TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart B, Class B** **ANSI C63.4:2014**
Report No.:	FDBENL-WTW-P22070904
FCC ID:	RYK-WNFQ269AXBT
Product:	802.11ax/ac/a/b/g/n Wi-Fi + BT M.2 card
Brand:	Sparklan
Model No.:	WNFQ-269AX(BT)
Received Date:	2022/7/31
Test Date:	2022/10/5 ~ 2022/10/13
Issued Date:	2022/12/23
Applicant:	SparkLAN Communications, Inc.
Address:	5F, No. 199, Ruihu St., Neihu Dist.,Taipei City 114067, Taiwan, R.O.C
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan
FCC Registration / Designation Number:	960022 / TW1058

Approved by: _____ , **Date:** **2022/12/23**

Ken Lu / Manager

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Prepared by : Vito Lung / Specialis

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Release Control Record

Issue No.	Description	Date Issued
FDBENL-WTW-P22070904	Original release.	2022/12/23

1 Certificate

Product:	802.11ax/ac/a/b/g/n Wi-Fi + BT M.2 card
Brand:	Sparklan
Test Model:	WNFQ-269AX(BT)
Sample Status:	Engineering sample
Applicant:	SparkLAN Communications, Inc.
Test Date:	2022/10/5 ~ 2022/10/13
Standard:	47 CFR FCC Part 15, Subpart B, Class B ANSI C63.4:2014

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

2 Summary of Test Results

The test items that the EUT need to perform in accordance with its interfaces, evaluated functions, are as follows:

Standard / Clause	Test Item	Result	Remark
FCC Part 15.107	Conducted Emissions from Power Ports	Pass	Minimum passing Class B margin is -16.63 dB at 0.16562 MHz
FCC Part 15.109	Radiated Emissions up to 1 GHz	Pass	Minimum passing Class B margin is -4.98 dB at 31.29 MHz
FCC Part 15.109	Radiated Emissions above 1 GHz	Pass	Minimum passing Class B margin is -9.60 dB at 17864.00 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	Specification	Expanded Uncertainty (k=2) (±)	Maximum allowable uncertainty (±)
Conducted Emissions from Power Ports	9 kHz ~ 30 MHz	1.8 dB	3.4 dB (U_{cispr})
Radiated Emissions up to 1 GHz	30 MHz ~ 1 GHz	5.8 dB	6.3 dB (U_{cispr})
Radiated Emissions above 1 GHz	1 GHz ~ 6 GHz	4.85 dB	5.2 dB (U_{cispr})
	6 GHz ~ 18 GHz	4.66 dB	5.5 dB (U_{cispr})
	18 GHz ~ 40 GHz	5.07 dB	-

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	802.11ax/ac/a/b/g/n Wi-Fi + BT M.2 card
Brand	Sparklan
Test Model	WNFQ-269AX(BT)
Sample Status	Engineering sample
Operating Software	NA
Power Supply Rating	3.3Vdc from host equipment
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This is a supplementary report of Report No.: FC201119E01 R1. The differences between them are as below information:
   - ◆ Change applicant & Brand Name & Model Name.
   - ◆ Add dipole antenna.
2. The antenna gain was declared by client; please refer to the following table:

Original

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length
1	Chain0/1	HONGBO	260-25094	3.53 3.06 3.07 4.81 4.2	2.4~2.4835 GHz 5.15~5.25 GHz 5.25~5.35 GHz 5.47~5.725 GHz 5.725~5.850GHz	0.76 1.16 1.18 1.2 1.27	PIFA	i-pex(MHF 4L)	300mm
2	Chain0/1	HONGBO	260-25083	5.09 5.14 5.09 5.16 5.12	5.850~5.895 GHz 5.925~6.425 GHz 6.425~6.525 GHz 6.525~6.875 GHz 6.875~7.125 GHz	1.29 1.32 1.35 1.4 1.45	PIFA	i-pex(MHF 4L)	300mm
3	Chain0/1	HONGBO	260-25084	3.22 3.35 3.42 4.77 4.72 4.71 4.75 4.29 4.81 4.74	2.4~2.4835 GHz 5.150~5.250 GHz 5.250~5.350 GHz 5.470~5.725 GHz	0.5 0.76 0.78 0.81 0.85 0.86 0.87 0.91 0.96 0.98	Monopole	i-pex(MHF 4L)	200mm

Newly

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Antenna Type	Connector Type	Cable Length
4	Chain0/1	Sparklan	AD-510AX	2.27 2.88 2.6 3.52	2.4~2.4835 GHz 5.150~5.825 GHz 5.850~5.895 GHz 5.925~7.125 GHz	Dipole	RP-SMA (M)	150mm

5	Chain0/1	SparkLAN	AD-103AG (UHW0935A4)	2.02 2.03 1.9	2.4~2.4835 GHz 5.150~5.850 GHz 5.850~5.895 GHz	Dipole	RP-SMA (M)	150mm
6	Chain0/1	SparkLAN	AD-302N	3.14 2.87 1.63	2.4~2.4835 GHz 5.150~5.850 GHz 5.850~5.895 GHz	Dipole	RP-SMA (M)	150mm
Note: From the antenna set above models, model: **AD-510AX** was selected as representative model for the test and its data was recorded in this report.								

3. According to above condition, all test items need to be performed. And all data was verified to meet the requirements.

4. The module has two variant designs as following table:

SKU No.	Description
SKU #1	M.2 2230 E-key
SKU #2	M.2 2230 AE-key

5. The product provides option to depopulate external LNA (Low-Noise amplifier) from 5GHz/6GHz receive path. This test report covers variation of with/without external LNA and test was conducted to confirm not change in RF compliance and EMC. And worst case was found in without external LNA.

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 7125MHz, provided by SparkLAN Communications, Inc., 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 SparkLAN Communications, Inc., 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 has been pre-tested under following test modes.

Test Condition	
Mode	Radiated Emissions up to 1 GHz
1	Client MODE AX 2.4G + Bluetooth link + Input Power(3.3 Vdc from host)
2	Client MODE AX 5G + Bluetooth link + Input Power(3.3 Vdc from host)
3	Client MODE AX 6G + Bluetooth link + Input Power(3.3 Vdc from host)
4	**Hotspot MODE AX 2.4G + Client MODE 6G + Bluetooth link + Input Power(3.3 Vdc from host)**
5	Hotspot MODE AX 5G + Client MODE 6G + Bluetooth link + Input Power(3.3 Vdc from host)
6	Hotspot MODE AX 2.4G + Client MODE 5G + Bluetooth link + Input Power(3.3 Vdc from host)
7	Hotspot MODE AX 2.4G + Client MODE 2.4G + Bluetooth link + Input Power(3.3 Vdc from host)
Note: The worst case is that mode 4 is shown in bold.	

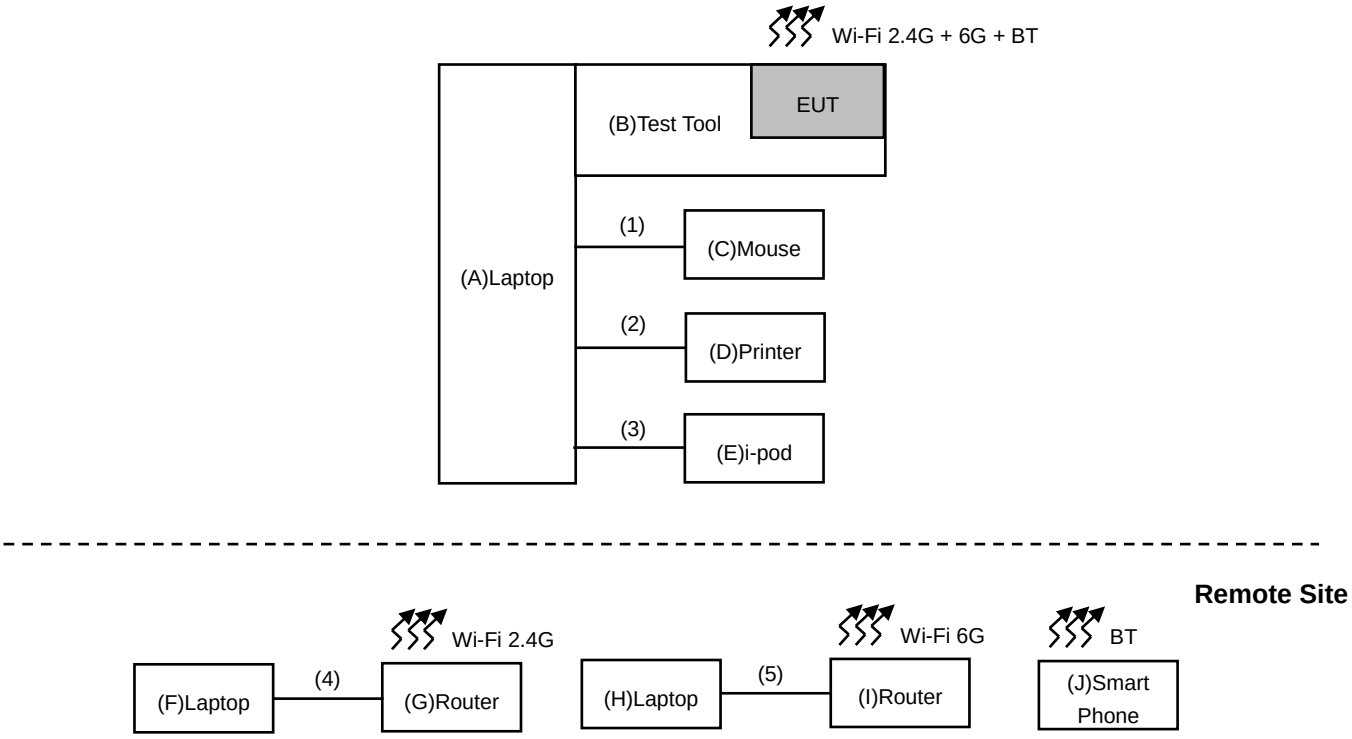
Test modes are presented in the report as below.

Test Condition	
Mode	Conducted Emissions from Power Ports
A	Hotspot MODE AX 2.4G + Client MODE 6G + Bluetooth link + Input Power(3.3 Vdc from host)
Mode	Radiated Emissions up to 1 GHz
A	Hotspot MODE AX 2.4G + Client MODE 6G + Bluetooth link + Input Power(3.3 Vdc from host)
Mode	Radiated Emissions above 1 GHz
A	Hotspot MODE AX 2.4G + Client MODE 6G + Bluetooth link + Input Power(3.3 Vdc from host)

3.5 Test Program Used and Operation Descriptions

1. Turn on the power of all equipment.
2. Support unit J (Laptop) links with support unit A (Laptop) via BT.
3. Support units F & H (Laptop) run “ping.exe” programs to communicate with support unit A (Laptop) via wireless.
4. Support unit A (Laptop) run “EMC test.exe” then sends “H” massages to itself.

3.6 Connection Diagram of EUT and Peripheral Devices



3.7 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	Lenovo	L440	R90JUJU7	N/A	Provided by Lab
B	Test Tool	N/A	N/A	N/A	N/A	Provided by applicant
C	Mouse	Logitech	M-U0026	810-002182_008	DoC	Provided by Lab
D	Printer	EPSON	LQ-300+II	G88Y074015	DoC	Provided by Lab
E	i-pod	Apple	MD778TA/A	CC4JMH7LF4T1	N/A	Provided by Lab
F	Laptop	DELL	P70F	1KY07L2	DoC	Provided by Lab
G	Router	ASUS	RT-AX88U	N/A	N/A	Provided by lab
H	Laptop	ASUS	X413F	L3N0CX14V85713A	DoC	Provided by Lab
I	Router	NETGEAR	AXE11000	N/A	N/A	Provided by lab
J	Smart Phone	SAMSUNG	SM-A715F/DS	R58N64SLYWH	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB cable	1	1.8	Yes	0	Provided by lab
2	USB cable	1	1.8	Yes	0	Provided by lab
3	USB cable	1	0.1	Yes	0	Provided by lab
4	Cat.5e cable	1	3	No	0	Provided by lab
5	Cat.5e cable	1	3	No	0	Provided by lab

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.	Calibrated Date	Calibrated Until
50 ohm terminal resistance	N/A	EMC-03	2022/9/27	2023/9/26
		EMC-04	2021/10/27	2022/10/26
DC LISN TESEQ	HV-AN 150	45176	2022/5/11	2023/5/10
		45177	2022/5/11	2023/5/10
Fixed attenuator STI	STI02-2200-10	006	2022/8/24	2023/8/23
LISN R&S	ENV216	100071	2021/10/27	2022/10/26
LISN Schwarzbeck	NNLK 8121	0809	2022/3/4	2023/3/3
	NSLK 8127	8127-522	2022/9/16	2023/9/15
RF Coaxial Cable JYEBO	5D-FB	COACAB-002	2022/8/24	2023/8/23
Software BV	BVADT_Cond_ V7.3.7.4	N/A	N/A	N/A
Test Receiver R&S	ESR3	102982	2022/5/25	2023/5/24

Notes:

1. The test was performed in HC - Conduction 3.
2. Tested Date: 2022/10/5

4.2 Radiated Emissions up to 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table CT	N/A	N/A	N/A	N/A
Fixed attenuator Marvelous Microwave Inc.	MVE2252-05	MVE2252-05-001	2022/9/8	2023/9/7
Pre_Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	2021/10/19	2022/10/18
RF Coaxial Cable COMMATE/PEWC	8D	CHGCAB-005	2022/9/8	2023/9/7
	8D-FB	CHGCAB-001-2	2022/9/8	2023/9/7
RF Coaxial Cable	RF-141	CHGCAB-004	2022/9/8	2023/9/7
Software BV	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Test Receiver Agilent	N9038A	MY51210105	2022/6/14	2023/6/13
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-360	2021/10/28	2022/10/27

Notes:

1. The test was performed in HC - 966 chamber 1. The test site validated date: 2022/9/8 (NSA)
2. Tested Date: 2022/10/13

4.3 Radiated Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table CT	N/A	N/A	N/A	N/A
Fix tool for Boresight BV	BAF-01	5	N/A	N/A
Horn Antenna FT-RF	HA-07M18G-NF	0000320091110	2021/11/14	2022/11/13
Horn Antenna Schwarzbeck	BBHA 9170	9170-424	2021/11/14	2022/11/13
Pre_Amplifier Agilent	8449B	3008A02578	2022/6/6	2023/6/5
Pre_Amplifier EMCI	EMC118A45SE	980817	2022/7/8	2023/7/7
	EMC184045SE	980770	2022/7/8	2023/7/7
RF Cable(46GHz /1.5M) SUHNER	SUCOFLEX 102	36432/2	2022/1/4	2023/1/3
RF Coaxial Cable EMCI	EMC104-SM-SM-2000	181208	2022/8/15	2023/8/14
	EMC104-SM-SM-6000	181209	2022/8/15	2023/8/14
	EMC104-SM-SM-8500	181211	2022/8/15	2023/8/14
RF Coaxial Cable EMEC	EM102-KMKM-450	21090302	2022/9/8	2023/9/7
Software BV	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Keysight	N9020B	MY60112816	2022/5/20	2023/5/19
Test Receiver Agilent	N9038A	MY51210105	2022/6/14	2023/6/13

Notes:

1. The test was performed in HC - 966 chamber 1. The test site validated date: 2022/8/13 (VSWR)
2. Tested Date: 2022/10/8

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
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Notes: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Radiated Emissions up to 1 GHz

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B, Class A	FCC 15B, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39.1	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		

Radiated Emissions Limits at 3 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B, Class A	FCC 15B, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	49.5	40.0	50.5	40.5
88-216	54.0	43.5		
216-230	56.9	46.0		
230-960			57.5	47.5
960-1000	60.0	54.0		

Notes: 1. The lower limit shall apply at the transition frequencies.

5.3 Radiated Emissions above 1 GHz

Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40GHz, whichever is lower

Radiated Emissions Limits at 3 meters (dBµV/m)		
Frequency range	Class A	Class B
Above 1GHz	Avg: 60 Peak: 80	Avg: 54 Peak: 74

Notes: 1. These limit levels apply for a measurement distance of 3 m. If using a different measurement distance, the measured levels shall be extrapolated to the 3 m limit distance using a factor of 20 dB per decade of distance. The measurement distance shall place the measurement antenna in the far field of the ITE or digital apparatus under test.

6 Test Arrangements

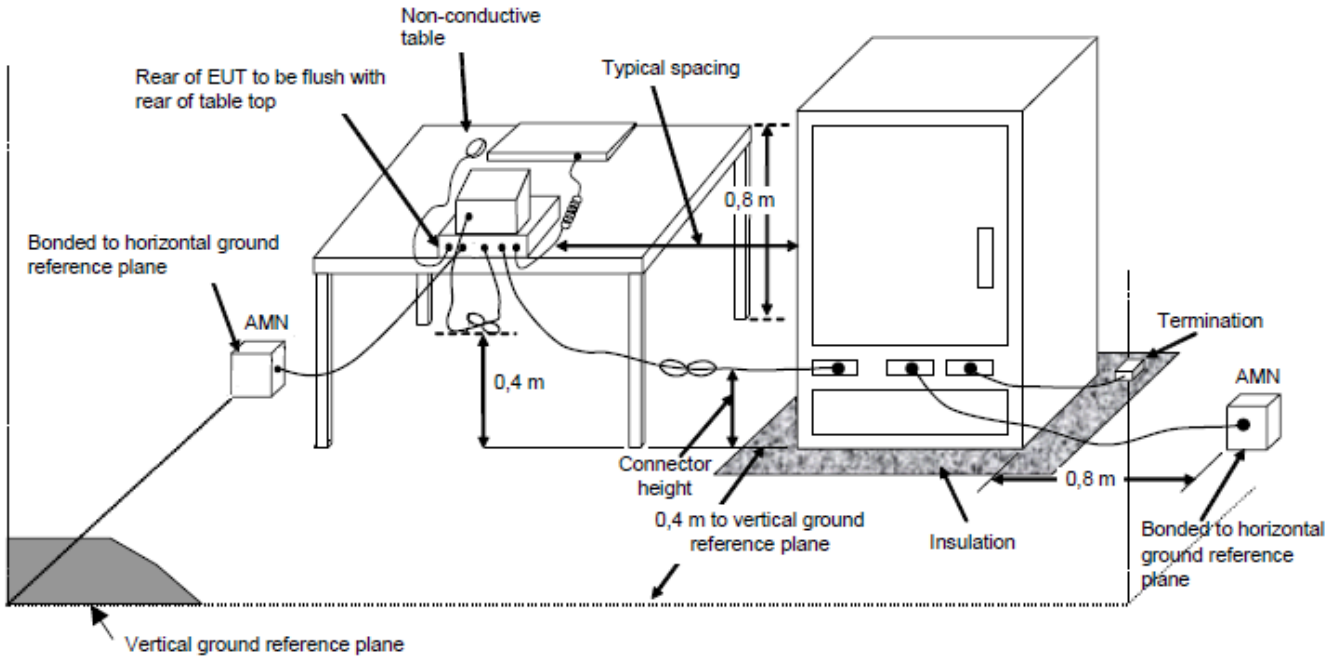
6.1 Conducted Emissions from Power Ports

a. For the table-top EUT is placed on a 0.8 meter insulation table; for the floor standing EUT shall be insulated (by insulation of 12 mm) from the horizontal reference ground plane. 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). Other support units are connected to the power mains through another LISN. 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.

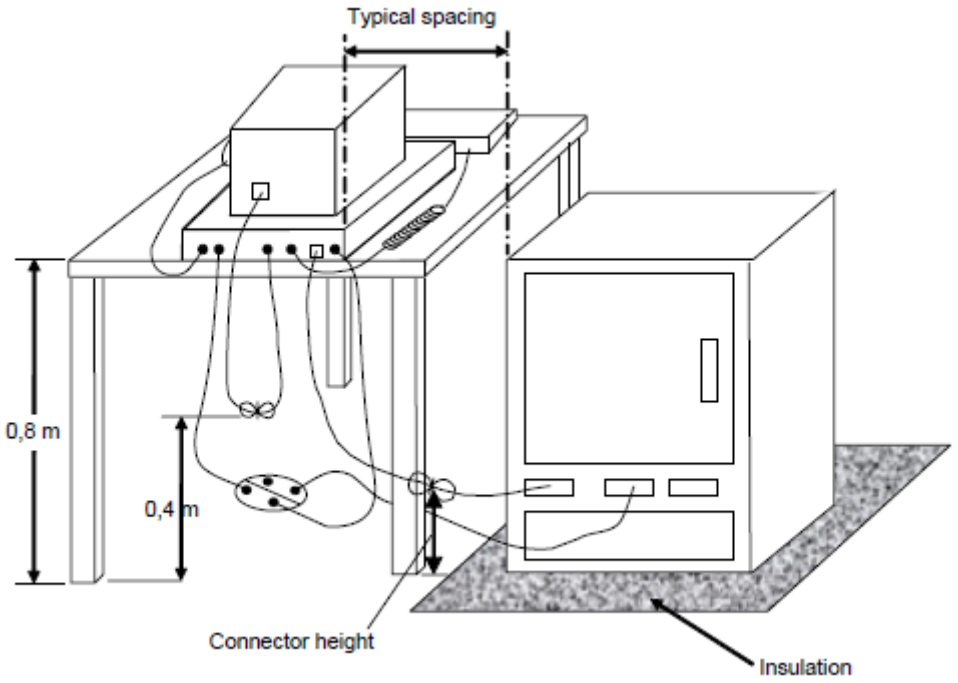


For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.2 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 floor standing EUT shall be insulated (by insulation of 12 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 3 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: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.

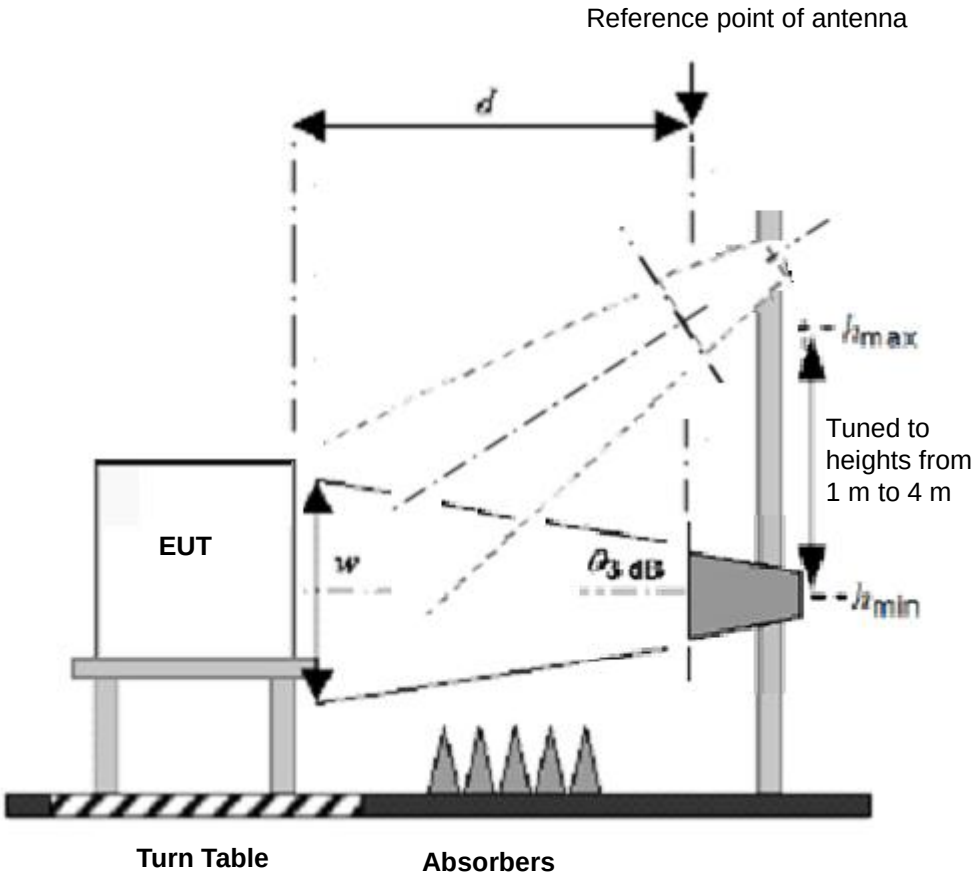


For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.3 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 floor standing EUT shall be insulated (by insulation of 12 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.



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

7 Test Results of Test Item

7.1 Conducted Emissions from Power Ports

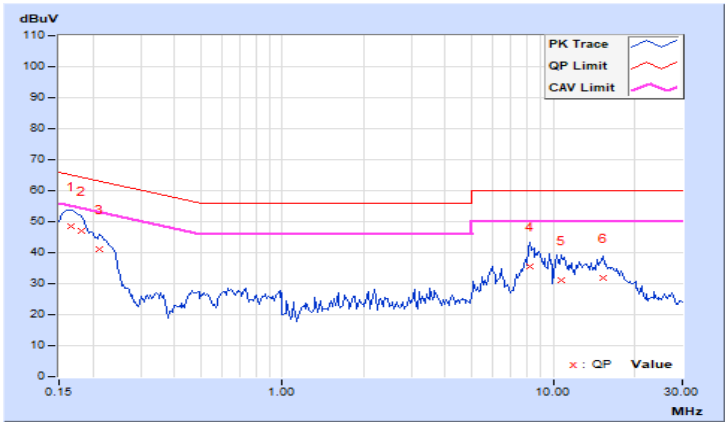
Mode A

Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 68% RH
Tested by	Eagle Chen		

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	**0.16562**	**10.00**	**38.55**	**18.17**	**48.55**	**28.17**	**65.18**	**55.18**	**-16.63**	**-27.01**
2	0.18125	10.00	36.90	17.19	46.90	27.19	64.43	54.43	-17.53	-27.24
3	0.21250	10.00	31.25	12.53	41.25	22.53	63.11	53.11	-21.86	-30.58
4	8.19531	10.27	25.34	17.80	35.61	28.07	60.00	50.00	-24.39	-21.93
5	10.68750	10.35	20.80	13.29	31.15	23.64	60.00	50.00	-28.85	-26.36
6	15.21094	10.44	21.23	12.98	31.67	23.42	60.00	50.00	-28.33	-26.58

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

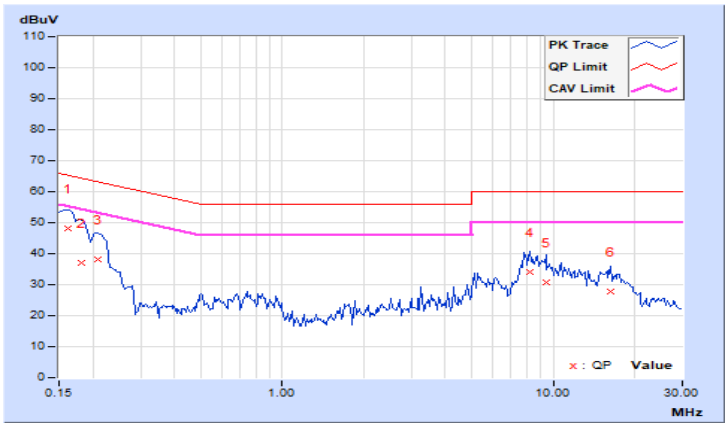


Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 68% RH
Tested by	Eagle Chen		

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	0.16172	10.00	38.03	26.43	48.03	36.43	65.38	55.38	-17.35	-18.95
2	0.18125	10.00	26.90	13.47	36.90	23.47	64.43	54.43	-27.53	-30.96
3	0.20859	10.00	27.97	18.79	37.97	28.79	63.26	53.26	-25.29	-24.47
4	8.16406	10.26	23.79	16.34	34.05	26.60	60.00	50.00	-25.95	-23.40
5	9.38281	10.30	20.26	13.11	30.56	23.41	60.00	50.00	-29.44	-26.59
6	16.21875	10.46	17.14	10.52	27.60	20.98	60.00	50.00	-32.40	-29.02

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 Radiated Emissions up to 1 GHz

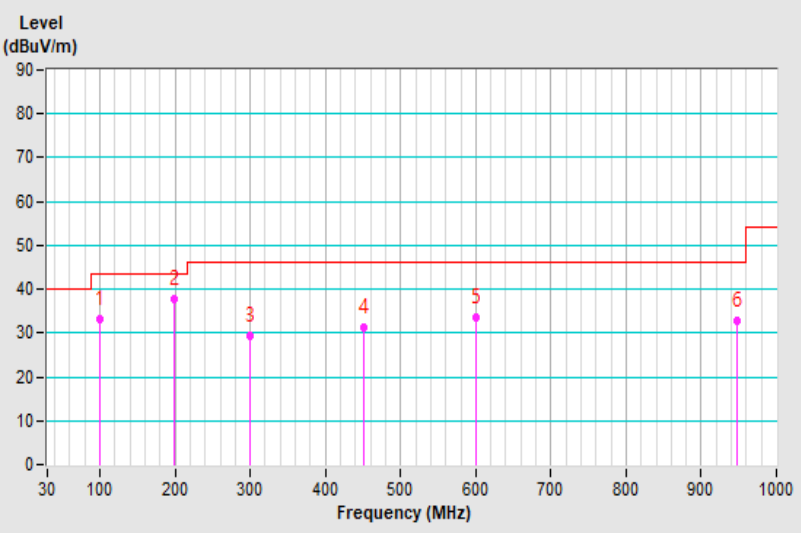
Mode A

Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP), 120 kHz
Input Power	3.3 Vdc from host	**Environmental Conditions**	24°C, 58% RH
Tested By	Darren Lin		

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	99.96	33.25 QP	43.50	-10.25	3.00 H	359	45.77	-12.52
2	199.19	37.75 QP	43.50	-5.75	1.88 H	360	48.86	-11.11
3	299.85	29.42 QP	46.00	-16.58	1.00 H	304	36.51	-7.09
4	451.10	31.15 QP	46.00	-14.85	2.00 H	281	34.21	-3.06
5	599.90	33.70 QP	46.00	-12.30	2.00 H	22	33.37	0.33
6	946.87	32.88 QP	46.00	-13.12	2.00 H	252	26.56	6.32

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

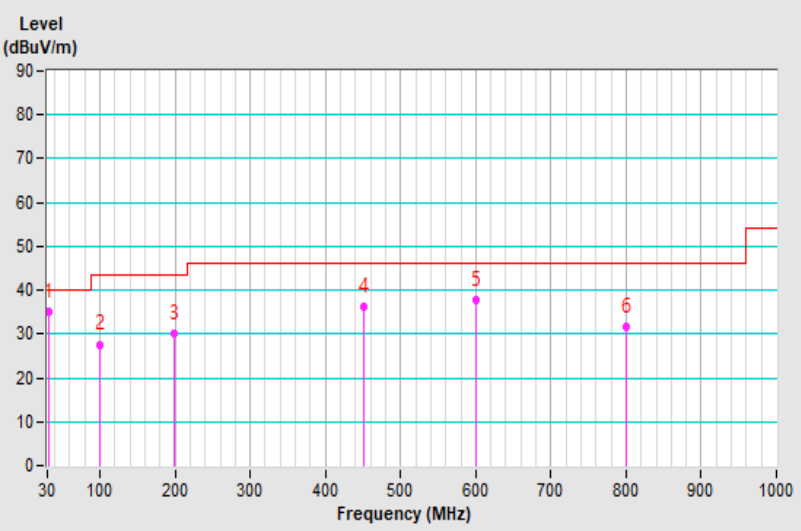


Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP), 120 kHz
Input Power	3.3 Vdc from host	**Environmental Conditions**	24°C, 58% RH
Tested By	Darren Lin		

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	**31.29**	**35.02 QP**	**40.00**	**-4.98**	**1.12 V**	**301**	**44.65**	**-9.63**
2	99.91	27.63 QP	43.50	-15.87	3.00 V	59	40.16	-12.53
3	199.22	30.17 QP	43.50	-13.33	1.00 V	229	41.28	-11.11
4	450.16	36.12 QP	46.00	-9.88	1.00 V	319	39.21	-3.09
5	599.90	37.71 QP	46.00	-8.29	1.00 V	312	37.38	0.33
6	799.45	31.79 QP	46.00	-14.21	1.00 V	185	27.89	3.90

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



7.3 Radiated Emissions above 1 GHz

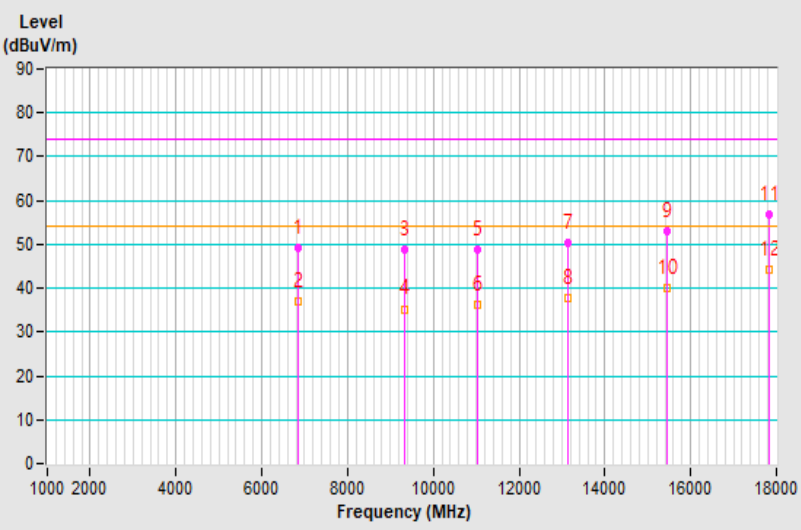
Mode A

Frequency Range	1GHz ~ 18GHz	**Detector Function & Resolution Bandwidth**	Peak (PK) / Average (AV), 1MHz
Input Power	3.3 Vdc from host	**Environmental Conditions**	24°C, 61% RH
Tested By	Darren Lin		

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	6836.10	49.16 PK	74.00	-24.84	1.50 H	360	40.13	9.03
2	6836.10	36.93 AV	54.00	-17.07	1.43 H	340	27.90	9.03
3	9320.65	48.68 PK	74.00	-25.32	1.00 H	357	43.16	5.52
4	9320.65	35.27 AV	54.00	-18.73	1.12 H	284	29.75	5.52
5	11027.45	48.89 PK	74.00	-25.11	1.00 H	212	43.04	5.85
6	11027.45	36.06 AV	54.00	-17.94	1.05 H	217	30.21	5.85
7	13143.10	50.45 PK	74.00	-23.55	1.00 H	190	44.04	6.41
8	13143.10	37.86 AV	54.00	-16.14	1.00 H	181	31.45	6.41
9	15435.55	53.01 PK	74.00	-20.99	1.00 H	177	46.53	6.48
10	15435.55	39.96 AV	54.00	-14.04	1.13 H	199	33.48	6.48
11	17837.65	56.75 PK	74.00	-17.25	2.00 H	113	47.79	8.96
12	17837.65	44.38 AV	54.00	-9.62	1.87 H	63	35.42	8.96

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

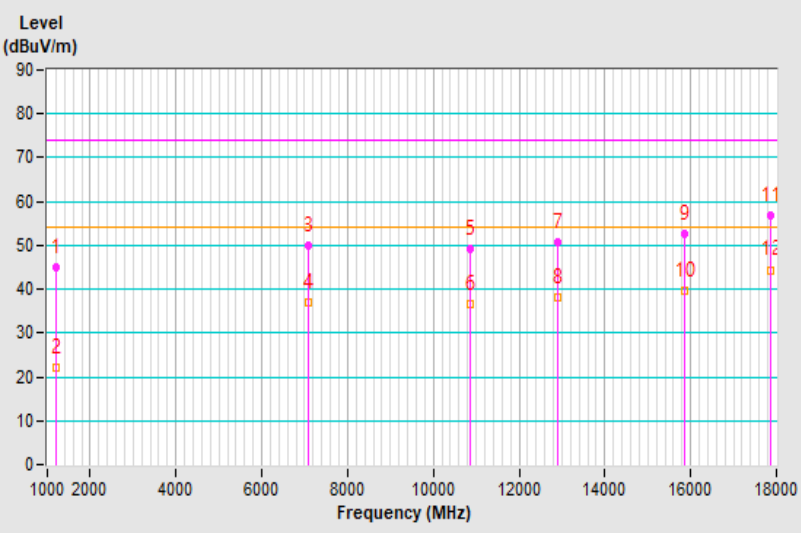


Frequency Range	1GHz ~ 18GHz	**Detector Function & Resolution Bandwidth**	Peak (PK) / Average (AV), 1MHz
Input Power	3.3 Vdc from host	**Environmental Conditions**	24°C, 61% RH
Tested By	Darren Lin		

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	1200.60	45.10 PK	74.00	-28.90	1.50 V	0	52.54	-7.44
2	1200.60	22.21 AV	54.00	-31.79	1.63 V	20	29.65	-7.44
3	7096.20	49.88 PK	74.00	-24.12	2.00 V	268	40.71	9.17
4	7096.20	37.07 AV	54.00	-16.93	1.88 V	173	27.90	9.17
5	10859.15	49.18 PK	74.00	-24.82	1.00 V	210	42.90	6.28
6	10859.15	36.61 AV	54.00	-17.39	1.05 V	220	30.33	6.28
7	12892.35	50.72 PK	74.00	-23.28	1.50 V	80	44.17	6.55
8	12892.35	37.97 AV	54.00	-16.03	1.44 V	115	31.42	6.55
9	15860.55	52.77 PK	74.00	-21.23	1.00 V	3	46.08	6.69
10	15860.55	39.79 AV	54.00	-14.21	1.05 V	28	33.10	6.69
11	17864.00	56.66 PK	74.00	-17.34	1.50 V	0	47.64	9.02
12	**17864.00**	**44.40 AV**	**54.00**	**-9.60**	**1.42 V**	**0**	**35.38**	**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

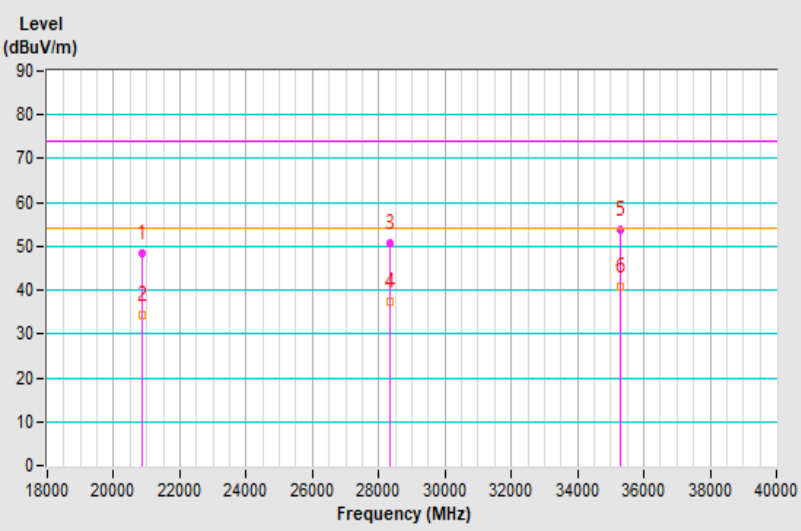


Frequency Range	18GHz ~ 35.625GHz	**Detector Function & Resolution Bandwidth**	Peak (PK) / Average (AV), 1MHz
Input Power	3.3 Vdc from host	**Environmental Conditions**	23°C, 60% RH
Tested By	Darren Lin		

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	20864.40	48.42 PK	74.00	-25.58	1.50 H	36	50.95	-2.53
2	20864.40	34.16 AV	54.00	-19.84	1.44 H	0	36.69	-2.53
3	28358.70	50.77 PK	74.00	-23.23	1.00 H	150	50.32	0.45
4	28358.70	37.50 AV	54.00	-16.50	1.12 H	182	37.05	0.45
5	35290.90	53.81 PK	74.00	-20.19	1.00 H	357	52.15	1.66
6	35290.90	40.86 AV	54.00	-13.14	1.08 H	336	39.20	1.66

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

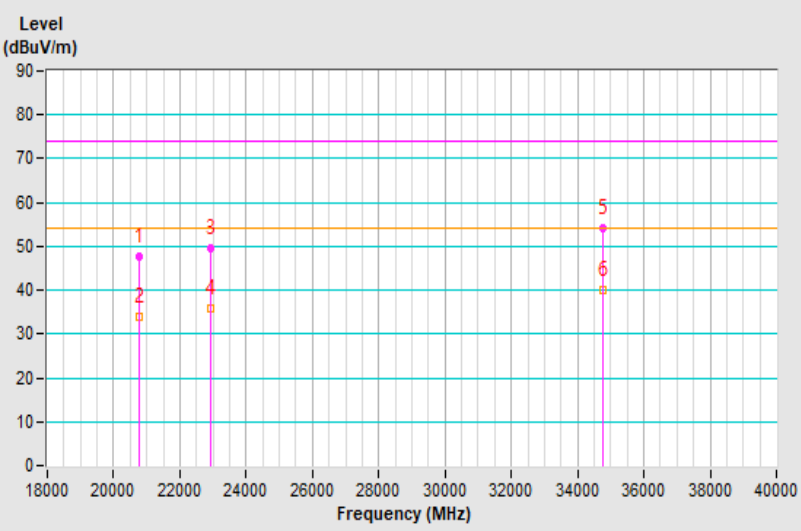


Frequency Range	18GHz ~ 35.625GHz	**Detector Function & Resolution Bandwidth**	Peak (PK) / Average (AV), 1MHz
Input Power	3.3 Vdc from host	**Environmental Conditions**	23°C, 60% RH
Tested By	Darren Lin		

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	20786.30	47.51 PK	74.00	-26.49	1.00 V	248	50.13	-2.62
2	20786.30	33.82 AV	54.00	-20.18	1.13 V	253	36.44	-2.62
3	22944.50	49.41 PK	74.00	-24.59	1.00 V	136	50.69	-1.28
4	22944.50	35.92 AV	54.00	-18.08	1.05 V	149	37.20	-1.28
5	34745.30	54.03 PK	74.00	-19.97	2.00 V	279	52.35	1.68
6	34745.30	39.95 AV	54.00	-14.05	1.83 V	248	38.27	1.68

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

Please refer to the attached file (Test Setup Photo)

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 FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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