

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)

Report No.: RFBIDS-WTW-P25030858-2

FCC ID: 2AKCZ-121

Product: Wireless Network Security Appliance

Brand: SONICWALL

Model No.: APL72-121

Received Date: 2025/3/31

Test Date: 2025/5/6 ~ 2025/5/23

Issued Date: 2025/8/26

Applicant: SonicWall Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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FCC Registration /
Designation Number: 788550 / TW0003

Approved by: _____

Jeremy Lin

, Date: _____

2025/8/26

Jeremy Lin / Project Engineer

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Prepared by : Pettie Chen / Senior Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFBDYS-WTW-P25030858-2	Original release.	2025/8/26

1 Certificate

Product: Wireless Network Security Appliance

Brand: SONICWALL

Test Model: APL72-121

Sample Status: Engineering sample

Applicant: SonicWall Inc.

Test Date: 2025/5/6 ~ 2025/5/23

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)

Measurement procedure: ANSI C63.10-2013

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 RF characteristics under the conditions specified in this report.

2 Summary of Test Results

Standard / Clause	Test Item	Result	Remark
15.205 /15.209 /15.247(d) 15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Meet the requirement of limit.
15.205 /15.209 /15.247(d) 15.407(b) (1/2/3/4(i)/10)	Unwanted Emissions above 1 GHz	Pass	Meet the requirement of limit.
15.247(d)	Conducted Out of Band Emissions	Pass	Meet the requirement of limit.

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:

Parameter	Specification	Uncertainty (±)
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3.59 dB
	30 MHz ~ 1 GHz	3.64 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 dB
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.79 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 General Description of EUT

Product	Wireless Network Security Appliance	
Brand	SONICWALL	
Test Model	APL72-121	
Modulation Technology	WLAN 2.4G	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT mode 1024QAM for OFDMA in 11ax mode
	WLAN 5G	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax mode
Operating Frequency	WLAN	2.412 GHz ~ 2.462 GHz 5.18 GHz ~ 5.24 GHz 5.745 GHz ~ 5.825 GHz

Note:

1. List of Accessory:

Item	Brand	Model	Specification
Adapter 1	BILLION	BA070-120500MAX	AC Input Power: 100~240Vac, 1.5A DC Output Power: 12Vdc, 5A 1.5m non-shielded cable with one core
Adapter 2	PHIHONG	AA65U-120A	AC Input Power: 100~240Vac, 1.6A DC Output Power: 12Vdc, 5.41A 1.2m non-shielded cable with one core
AC Power Cord	KING-CORD	NA	1.0m non-shielded cable without core
USB Console Cable	NIENYI	NA	1.0m
RJ45 Ethernet Cable	NIENYI	NA	1.0m

2. There are WLAN (2.4 GHz & 5 GHz) technology used for the EUT.

3. Simultaneously transmission combination.

Combination	Technology	
1	WLAN (2.4 GHz)	WLAN (5 GHz)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna No.	Brand	Model	Antenna Gain (dBi)	Frequency range	Antenna Type	Connector Type
0/1	AWAN	A8PEE-100007	2.78	2.4~2.4835GHz	Dipole	R-SMA
			5.08	5.15~5.25GHz	Dipole	R-SMA
			5.18	5.725~5.85GHz	Dipole	R-SMA

* Antenna cable loss: 0.5dB

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a MIMO function:

2.4 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11b	2Tx/1Tx Diversity	2RX
802.11g	2Tx/1Tx Diversity	2RX
802.11n (HT20)	2Tx/1Tx Diversity	2RX
802.11n (HT40)	2Tx/1Tx Diversity	2RX
VHT20	2Tx/1Tx Diversity	2RX
VHT40	2Tx/1Tx Diversity	2RX
802.11ax (HE20)	2Tx/1Tx Diversity	2RX
802.11ax (HE40)	2Tx/1Tx Diversity	2RX

Note:

1. All of modulation mode support beamforming function except 802.11b/g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both modes were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), VHT mode for 20 MHz (40 MHz) and 802.11ax mode for 20 MHz (40 MHz). Therefore, the investigated worst case is the representative mode in test report.
4. The EUT equipment modulation technology OFDMA does not support partial RU (resource unit) and channel puncturing/bandwidth reduction mechanisms.

5 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX

Note:

1. All of modulation mode support beamforming function except 802.11a modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), 802.11ac mode for 20 MHz (40 MHz, 80 MHz) and 802.11ax mode for 20 MHz (40 MHz, 80 MHz). Therefore, the investigated worst case is the representative mode in test report.
4. The EUT equipment modulation technology OFDMA does not support partial RU (resource unit) and channel puncturing/bandwidth reduction mechanisms.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	<ol style="list-style-type: none"> 1. EUT can be used in the following ways: Lying & Wall Mount. Pre-scan these ways and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
Worst Case:	1. Worst Condition: Lying

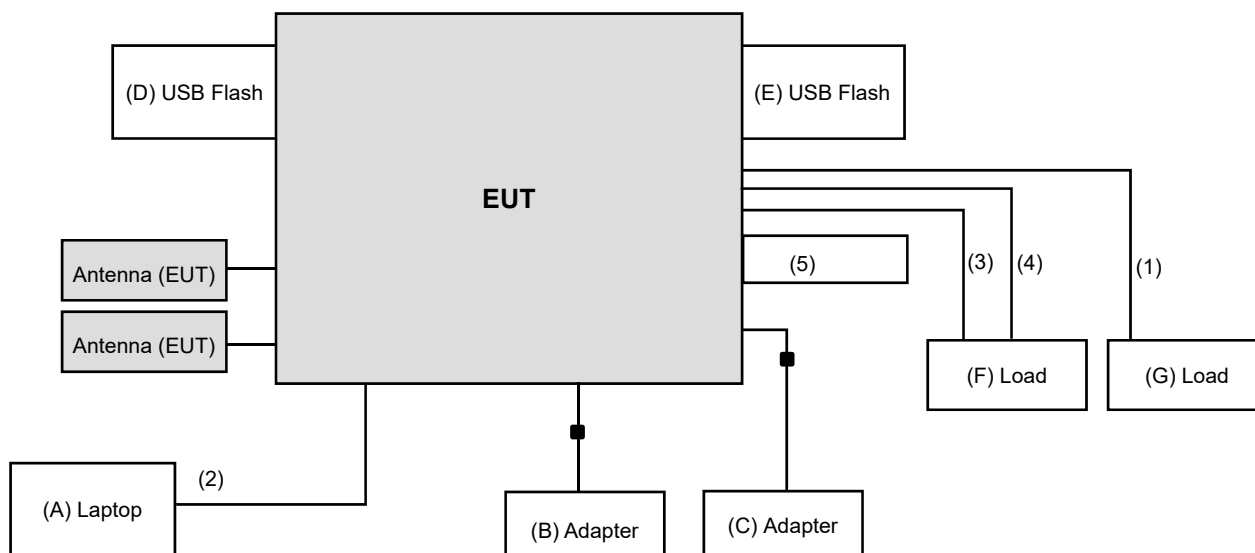
Following channel(s) was (were) selected for the final test as listed below:

Test Item	Combination	Mode	Tested Channel
Unwanted Emissions below 1 GHz	1	802.11b	6
		802.11a	165
Unwanted Emissions above 1 GHz	1	802.11b	6
		802.11a	165
Conducted Out of Band Emissions	1	802.11b	6
		802.11a	165

3.4 Test Program Used and Operation Descriptions

Controlling software Tera Term Version 4.106 has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.5 Connection Diagram of EUT and Peripheral Devices



3.6 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	DELL	E5430	2RL3YW1	NA	Provided by Lab
B	Adapter	BILLION	BA070-120500MAX	NA	NA	Accessory
C	Adapter	PHIHONG	AA65U-120A	NA	NA	Accessory
D	USB 3.0 Flash	SanDisk	SDDDC3-032G	NA	NA	Provided by Lab
E	USB 3.0 Flash	SanDisk	SDDDC3-032G	NA	NA	Provided by Lab
F	Load	BV	LP-04	NA	NA	Provided by Lab
G	Load	BV	LP-04	NA	NA	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	RJ-45 Cable	4	1.5	No	0	Provided by Lab
2	USB Console Cable	1	1	No	0	Accessory
3	RJ-45 Cable	1	1	No	0	Accessory
4	RJ-45 Cable	3	1.5	No	0	Provided by Lab
5	Fiber	1	5	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 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-155	2024/10/14	2025/10/13
EMI Test Receiver R&S	ESR3	102782	2024/12/10	2025/12/9
Loop Antenna TESEQ	HLA 6121	45745	2024/8/21	2025/8/20
Preamplifier Agilent	8447D	2944A10631	2025/4/27	2026/4/26
RF Coaxial Cable Woken	8D-FB	Cable-CH4-01	2024/7/6	2025/7/5
Signal & Spectrum Analyzer R&S	FSV3044	101105	2025/2/25	2026/2/24
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2025/5/23

4.2 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower inn-co GmbH	MA 4000	010303	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	5	N/A	N/A
EMI Test Receiver R&S	ESR3	102782	2024/12/10	2025/12/9
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-408	2024/11/10	2025/11/9
	BBHA 9170	9170-480	2024/11/10	2025/11/9
		BBHA9170241	2024/10/18	2025/10/17
		BBHA9170243	2024/11/10	2025/11/9
Preamplifier EMCI	EMC 184045	980116	2024/9/24	2025/9/23
Preamplifier Keysight	83017A	MY53270295	2025/4/27	2026/4/26
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2024/7/6	2025/7/5
	EMC102-KM-KM-3000	150929	2024/7/6	2025/7/5
RF Coaxial Cable HUBER+SUHNER	EMC104-SM-SM-10000	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-4)	2025/4/27	2026/4/26
	SUCOFLEX 104	Cable-CH4-03(250724)	2025/4/27	2026/4/26
Signal & Spectrum Analyzer R&S	FSV3044	101105	2025/2/25	2026/2/24
Software BV ADT	ADT_Radiated_V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 3.
2. Tested Date: 2025/5/16

4.3 Conducted Out of Band Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Signal & Spectrum Analyzer R&S	FSV3044	101504	2024/6/18	2025/6/17
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2025/5/6

5 Limits of Test Items

5.1 Unwanted Emissions below 1 GHz

For FCC 15.247:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

For FCC 15.407:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.2 Unwanted Emissions above 1 GHz

For FCC 15.247:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

For FCC 15.407 transmitters operating in the 5.150-5.850 GHz band:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To	Limit	
789033 D02 General UNII Test Procedure New Rules v02r01	Field Strength at 3 m	
	PK: 74 (dBμV/m)	AV: 54 (dBμV/m)

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m) *
15.407(b)(2)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m) *
15.407(b)(3)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m) *
15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2 (dBμV/m) ^{*1} PK: 105.2 (dBμV/m) ^{*2} PK: 110.8 (dBμV/m) ^{*3} PK: 122.2 (dBμV/m) ^{*4}

^{*1} beyond 75 MHz or more above of the band edge.

^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000 \sqrt{30P}}{3} \mu\text{V/m, where } P \text{ is the eirp (Watts).}$$

5.3 Conducted Out of Band Emissions

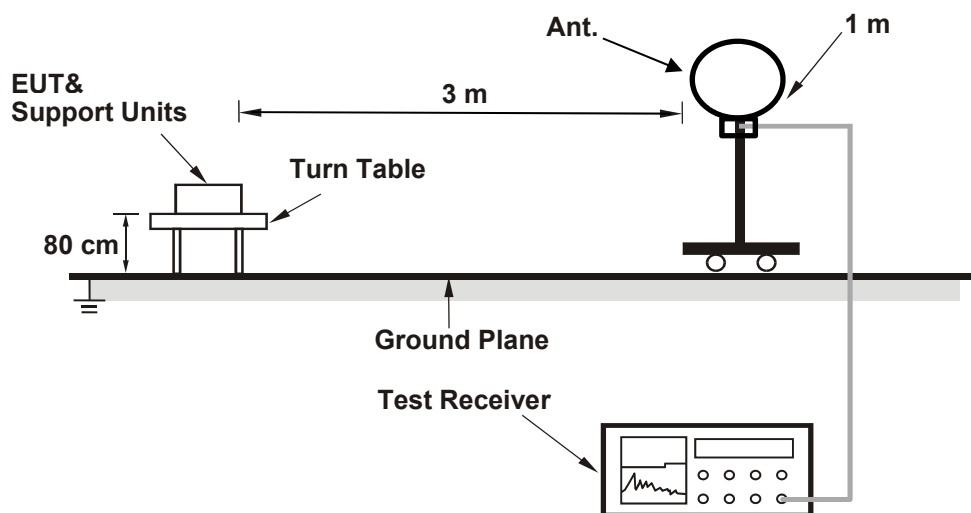
Below 30 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

6 Test Arrangements

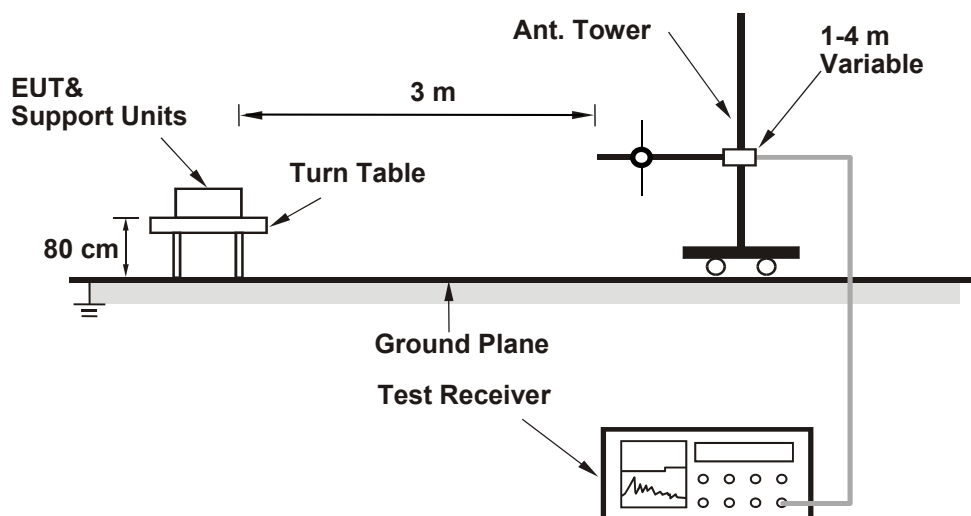
6.1 Unwanted Emissions below 1 GHz

6.1.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.1.2 Test Procedure

For Radiated emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. 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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

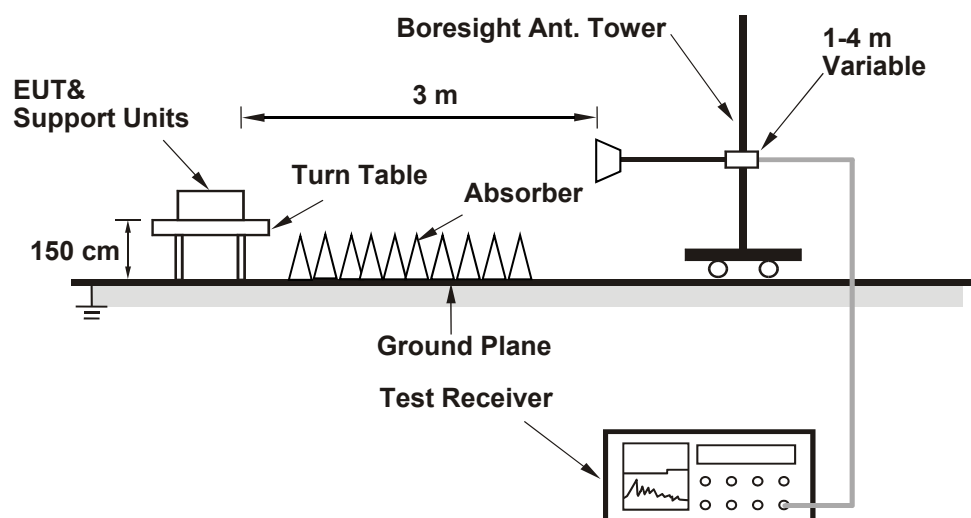
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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 below 1 GHz.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

6.2 Unwanted Emissions above 1 GHz

6.2.1 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.2.2 Test Procedure

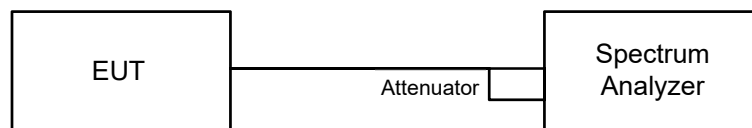
- The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Notes:

- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
- For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

6.3 Conducted Out of Band Emissions

6.3.1 Test Setup



6.3.2 Test Procedure

MEASUREMENT PROCEDURE REF

- Set the RBW = 100 kHz.
- Set the VBW \geq 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

- Set RBW = 100 kHz.
- Set VBW \geq 300 kHz.
- Detector = peak.
- Sweep = auto couple.
- Trace Mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

7 Test Results of Test Item

7.1 Unwanted Emissions below 1 GHz

FCC 15.247

FCC 15.407

Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120 kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 66 % RH
Tested By	Luis Lee		

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	42.65	29.6 QP	40.0	-10.4	1.50 H	315	38.7	-9.1
2	164.96	41.3 QP	43.5	-2.2	1.50 H	258	49.9	-8.6
3	239.46	37.7 QP	46.0	-8.3	1.00 H	200	47.5	-9.8
4	323.81	38.6 QP	46.0	-7.4	1.00 H	228	45.3	-6.7
5	399.72	31.8 QP	46.0	-14.2	1.00 H	215	37.5	-5.7
6	647.14	31.4 QP	46.0	-14.6	1.00 H	149	31.7	-0.3
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	164.96	38.1 QP	43.5	-5.4	1.01 V	347	46.7	-8.6
2	239.46	32.1 QP	46.0	-13.9	1.01 V	280	41.9	-9.8
3	298.51	30.9 QP	46.0	-15.1	1.49 V	211	38.2	-7.3
4	344.9	31.0 QP	46.0	-15.0	1.49 V	198	37.6	-6.6
5	604.97	31.1 QP	46.0	-14.9	1.01 V	45	32.2	-1.1
6	798.97	35.6 QP	46.0	-10.4	1.49 V	169	32.5	3.1

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

7.2 Unwanted Emissions above 1 GHz

FCC 15.247

Combination	1		
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 70 % RH
Tested By	Luis Lee		

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	*2437	107.1 PK			1.90 H	205	72.2	34.9
2	*2437	105.0 AV			1.90 H	205	70.1	34.9
3	2483.5	60.8 PK	74.0	-13.2	1.90 H	205	26.1	34.7
4	2483.5	50.3 AV	54.0	-3.7	1.90 H	205	15.6	34.7
5	4874	50.5 PK	74.0	-23.5	1.23 H	317	37.1	13.4
6	4874	40.0 AV	54.0	-14.0	1.23 H	317	26.6	13.4
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	*2437	112.0 PK			1.77 V	165	77.1	34.9
2	*2437	109.5 AV			1.77 V	165	74.6	34.9
3	2496.6	62.0 PK	74.0	-12.0	1.77 V	165	27.2	34.8
4	2496.6	52.0 AV	54.0	-2.0	1.77 V	165	17.2	34.8
5	4874	53.4 PK	74.0	-20.6	1.95 V	63	40.0	13.4
6	4874	47.0 AV	54.0	-7.0	1.95 V	63	33.6	13.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

FCC 15.407

Combination	1		
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 66 % RH
Tested By	Luis Lee		

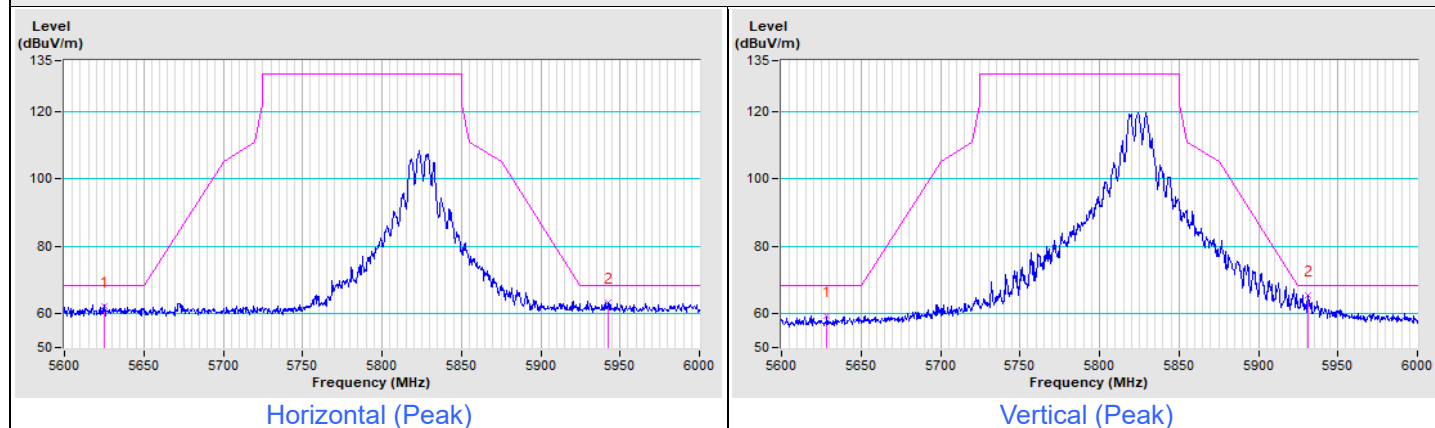
Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5825	110.5 PK			1.89 H	290	65.8	44.7
2	*5825	100.6 AV			1.89 H	290	55.9	44.7
3	11650	61.1 PK	74.0	-12.9	2.15 H	189	38.7	22.4
4	11650	48.0 AV	54.0	-6.0	2.15 H	189	25.6	22.4
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	*5825	122.8 PK			1.62 V	280	78.1	44.7
2	*5825	112.6 AV			1.62 V	280	67.9	44.7
3	11650	61.3 PK	74.0	-12.7	1.80 V	93	38.8	22.5
4	11650	48.5 AV	54.0	-5.5	1.80 V	93	26.0	22.5

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

Plot of Band Edge

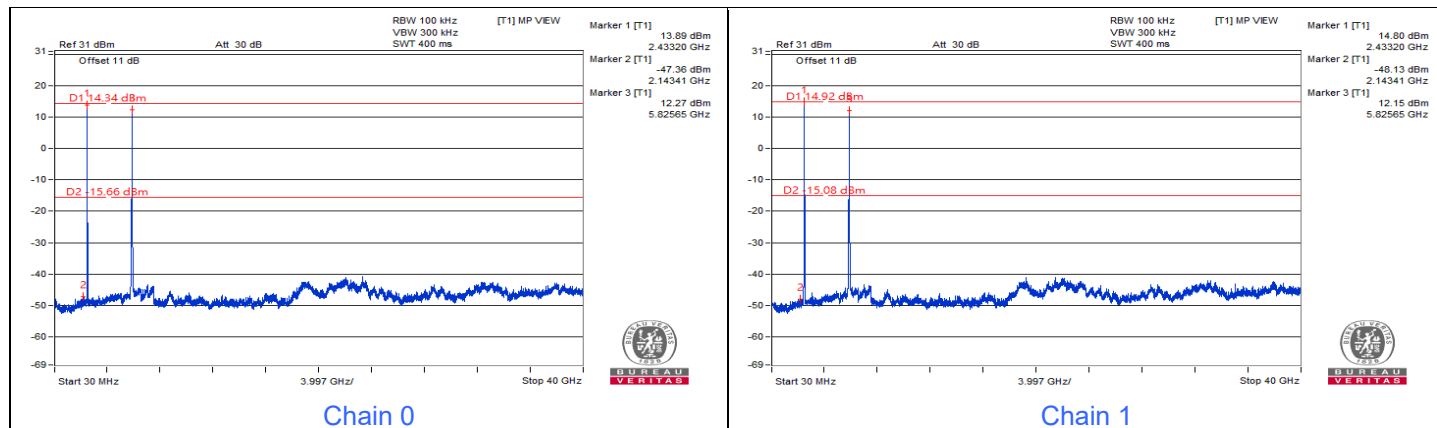
Combination 1



7.3 Conducted Out of Band Emissions

Environmental Conditions:	22°C, 66% RH	Tested By:	Ivan Tesng
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Combination 1



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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