

TEST REPORT

CERTIFICATE OF CONFORMITY

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

Report No.: RFBDYS-WTW-P22031091C-2

FCC ID: 2AKCZ-108

Product: Wireless Access Point

Brand: SONICWALL

Model No.: APL68-108

Received Date: 2024/3/28

Test Date: 2024/7/12 ~ 2024/8/6

Issued Date: 2024/9/3

Applicant: SonicWall Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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FCC Registration /
Designation Number: 788550 / TW0003

Approved by: Jeremy Lin, **Date:** 2024/9/3
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-P22031091C-2	Original release.	2024/9/3

1 Certificate

Product: Wireless Access Point

Brand: SONICWALL

Test Model: APL68-108

Sample Status: Engineering sample

Applicant: SonicWall Inc.

Test Date: 2024/7/12 ~ 2024/8/6

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

Measurement procedure: ANSI C63.10-2013

KDB 558074 D01 15.247 Meas Guidance v05r02

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

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Standard / Clause	Test Item	Result	Remark
15.247(b)	RF Output Power	NA	Refer to Note 1
15.247(e)	Power Spectral Density	NA	Refer to Note 1
15.247(a)(2)	6 dB Bandwidth	NA	Refer to Note 1
15.247(d)	Conducted Out of Band Emissions	NA	Refer to Note 1
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -5.61 dB at 0.50600 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -0.1 dB at 32.91 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	NA	Refer to Note 1
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

Note:

1. Unwanted Emissions below 1 GHz and conducted emission are performed for the addendum. Refer to original report for the other test data.
2. 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) (±)
AC Power Conducted Emissions	9 kHz ~ 30 MHz	2.90 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.59 dB
	30 MHz ~ 1 GHz	3.6 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

Product	Wireless Access Point
Brand	SONICWALL
Test Model	APL68-108
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from adapter 48-56Vdc from POE
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Bluetooth LE 4.0: 1Mbps Bluetooth LE 5.0: 2Mbps
Operating Frequency	2402 ~ 2480MHz
Number of Channel	40
Output Power	1.845mW

Note:

1. This report is prepared for FCC class II permissive change. The differences compared with the original report (BV CPS report no.: RFBIDS-WTW-P22031091-2. The differences compared with original report are changing 2.4G traffic radio 2nd source (pin-to-pin) chip and changing 5G scan radio 2nd source (pin-to-pin) FEM. Therefore, Unwanted Emissions below 1 GHz and conducted emission are performed for the addendum. Refer to original report for the other test data.
2. The EUT uses following accessories.

Item	Brand	Model	Specification
BRACKET T-BAR LFP	Senao	6301A4133020	Accessory
AC Adapter (Optional)	Sunny	SYS1546-3612-T3	AC Input : 100-240Vac, 1.5A MAX, 50-60Hz DC Output : 12.0Vdc, 3.0A power cord : Non-shielded AC (1.77m) Non-shielded DC (1.86m with one ferrite core)
POE (Support unit only)	EnGenius	EPA5006GAT	AC Input : 100-240Vac, 0.8A, 50-60Hz DC Output : 48-56Vdc, 0.6A Non-shielded AC (0.5m)

3. The simultaneous operation mode was determined by client.

No	Mode
1	2GHz traffic radio (Radio 2) + 5GHz traffic radio (Radio 1) + 5GHz Scanning radio (Radio 3) + BLE
2	5GHz traffic radio (Radio 1) + 2GHz Scanning radio (Radio 3) + BLE

* 5GHz traffic radio (Radio 1) and 5GHz Scanning radio (Radio 3) cannot transmit in the same band at same time.

* 2GHz traffic radio (Radio 2) and 2GHz Scanning radio (Radio 3) cannot transmit at same time.

* Spurious 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.

No.	Type	Connector	Gain (dBi)					
			2400MHz	2450MHz	2500MHz	5150MHz	5500MHz	5850MHz
2G1	PIFA	I-PEX	3.05	3.14	3.21	-	-	-
2G2	PIFA	I-PEX	3.52	3.43	3.64	-	-	-
5G1	PIFA	I-PEX	-	-	-	4.52	4.63	5.07
5G2	PIFA	I-PEX	-	-	-	4.13	4.98	4.62
Scan	PIFA	I-PEX	3.83	3.93	3.81	3.81	4.23	4.89
BLE	PIFA	I-PEX	3.09	3.70	3.58	-	-	-

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

3.3 Channel List

40 channels are provided for BT-LE:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	EUT can be used in the following ways: X/ Y/ Z axis. Pre-scan in these ways and find the worst case as a representative test condition.
Worst Case:	Y-Axis

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

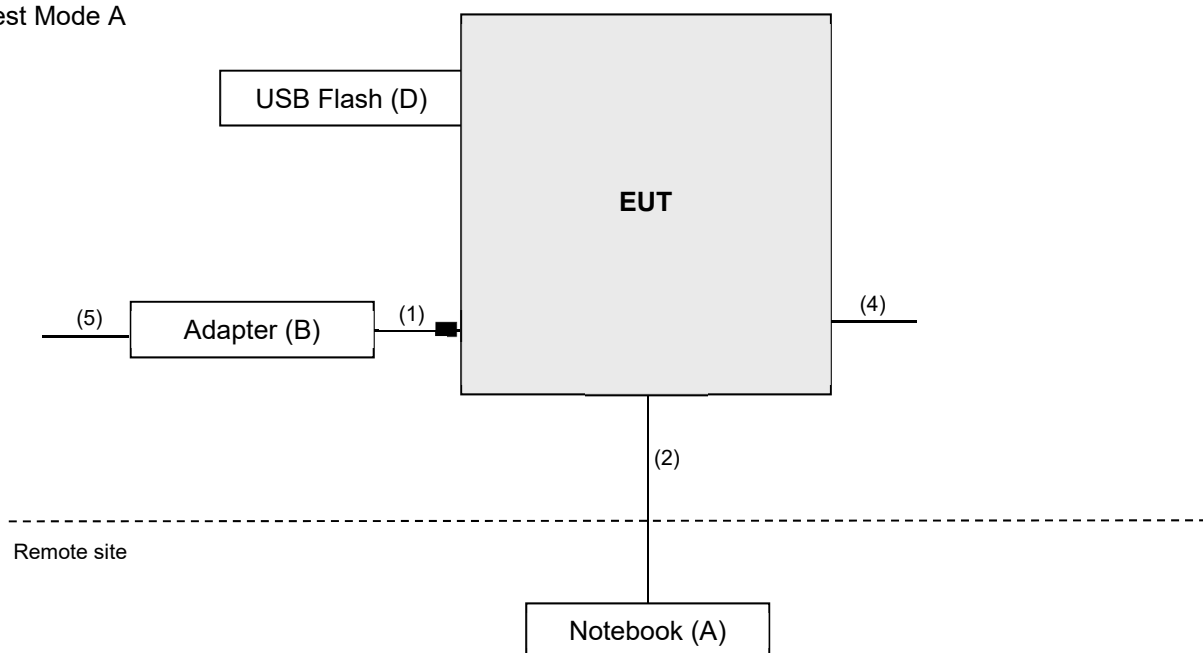
Test Item	EUT Configure Mode	Mode	Tested Channel	Modulation	Data Rate Parameter
AC Power Conducted Emissions	A, B	BT-LE 1M	0	GFSK	1Mb/s
Unwanted Emissions below 1 GHz	A, B	BT-LE 1M	0	GFSK	1Mb/s
EUT Configure Mode:	A	Powered by adapter			
	B	Powered by PoE			

3.5 Test Program Used and Operation Descriptions

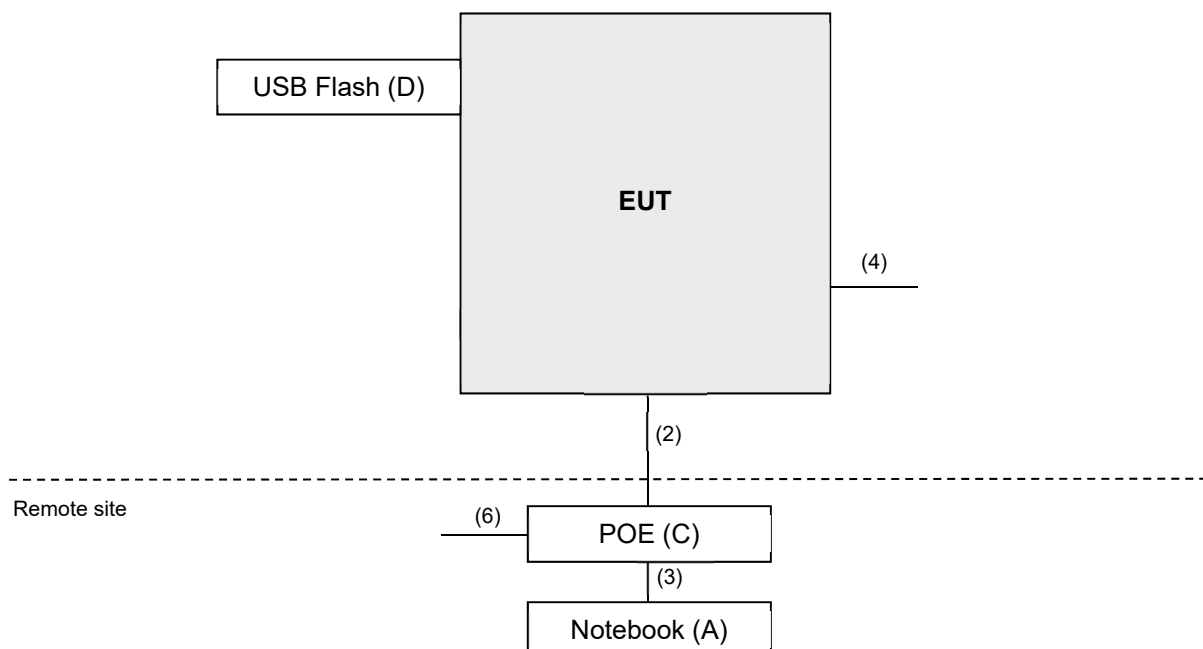
Controlling software QSPR Version 5.0-00199 has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.6 Connection Diagram of EUT and Peripheral Devices

Test Mode A



Test Mode B



3.7 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	Lenovo	X250ALT5	PC06HPSE	FCC DoC Approved	-
B.	Adapter	Sunny	SYS1546-3612-T3	NA	NA	Provided by client
C.	PoE	EnGenius	EPA5006GAT	NA	NA	Provided by client
D.	USB Flash	SanDisk	SDDDC3-032G	5	NA	-

No.	Cable Descriptions	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Qty.)	Remark
1.	DC Power Cable	1	1.86	N	1	Provided by client
2.	LAN Cable	1	10.0	N	0	RJ45, Cat5e
3.	LAN Cable	1	1.5	N	0	RJ45, Cat5e
4.	Micro USB cable	1	1.5	Y	0	-
5.	AC Power Cable	1	1.77	N	0	Provided by client
6.	AC Power Cable	1	0.5	N	0	Provided by client

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 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance HUBER+SUHNER	E1-011315	13	2023/11/22	2024/11/21
50 ohm terminal resistance	E1-011279	04	2023/11/22	2024/11/21
	E1-011280	05	2023/11/22	2024/11/21
DC-LISN Schwarzbeck	NNBM 8126G	8126G-069	2023/11/7	2024/11/6
EMI Test Receiver R&S	ESCI	100613	2023/12/4	2024/12/3
Fixed Attenuator Mini-Circuits	HAT-10+	PAD-COND1-01	2024/1/6	2025/1/5
LISN R&S	ENV216	101826	2024/3/25	2025/3/24
	ESH3-Z5	100311	2023/9/6	2024/9/5
RF Coaxial Cable Woken	5D-FB	Cable-cond1-01	2024/1/6	2025/1/5
Software BVADT	BVADT_Conf_ V7.4.1.0	N/A	N/A	N/A
V-LISN Schwarzbeck	NNBL 8226-2	8226-142	2023/8/31	2024/8/30

Notes:

1. The test was performed in HY - Conduction 1.
2. Tested Date: 2024/7/13 ~ 2024/8/6

4.2 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn BV ADT	AT100	AT93021705	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-160	2023/10/17	2024/10/16
Loop Antenna Electro-Metrics	EM-6879	269	2023/9/23	2024/9/22
Loop Antenna TESEQ	HLA 6121	45745	2023/8/8	2024/8/7
MXE EMI Receiver Keysight	N9038B	MY60180018	2024/3/13	2025/3/12
Preamplifier Agilent	8447D	2944A10638	2024/5/1	2025/4/30
Preamplifier EMCI	EMC001340	980201	2023/9/27	2024/9/26
RF Coaxial Cable Woken	8D-FB	Cable-CH9-01	2024/5/1	2025/4/30
Signal & Spectrum Analyzer R&S	FSW43	101867	2023/12/29	2024/12/28
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 4.
2. Tested Date: 2024/7/12 ~ 2024/8/6

5 Limits of Test Items

5.1 AC Power Conducted Emissions

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Notes:

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

5.2 Unwanted Emissions below 1 GHz

Radiated emissions up to 1 GHz which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30 dB below the highest level of the desired power:

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

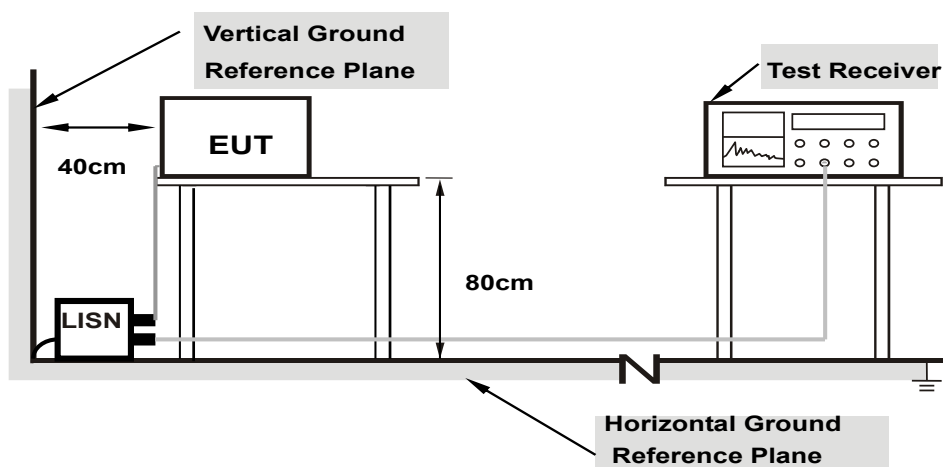
Notes:

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

6 Test Arrangements

6.1 AC Power Conducted Emissions

6.1.1 Test Setup



Note: 1.Support units were connected to second LISN.

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

6.1.2 Test Procedure

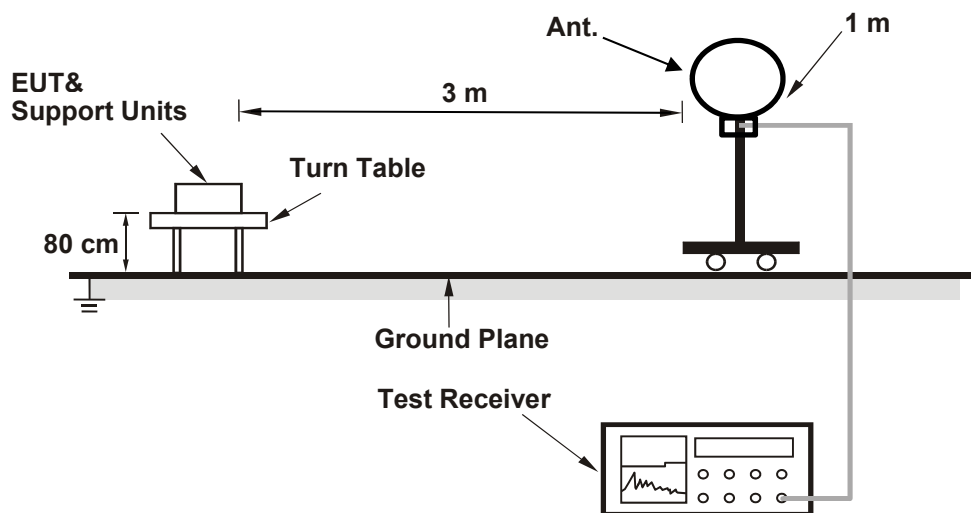
- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz-30 MHz.

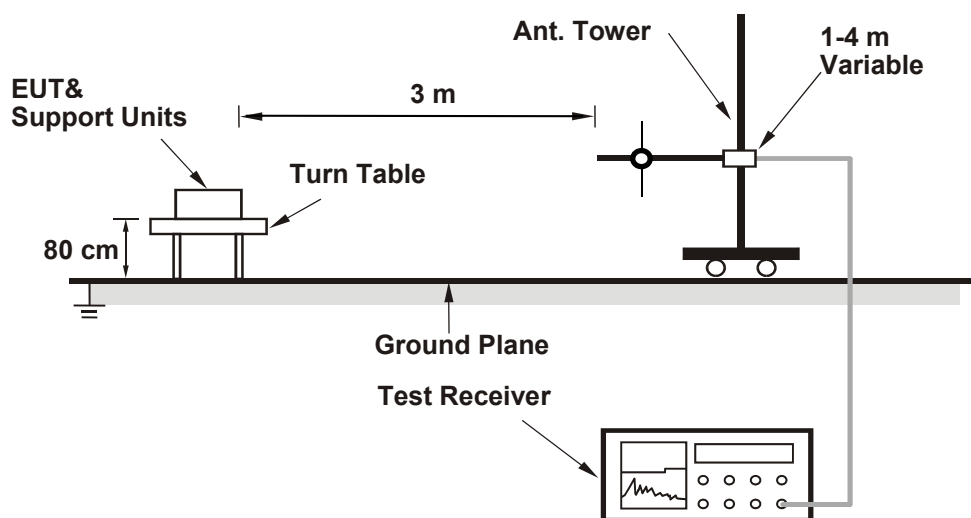
6.2 Unwanted Emissions below 1 GHz

6.2.1 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).

6.2.2 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.

7 Test Results of Test Item

7.1 AC Power Conducted Emissions

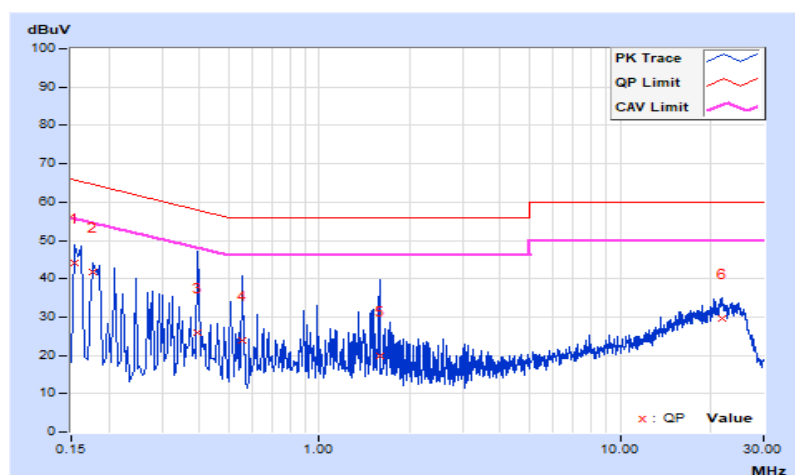
Mode A

RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Rex Wang		

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	0.15400	9.67	34.48	13.83	44.15	23.50	65.78	55.78	-21.63	-32.28
2	0.17800	9.66	32.24	12.04	41.90	21.70	64.58	54.58	-22.68	-32.88
3	0.39400	9.69	16.18	4.90	25.87	14.59	57.98	47.98	-32.11	-33.39
4	0.55400	9.70	14.12	0.54	23.82	10.24	56.00	46.00	-32.18	-35.76
5	1.59800	9.75	10.19	1.22	19.94	10.97	56.00	46.00	-36.06	-35.03
6	21.75000	10.06	19.67	13.80	29.73	23.86	60.00	50.00	-30.27	-26.14

Remarks:

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

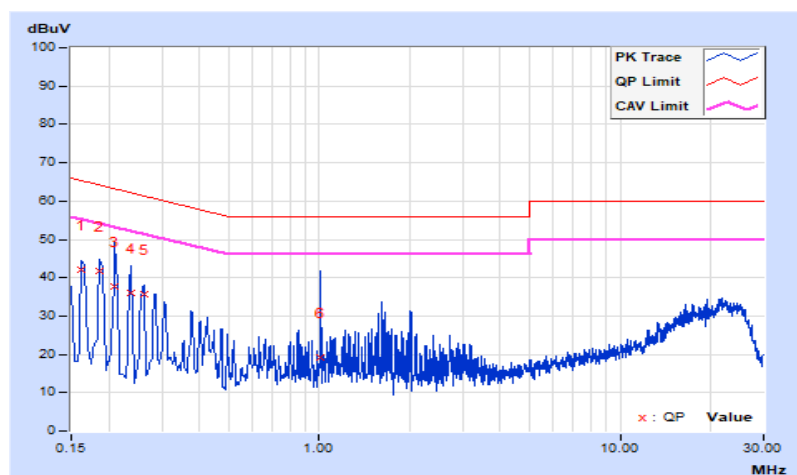


RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Rex Wang		

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	0.16200	9.64	32.32	16.13	41.96	25.77	65.36	55.36	-23.40	-29.59
2	0.18600	9.65	32.19	12.25	41.84	21.90	64.21	54.21	-22.37	-32.31
3	0.21000	9.65	28.05	7.66	37.70	17.31	63.21	53.21	-25.51	-35.90
4	0.23800	9.66	26.37	5.24	36.03	14.90	62.17	52.17	-26.14	-37.27
5	0.26152	9.67	26.04	4.08	35.71	13.75	61.38	51.38	-25.67	-37.63
6	1.01400	9.74	9.40	3.13	19.14	12.87	56.00	46.00	-36.86	-33.13

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



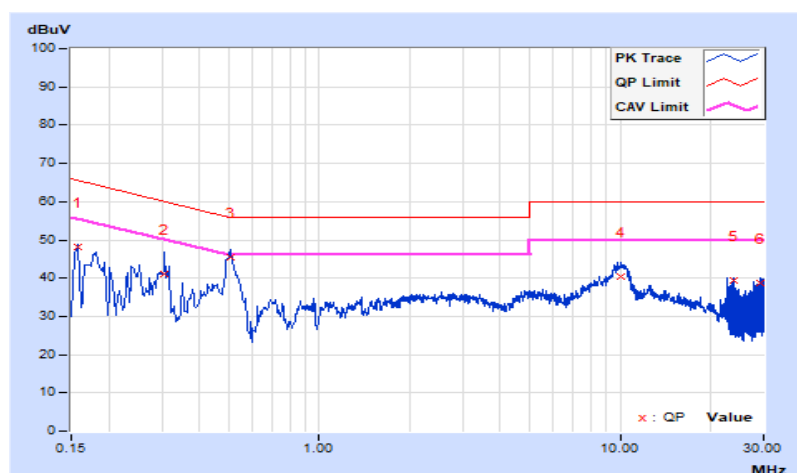
Mode B

RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Rex Wang		

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	0.15800	9.63	38.57	22.32	48.20	31.95	65.57	55.57	-17.37	-23.62
2	0.30600	9.66	31.53	20.56	41.19	30.22	60.08	50.08	-18.89	-19.86
3	0.50600	9.68	35.86	30.71	45.54	40.39	56.00	46.00	-10.46	-5.61
4	10.04600	9.80	30.75	26.02	40.55	35.82	60.00	50.00	-19.45	-14.18
5	23.81400	9.81	29.57	28.94	39.38	38.75	60.00	50.00	-20.62	-11.25
6	29.38600	9.79	28.80	26.82	38.59	36.61	60.00	50.00	-21.41	-13.39

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

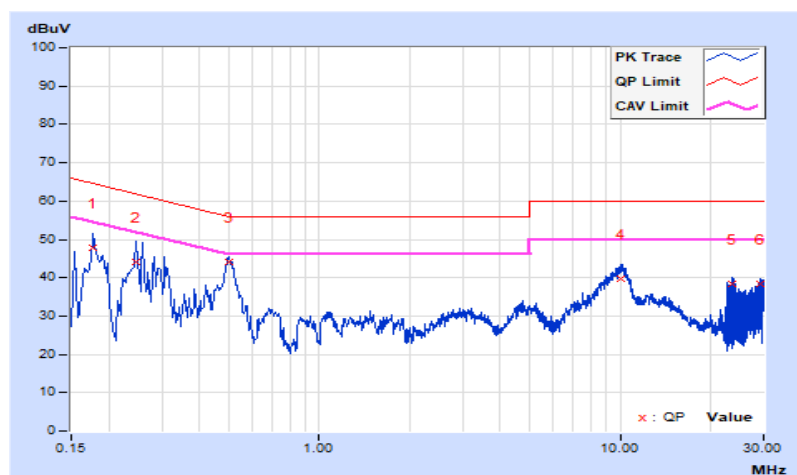


RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Rex Wang		

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	0.17800	9.64	38.27	28.93	47.91	38.57	64.58	54.58	-16.67	-16.01
2	0.24600	9.65	34.51	23.14	44.16	32.79	61.89	51.89	-17.73	-19.10
3	0.49870	9.68	34.57	29.75	44.25	39.43	56.02	46.02	-11.77	-6.59
4	10.03400	9.82	29.97	25.08	39.79	34.90	60.00	50.00	-20.21	-15.10
5	23.56200	9.93	28.44	25.40	38.37	35.33	60.00	50.00	-21.63	-14.67
6	29.14200	9.93	28.41	25.83	38.34	35.76	60.00	50.00	-21.66	-14.24

Remarks:

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



7.2 Unwanted Emissions below 1 GHz

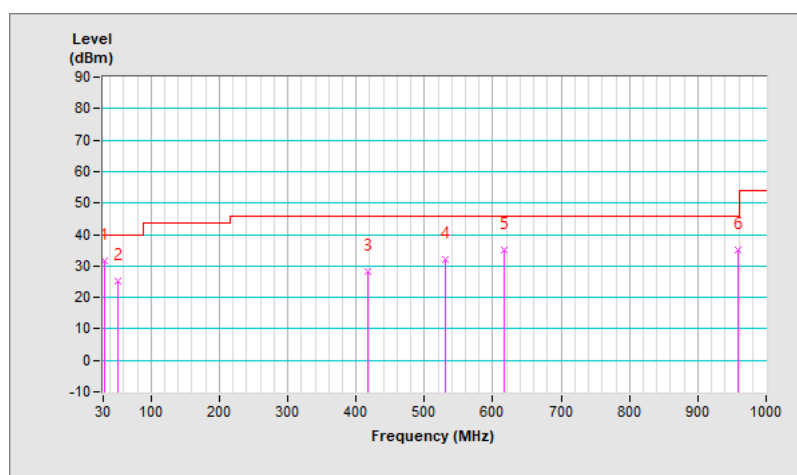
Mode A

RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	21.6 °C, 73.3 % RH
Tested By	Rex Wang		

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	32.91	31.6 QP	40.0	-8.4	1.99 H	34	42.1	-10.5
2	51.34	25.1 QP	40.0	-14.9	1.99 H	76	34.0	-8.9
3	417.03	28.0 QP	46.0	-18.0	1.99 H	177	32.5	-4.5
4	530.52	32.2 QP	46.0	-13.8	1.49 H	60	34.6	-2.4
5	615.88	35.0 QP	46.0	-11.0	1.00 H	151	35.3	-0.3
6	959.26	34.9 QP	46.0	-11.1	1.49 H	120	29.1	5.8

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.

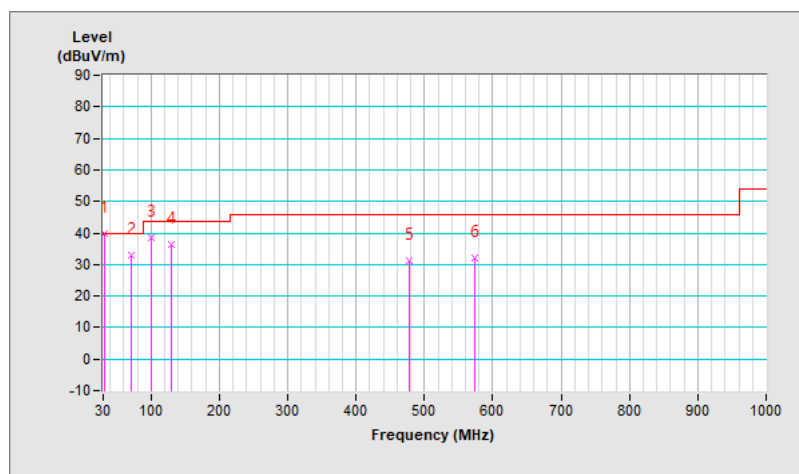


RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	21.6 °C, 73.3 % RH
Tested By	Rex Wang		

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	32.91	39.9 QP	40.0	-0.1	1.00 V	121	50.4	-10.5
2	71.71	32.9 QP	40.0	-7.1	1.00 V	39	44.0	-11.1
3	100.81	38.5 QP	43.5	-5.0	1.00 V	79	51.4	-12.9
4	129.91	36.2 QP	43.5	-7.3	1.49 V	191	45.9	-9.7
5	478.14	31.3 QP	46.0	-14.7	1.00 V	14	34.5	-3.2
6	573.20	31.9 QP	46.0	-14.1	1.49 V	155	33.4	-1.5

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 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.



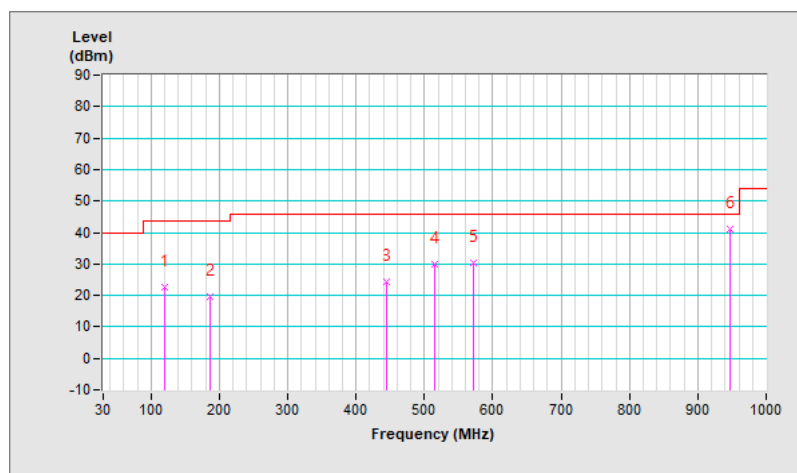
Mode B

RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Rex Wang		

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	119.24	22.5 QP	43.5	-21.0	1.51 H	120	33.3	-10.8
2	187.14	19.6 QP	43.5	-23.9	1.00 H	24	30.0	-10.4
3	445.16	24.4 QP	46.0	-21.6	1.51 H	141	28.1	-3.7
4	514.03	29.8 QP	46.0	-16.2	1.51 H	148	32.4	-2.6
5	572.23	30.2 QP	46.0	-15.8	1.00 H	159	31.7	-1.5
6	947.65	41.1 QP	46.0	-4.9	1.00 H	228	35.6	5.5

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 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.

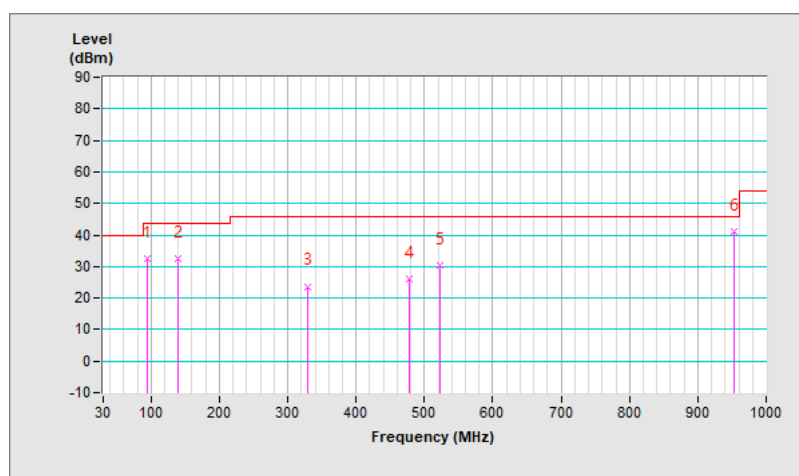


RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Rex Wang		

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	94.99	32.6 QP	43.5	-10.9	1.00 V	213	46.4	-13.8
2	138.64	32.3 QP	43.5	-11.2	1.00 V	89	41.2	-8.9
3	328.76	23.7 QP	46.0	-22.3	1.49 V	301	29.6	-5.9
4	478.14	25.9 QP	46.0	-20.1	1.00 V	253	29.1	-3.2
5	522.76	30.4 QP	46.0	-15.6	1.00 V	348	32.9	-2.5
6	953.04	41.0 QP	46.0	-5.0	1.49 V	299	35.5	5.5

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 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.



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.

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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