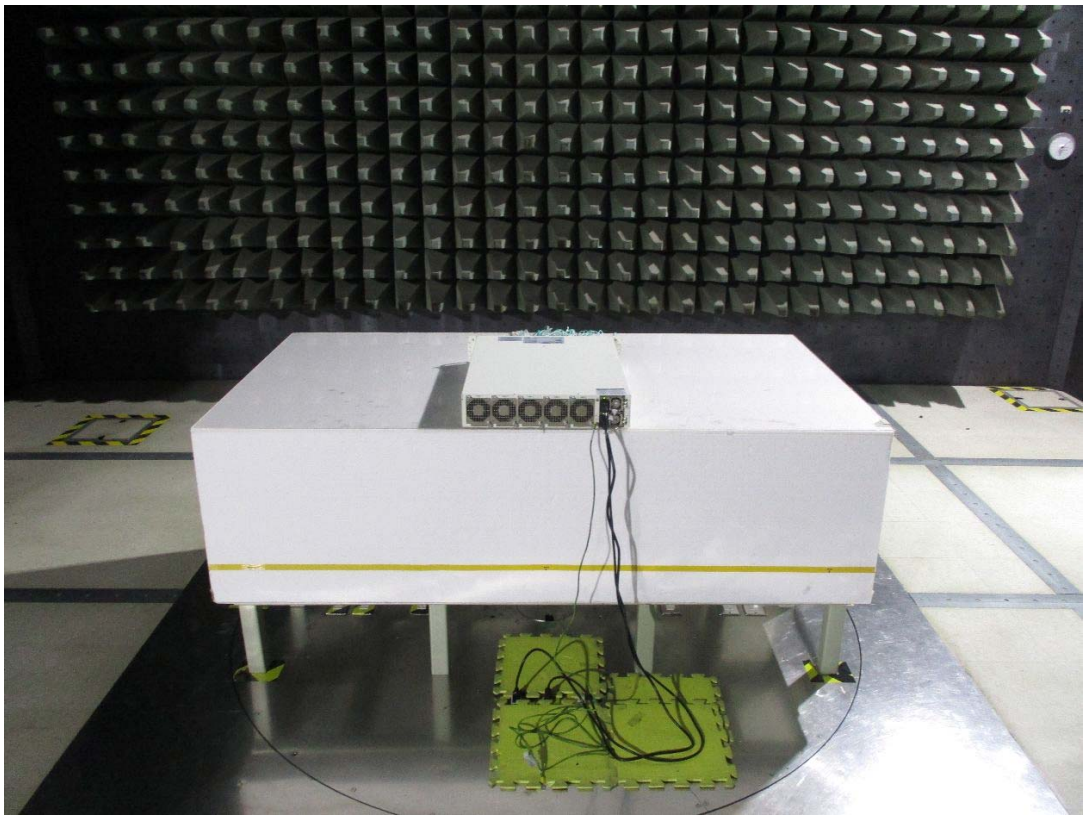
8.2 Conducted Emissions from Wired Network Ports



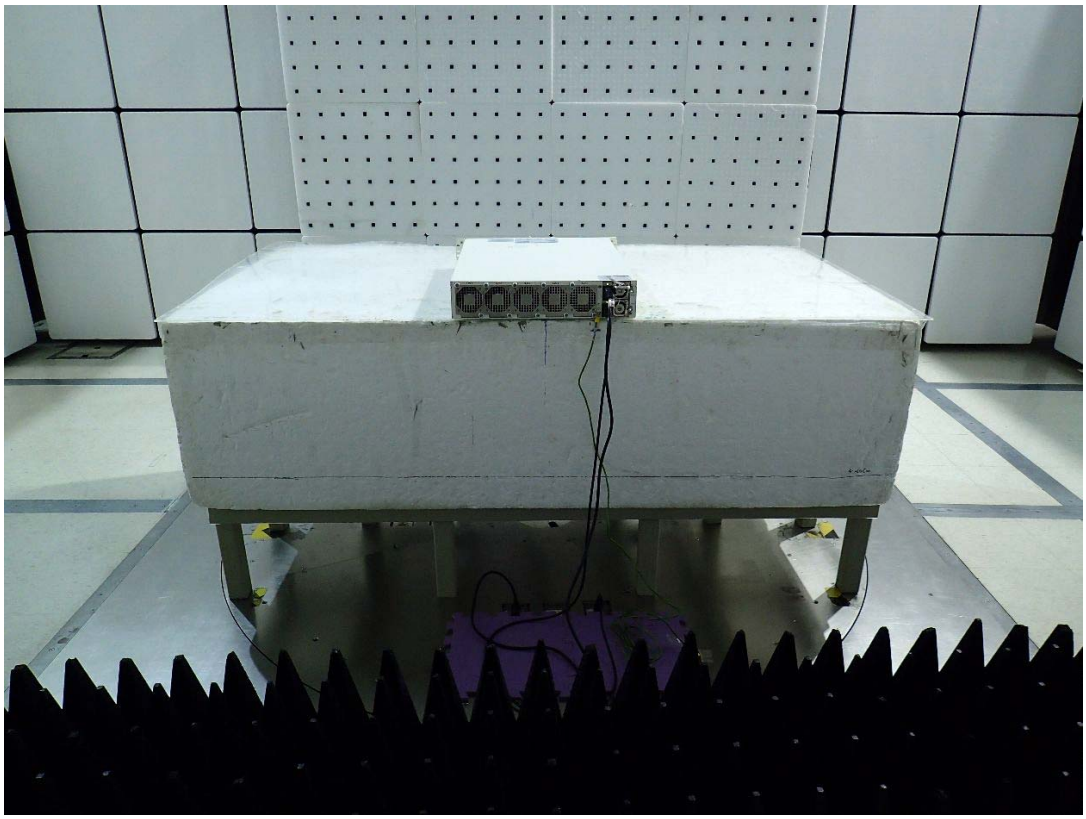


8.3 Radiated Emissions up to 1 GHz





8.4 Radiated Emissions above 1 GHz



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

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