TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart C (Section 15.247)**
Report No.:	RFBENL-WTW-P22070089-2
FCC ID:	RYK-WPEQ262ACNIBT
Model No.:	WPEQ-262ACNI(BT)
Received Date:	2022/7/5
Test Date:	2022/7/19 ~ 2022/8/18
Issued Date:	2022/10/11
Applicant:	SparkLAN Communications, Inc.
Address:	5F, No. 199, Ruihu St., Neihu Dist., Taipei City 114067, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kewi Shan Dist., Taoyuan City 33383, Taiwan
Test Location (2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan
FCC Registration / Designation Number:	788550 / TW0003 281270 / TW0032

Approved by: Jeremy Lin , **Date:** 2022/10/11

Jeremy Lin / Project Engineer

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Prepared by : Lena Wang / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBENL-WTW-P22070089-2	Original Release	2022/10/11

1 Certificate

Product:	802.11ac/b/g/n Wi-Fi+BT Module
Brand:	SparkLAN
Test Model:	WPEQ-262ACNI(BT)
Sample Status:	Mass product
Applicant:	SparkLAN Communications, Inc.
Test Date:	2022/7/19 ~ 2022/8/18
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 KDB 662911 D01 Multiple Transmitter Output v02r01

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	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	N/A	Refer to note.
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to note.
15.247(d)	Conducted Out of Band Emissions	N/A	Refer to note.
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -19.44 dB at 0.40927 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -7.0 dB at 298.51 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.1 dB at 2390.00 MHz
15.203	Antenna Requirement	Pass	No antenna connector is used.

Notes:

1. This report is a partial report, only test item of RF Output Power, AC Power Conducted Emissions and Unwanted Emissions tests were performed for this report. Other testing data please refer to original BV CPS report no.: RF190625C32-2.
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	2.79 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3 dB
	30 MHz ~ 1 GHz	2.93 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 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	802.11ac/b/g/n Wi-Fi+BT Module
Brand	SparkLAN
Test Model	WPEQ-262ACNI(BT)
Status of EUT	Mass product
Power Supply Rating	3.3Vdc
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM,
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to 300Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
Output Power	CDD Mode: 127.567 mW (21.06 dBm) Beamforming Mode: 54.191 mW (17.34 dBm)

Note:

1. This report is prepared for FCC class II permissive change.This report is issued as a supplementary report to BV CPS report no. RF190625C32-2. The difference compared with original report is adding antenna and reducing the power, therefore only test item of RF Output Power, AC Power Conducted Emissions and Unwanted Emissions tests were performed for this report. Other testing data please refer to original report.
2. There are Bluetooth and WLAN (2.4 GHz & 5 GHz) technology used for the EUT.
3. 2.4GHz & 5GHz technologies cannot transmit at same time.
4. WLAN & BT technologies cannot transmit at same time.
5. 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 5 is new)

No.	Transmitter Circuit	Brand	Model	Antenna Type	2.4G gain with cable loss (dBi)	5G gain with cable loss (dBi)	Connector Type
1	Chain(0) Chain(1)	Sparklan	AD-300N	Dipole	3	5	RP-SMA
2	Chain(0) Chain(1)	Sparklan	AD-103AG	Dipole	2.02	2.03	RP-SMA
3	Chain(0) Chain(1)	Sparklan	AD-302N	Dipole	3	2	RP-SMA
4	Chain(0) Chain(1)	Sparklan	AD-303N	Dipole	3	3	RP-SMA
5	-	Taolas	MA230.LBC.002	PIFA	1.5	2	RP-SMA

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

2. The EUT provides 2 completed transmitter and 2 receiver.

2.4 GHz Band			
Modulation Mode	**TX & RX Configuration**		**Beamforming**
802.11b	2TX	2RX	Not Support
802.11g	2TX	2RX	Not Support
802.11n (HT20)	2TX	2RX	Support
802.11n (HT40)	2TX	2RX	Support

3.3 Channel List

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

3.4 Test Mode Applicability and Tested Channel Detail

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

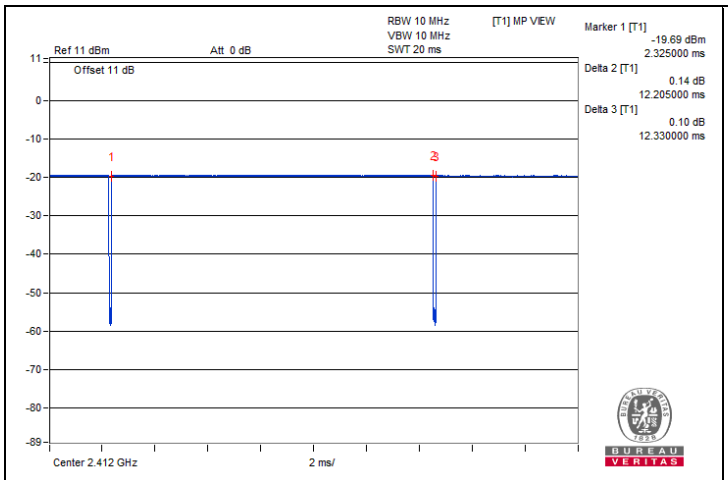
Following channel(s) was (were) selected for the final test as listed below:

Test Item	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power	802.11b	CDD	1, 6, 11	DBPSK	1Mb/s
	802.11g	CDD	1, 6, 11	BPSK	6Mb/s
	802.11n (HT20)	CDD & Beamforming	1, 6, 11	BPSK	6.5Mb/s
	802.11n (HT40)	CDD & Beamforming	3, 6, 9	BPSK	13.5Mb/s
AC Power Conducted Emissions	802.11b	CDD	1	DBPSK	1Mb/s
Unwanted Emissions below 1 GHz	802.11b	CDD	1	DBPSK	1Mb/s
Unwanted Emissions above 1 GHz	802.11b	CDD	1, 6, 11	DBPSK	1Mb/s
	802.11g	CDD	1, 6, 11	BPSK	6Mb/s
	802.11n (HT20)	CDD	1, 6, 11	BPSK	6.5Mb/s
	802.11n (HT40)	CDD	3, 6, 9	BPSK	13.5Mb/s

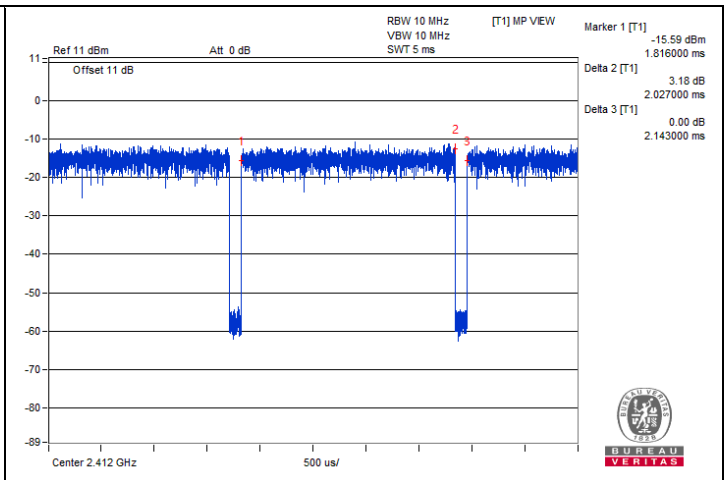
3.5 Duty Cycle of Test Signal

Duty cycle of test signal is >= 98 %, duty factor is not required.
Duty cycle of test signal is < 98 %, duty factor shall be considered.

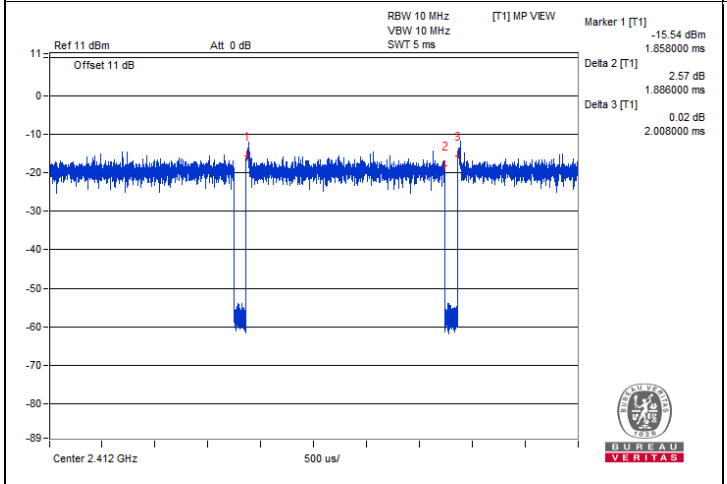
802.11b: Duty cycle = 12.205 ms / 12.33 ms x 100% = 99.0%
802.11g: Duty cycle = 2.027 ms / 2.143 ms x 100% = 94.6%, duty factor = 10 * log (1/Duty cycle) = 0.24 dB
802.11n (HT20): Duty cycle = 1.886 ms / 2.008 ms x 100% = 93.9%, duty factor = 10 * log (1/Duty cycle) = 0.27 dB
802.11n (HT40): Duty cycle = 0.927 ms / 1.053 ms x 100% = 88.0%, duty factor = 10 * log (1/Duty cycle) = 0.55 dB



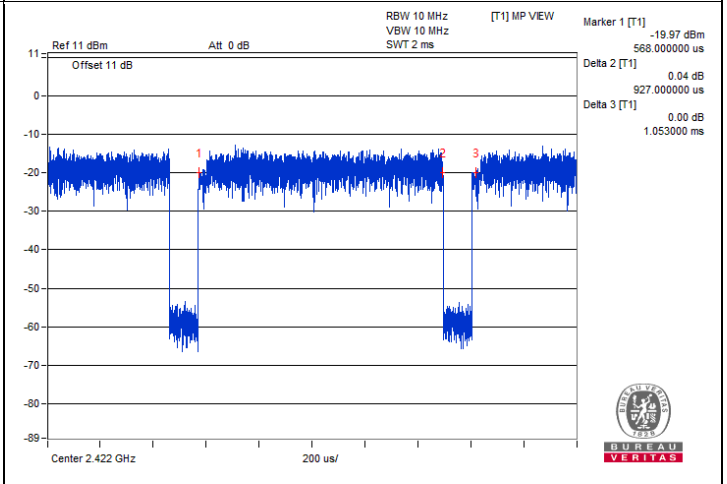
802.11b



802.11g



802.11n (HT20)

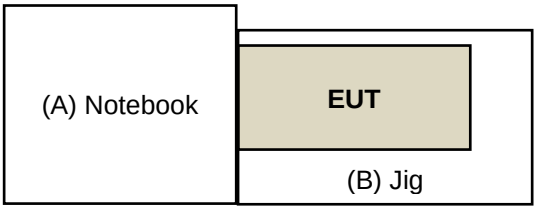


802.11n (HT40)

3.6 Test Program Used and Operation Descriptions

Controlling software QCARCT_3.0.203.0 has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Notebook	Dell	E5430	HMZJ7W1	N/A	Provided by Lab
B	Jig	N/A	N/A	N/A	N/A	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 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	2022/1/18	2023/1/17
Power sensor Keysight	U2021XA	MY55380009	2022/3/23	2023/3/22
Wideband Power Sensor(N1923A) KEYSIGHT	N1923A	MY58020002	2022/1/17	2023/1/16

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/8/3

4.2 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
DC LISN R&S	ESH3-Z6	100219	2021/7/25	2022/7/24
		844950/018	2021/7/25	2022/7/24
DC-LISN SCHWARZBECK MESS-ELETRONIK	NNBM 8126G	8126G-069	2021/11/10	2022/11/9
LISN R&S	ESH2-Z5	100100	2022/2/17	2023/2/16
	ESH3-Z5	100312	2021/9/17	2022/9/16
RF Coaxial Cable WORKEN	5D-FB	Cable-cond2-01	2021/9/4	2022/9/3
Software BVADT	BVADT_Cond_ V7.3.7.4	N/A	N/A	N/A
Test Receiver R&S	ESR3	102783	2021/12/20	2022/12/19
V-LISN Schwarzbeck	NNBL 8226-2	8226-142	2021/8/20	2022/8/19

Notes:

1. The test was performed in HY - Conduction 2.
2. Tested Date: 2022/7/22

4.3 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Bi-log Broadband Antenna Schwarzbeck	VULB9168	9168-1213	2021/10/27	2022/10/26
Loop Antenna EMCI	EM-6879	269	2021/9/16	2022/9/15
Pre-amplifier EMCI	EMC001340	980201	2021/9/15	2022/9/14
Pre_Amplifier EMCI	EMC330N	980782	2022/1/17	2023/1/16
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2022/1/15	2023/1/14
	EMCCFD400-NM-NM-500	201233	2022/1/17	2023/1/16
	EMCCFD400-NM-NM-3000	201235	2022/1/17	2023/1/16
	EMCCFD400-NM-NM-9000	201236	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer R&S	FSW43	101866	2022/1/14	2023/1/13
Test Receiver R&S	ESR3+	102782	2021/12/10	2022/12/9
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2022/7/21

4.4 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Horn Antenna RFSPIN	DRH18-E	210103A18E	2021/11/14	2022/11/13
Horn Antenna Schwarzbeck	BBHA 9170	9170-1049	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC118A45SE	980808	2021/12/30	2022/12/29
	EMC184045SE	980788	2022/1/17	2023/1/16
RF Coaxial Cable EMCI	EMC101G-KM-KM-2000	201254	2022/1/17	2023/1/16
	EMC101G-KM-KM-3000	201257	2022/1/17	2023/1/16
	EMC101G-KM-KM-5000	201260	2022/1/17	2023/1/16
	EMC104-SM-SM-1000	210102	2022/1/17	2023/1/16
	EMC104-SM-SM-3000	201231	2022/1/17	2023/1/16
	EMC104-SM-SM-9000	201243	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Spectrum Analyzer R&S	FSW43	101866	2022/1/14	2023/1/13
Test Receiver R&S	ESR3+	102782	2021/12/10	2022/12/9
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2022/7/19 ~ 2022/8/18

5 Limits of Test Items

5.1 RF Output Power

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

5.2 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.

5.3 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).

5.4 Unwanted Emissions above 1 GHz

Radiated emissions above 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)
Above 960	500	3

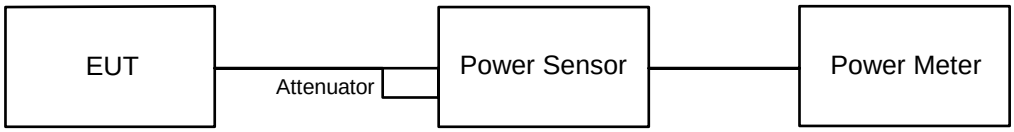
Notes:

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.

6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup

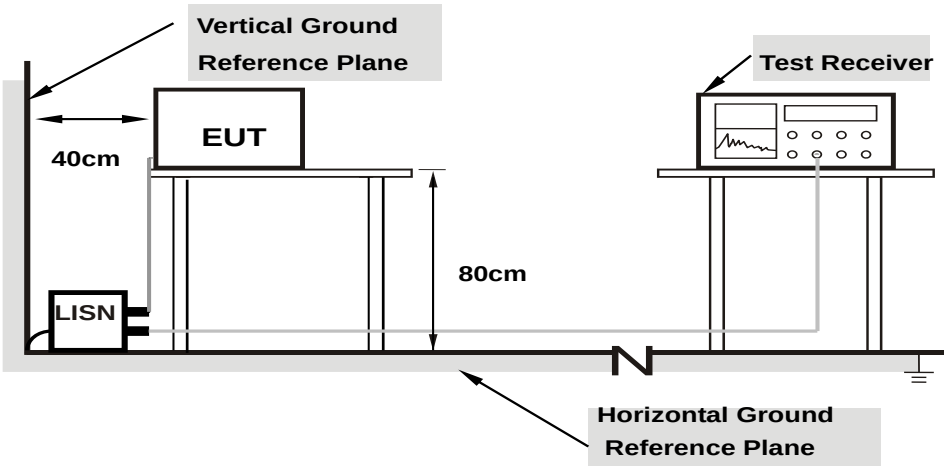


6.1.2 Test Procedure

Average Power:
Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

6.2 AC Power Conducted Emissions

6.2.1 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).

6.2.2 Test Procedure

a. 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.

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

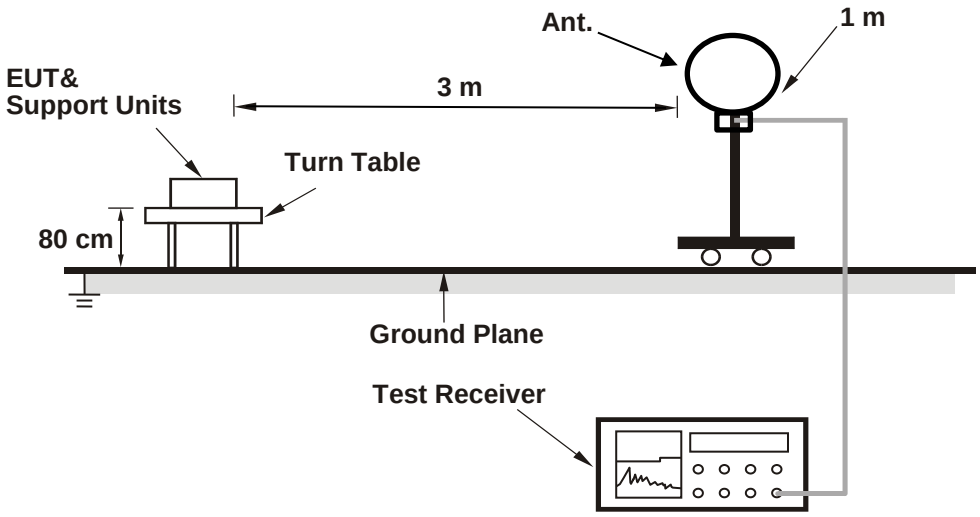
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

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.

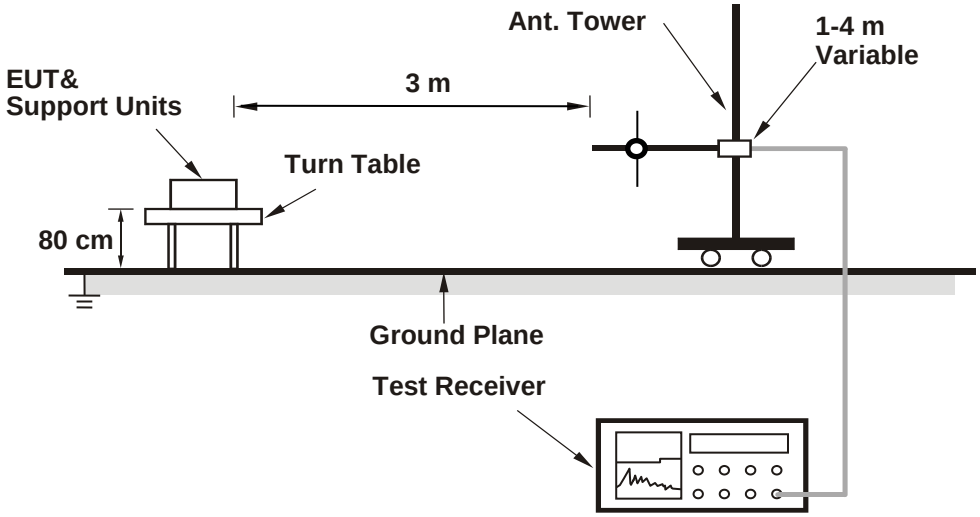
6.3 Unwanted Emissions below 1 GHz

6.3.1 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).

6.3.2 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.

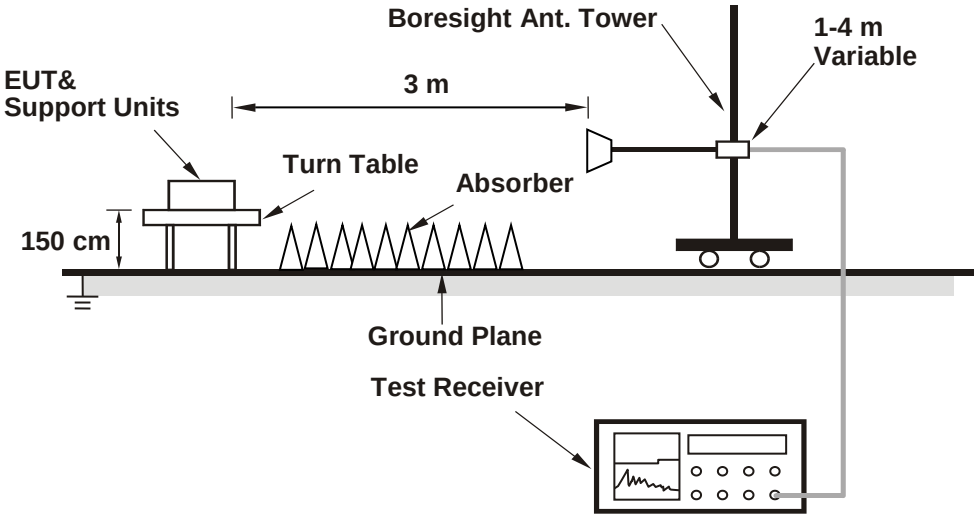
Notes:

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.

6.4 Unwanted Emissions above 1 GHz

6.4.1 Test Setup

For Radiated emission above 1 GHz



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

6.4.2 Test Procedure

a. The EUT was placed on the top of a rotating table 1.5 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 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:

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

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang

CDD Mode:

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	18.18	17.91	127.567	21.06	30	Pass
6	2437	17.45	17.12	107.113	20.30	30	Pass
11	2462	16.54	16.24	87.154	19.40	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 1.5 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	13.55	13.51	45.085	16.54	30	Pass
6	2437	17.75	17.66	117.911	20.72	30	Pass
11	2462	15.76	15.31	71.633	18.55	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 1.5 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	11.37	11.12	26.651	14.26	30	Pass
6	2437	17.55	17.17	109.005	20.37	30	Pass
11	2462	14.15	13.38	47.779	16.79	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 1.5 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	11.32	10.75	25.437	14.05	30	Pass
6	2437	17.13	16.95	101.187	20.05	30	Pass
9	2452	11.35	10.78	25.613	14.08	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 1.5 dBi < 6 dBi, so the output power limit shall not be reduced.

Beamforming Mode:

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	8.32	8.08	13.219	11.21	30	Pass
6	2437	14.51	14.14	**54.191**	**17.34**	30	Pass
11	2462	11.11	10.32	23.677	13.74	30	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. The directional gain is 4.51 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	8.28	7.67	12.578	11.00	30	Pass
6	2437	14.08	13.88	50.02	16.99	30	Pass
9	2452	8.32	7.69	12.667	11.03	30	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. The directional gain is 4.51 dBi < 6 dBi, so the output power limit shall not be reduced.

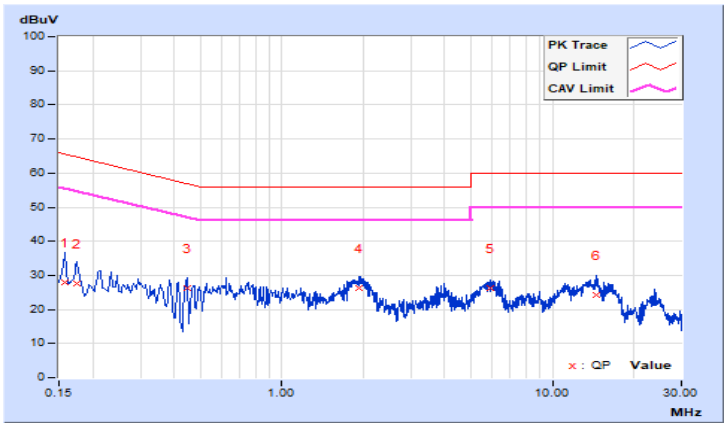
7.2 AC Power Conducted Emissions

RF Mode	TX 802.11b	**Channel**	CH 1：2412 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**	23°C, 66% RH
Tested By	TitanHSU		

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	10.13	17.87	12.52	28.00	22.65	65.57	55.57	-37.57	-32.92
2	0.17400	10.13	17.52	8.95	27.65	19.08	64.77	54.77	-37.12	-35.69
3	0.44600	10.16	16.18	8.51	26.34	18.67	56.95	46.95	-30.61	-28.28
4	1.92200	10.22	15.93	10.13	26.15	20.35	56.00	46.00	-29.85	-25.65
5	5.91800	10.26	16.11	10.12	26.37	20.38	60.00	50.00	-33.63	-29.62
6	14.51000	10.33	13.84	6.89	24.17	17.22	60.00	50.00	-35.83	-32.78

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

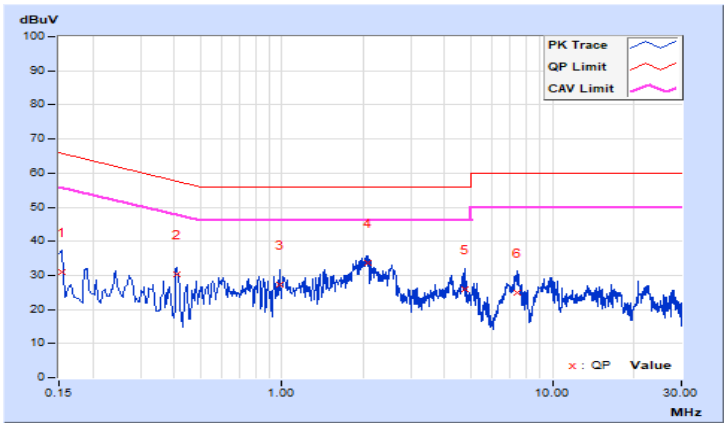


RF Mode	TX 802.11b	**Channel**	CH 1：2412 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 66% RH
Tested By	TitanHSU		

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	0.15400	10.14	20.94	10.54	31.08	20.68	65.78	55.78	-34.70	-35.10
2	**0.40927**	**10.17**	**20.17**	**18.05**	**30.34**	**28.22**	**57.66**	**47.66**	**-27.32**	**-19.44**
3	0.98200	10.20	16.98	10.56	27.18	20.76	56.00	46.00	-28.82	-25.24
4	2.08200	10.23	23.38	15.11	33.61	25.34	56.00	46.00	-22.39	-20.66
5	4.73000	10.28	15.49	6.57	25.77	16.85	56.00	46.00	-30.23	-29.15
6	7.43800	10.32	14.63	7.67	24.95	17.99	60.00	50.00	-35.05	-32.01

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



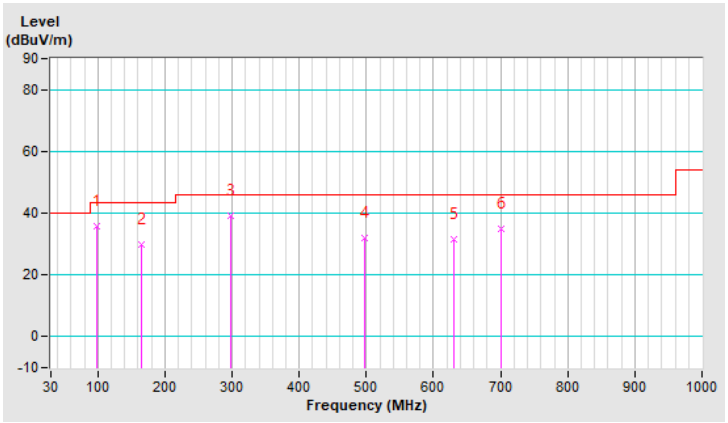
7.3 Unwanted Emissions below 1 GHz

RF Mode	TX 802.11b	**Channel**	CH 1：2412 MHz
Frequency Range	9 kHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 66% RH
Tested By	Titan Hsu		

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	98.88	35.8 QP	43.5	-7.8	1.99 H	166	53.6	-17.9
2	164.96	30.0 QP	43.5	-13.6	1.49 H	167	43.2	-13.2
3	**298.51**	**39.0 QP**	**46.0**	**-7.0**	**1.00 H**	**157**	**51.6**	**-12.7**
4	498.13	32.1 QP	46.0	-13.9	1.49 H	211	40.0	-7.9
5	630.28	31.5 QP	46.0	-14.5	1.00 H	270	36.4	-4.9
6	700.57	34.8 QP	46.0	-11.2	1.00 H	202	38.8	-4.1

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

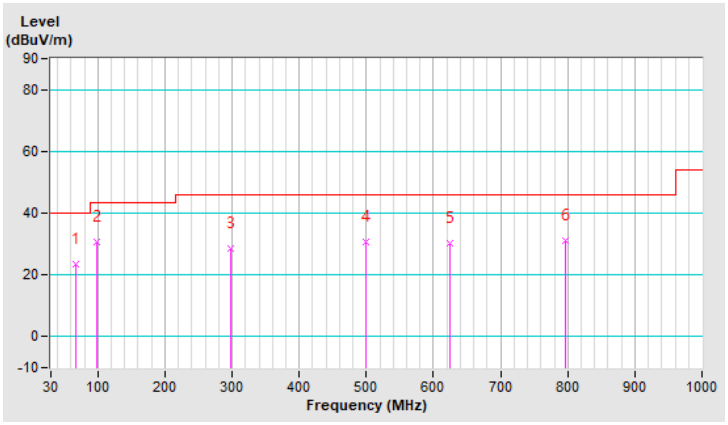


RF Mode	TX 802.11b	**Channel**	CH 1：2412 MHz
Frequency Range	9 kHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 66% RH
Tested By	Titan Hsu		

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	66.55	23.5 QP	40.0	-16.5	1.01 V	37	38.3	-14.8
2	98.88	30.7 QP	43.5	-12.8	2.50 V	96	48.6	-17.9
3	298.51	28.6 QP	46.0	-17.4	2.50 V	264	41.3	-12.7
4	499.54	30.8 QP	46.0	-15.2	1.51 V	166	38.7	-7.9
5	624.65	30.1 QP	46.0	-15.9	1.51 V	18	35.1	-5.0
6	797.57	31.1 QP	46.0	-14.9	1.01 V	97	33.5	-2.5

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



7.4 Unwanted Emissions above 1 GHz

RF Mode	TX 802.11b	**Channel**	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	23°C, 66% RH
Tested By	Tim-chen		

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	2390.00	59.5 PK	74.0	-14.5	1.00 H	163	27.5	32.0
2	2390.00	47.5 AV	54.0	-6.5	1.00 H	163	15.5	32.0
3	*2412.00	107.9 PK			1.00 H	163	75.9	32.0
4	*2412.00	105.5 AV			1.00 H	163	73.5	32.0
5	4824.00	53.9 PK	74.0	-20.1	2.00 H	191	50.9	3.0
6	4824.00	49.8 AV	54.0	-4.2	2.00 H	191	46.8	3.0
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	2390.00	59.3 PK	74.0	-14.7	2.60 V	194	27.3	32.0
2	2390.00	47.1 AV	54.0	-6.9	2.60 V	194	15.1	32.0
3	*2412.00	105.0 PK			2.60 V	194	73.0	32.0
4	*2412.00	102.5 AV			2.60 V	194	70.5	32.0
5	4824.00	56.5 PK	74.0	-17.5	1.95 V	110	53.5	3.0
6	4824.00	53.3 AV	54.0	-0.7	1.95 V	110	50.3	3.0

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.

RF Mode	TX 802.11b	Channel	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	*2437.00	108.7 PK			1.19 H	163	76.8	31.9
2	*2437.00	106.3 AV			1.19 H	163	74.4	31.9
3	4874.00	54.3 PK	74.0	-19.7	2.00 H	190	51.5	2.8
4	4874.00	50.4 AV	54.0	-3.6	2.00 H	190	47.6	2.8
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	*2437.00	105.8 PK			2.46 V	195	73.9	31.9
2	*2437.00	103.4 AV			2.46 V	195	71.5	31.9
3	4874.00	56.7 PK	74.0	-17.3	1.94 V	122	53.9	2.8
4	4874.00	53.5 AV	54.0	-0.5	1.94 V	122	50.7	2.8

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	TX 802.11b	Channel	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	*2462.00	109.7 PK			1.00 H	171	77.7	32.0
2	*2462.00	107.5 AV			1.00 H	171	75.5	32.0
3	2483.50	60.0 PK	74.0	-14.0	1.00 H	171	28.0	32.0
4	2483.50	49.9 AV	54.0	-4.1	1.00 H	171	17.9	32.0
5	4924.00	55.1 PK	74.0	-18.9	1.60 H	191	52.3	2.8
6	4924.00	51.4 AV	54.0	-2.6	1.60 H	191	48.6	2.8
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	*2462.00	108.4 PK			2.87 V	327	76.4	32.0
2	*2462.00	105.9 AV			2.87 V	327	73.9	32.0
3	2483.50	60.2 PK	74.0	-13.8	2.87 V	327	28.2	32.0
4	2483.50	49.3 AV	54.0	-4.7	2.87 V	327	17.3	32.0
5	4924.00	56.3 PK	74.0	-17.7	2.12 V	114	53.5	2.8
6	4924.00	53.8 AV	54.0	-0.2	2.12 V	114	51.0	2.8

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	TX 802.11g	Channel	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	2390.00	60.5 PK	74.0	-13.5	2.03 H	162	29.6	30.9
2	2390.00	49.4 AV	54.0	-4.6	2.03 H	162	18.5	30.9
3	*2412.00	106.2 PK			2.03 H	162	75.3	30.9
4	*2412.00	97.0 AV			2.03 H	162	66.1	30.9
5	4824.00	44.7 PK	74.0	-29.3	1.11 H	158	60.5	-15.8
6	4824.00	35.5 AV	54.0	-18.5	1.11 H	158	51.3	-15.8
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	2390.00	58.7 PK	74.0	-15.3	3.00 V	330	27.8	30.9
2	2390.00	47.7 AV	54.0	-6.3	3.00 V	330	16.8	30.9
3	*2412.00	101.7 PK			3.00 V	330	70.8	30.9
4	*2412.00	92.2 AV			3.00 V	330	61.3	30.9
5	4824.00	43.1 PK	74.0	-30.9	1.20 V	132	58.9	-15.8
6	4824.00	24.3 AV	54.0	-29.7	1.20 V	132	40.1	-15.8

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	TX 802.11g	Channel	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	*2437.00	113.2 PK			1.63 H	172	82.3	30.9
2	*2437.00	103.9 AV			1.63 H	172	73.0	30.9
3	4874.00	53.9 PK	74.0	-20.1	1.82 H	177	69.8	-15.9
4	4874.00	42.5 AV	54.0	-11.5	1.82 H	177	58.4	-15.9
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	*2437.00	111.8 PK			2.98 V	331	80.9	30.9
2	*2437.00	101.9 AV			2.98 V	331	71.0	30.9
3	4874.00	52.4 PK	74.0	-21.6	2.03 V	167	68.3	-15.9
4	4874.00	41.2 AV	54.0	-12.8	2.03 V	167	57.1	-15.9

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.

RF Mode	TX 802.11g	Channel	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	*2462.00	112.1 PK			1.54 H	163	80.1	32.0
2	*2462.00	102.3 AV			1.54 H	163	70.3	32.0
3	2483.50	67.0 PK	74.0	-7.0	1.54 H	163	35.0	32.0
4	2483.50	53.8 AV	54.0	-0.2	1.54 H	163	21.8	32.0
5	4924.00	53.1 PK	74.0	-20.9	3.52 H	78	50.3	2.8
6	4924.00	42.0 AV	54.0	-12.0	3.52 H	78	39.2	2.8
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	*2462.00	110.0 PK			3.24 V	304	78.0	32.0
2	*2462.00	100.5 AV			3.24 V	304	68.5	32.0
3	2483.50	66.3 PK	74.0	-7.7	3.24 V	304	34.3	32.0
4	2483.50	52.7 AV	54.0	-1.3	3.24 V	304	20.7	32.0
5	4924.00	51.4 PK	74.0	-22.6	1.05 V	122	48.6	2.8
6	4924.00	39.9 AV	54.0	-14.1	1.05 V	122	37.1	2.8

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	TX 802.11n (HT20)	Channel	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	2390.00	67.2 PK	74.0	-6.8	1.67 H	174	35.2	32.0
2	2390.00	53.1 AV	54.0	-0.9	1.67 H	174	21.1	32.0
3	*2412.00	109.8 PK			1.67 H	174	77.8	32.0
4	*2412.00	100.1 AV			1.67 H	174	68.1	32.0
5	4824.00	51.2 PK	74.0	-22.8	3.35 H	81	48.2	3.0
6	4824.00	39.2 AV	54.0	-14.8	3.35 H	81	36.2	3.0
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	2390.00	62.6 PK	74.0	-11.4	3.68 V	333	30.6	32.0
2	2390.00	49.7 AV	54.0	-4.3	3.68 V	333	17.7	32.0
3	*2412.00	109.2 PK			3.68 V	333	77.2	32.0
4	*2412.00	99.5 AV			3.68 V	333	67.5	32.0
5	4824.00	50.2 PK	74.0	-23.8	1.23 V	127	47.2	3.0
6	4824.00	37.5 AV	54.0	-16.5	1.23 V	127	34.5	3.0

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.

RF Mode	TX 802.11n (HT20)	Channel	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	*2437.00	113.0 PK			1.66 H	173	82.1	30.9
2	*2437.00	103.6 AV			1.66 H	173	72.7	30.9
3	4874.00	53.6 PK	74.0	-20.4	1.93 H	180	69.5	-15.9
4	4874.00	42.2 AV	54.0	-11.8	1.93 H	180	58.1	-15.9
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	*2437.00	111.2 PK			2.93 V	328	80.3	30.9
2	*2437.00	101.4 AV			2.93 V	328	70.5	30.9
3	4874.00	52.0 PK	74.0	-22.0	2.01 V	164	67.9	-15.9
4	4874.00	40.7 AV	54.0	-13.3	2.01 V	164	56.6	-15.9

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.

RF Mode	TX 802.11n (HT20)	Channel	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	*2462.00	110.5 PK			1.45 H	158	78.5	32.0
2	*2462.00	100.4 AV			1.45 H	158	68.4	32.0
3	2483.50	65.9 PK	74.0	-8.1	1.45 H	158	33.9	32.0
4	2483.50	53.5 AV	54.0	-0.5	1.45 H	158	21.5	32.0
5	4924.00	51.3 PK	74.0	-22.7	3.55 H	75	48.5	2.8
6	4924.00	40.0 AV	54.0	-14.0	3.55 H	75	37.2	2.8
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	*2462.00	108.8 PK			3.23 V	306	76.8	32.0
2	*2462.00	99.4 AV			3.23 V	306	67.4	32.0
3	2483.50	63.5 PK	74.0	-10.5	3.23 V	306	31.5	32.0
4	2483.50	51.3 AV	54.0	-2.7	3.23 V	306	19.3	32.0
5	4924.00	50.0 PK	74.0	-24.0	1.07 V	125	47.2	2.8
6	4924.00	38.7 AV	54.0	-15.3	1.07 V	125	35.9	2.8

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	TX 802.11n (HT40)	Channel	CH 3：2422 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	2390.00	67.9 PK	74.0	-6.1	1.65 H	173	35.9	32.0
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.65 H**	**173**	**21.9**	**32.0**
3	*2422.00	103.1 PK			1.65 H	173	71.2	31.9
4	*2422.00	94.4 AV			1.65 H	173	62.5	31.9
5	4844.00	49.4 PK	74.0	-24.6	3.37 H	88	46.5	2.9
6	4844.00	36.1 AV	54.0	-17.9	3.37 H	88	33.2	2.9
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	2390.00	65.6 PK	74.0	-8.4	3.63 V	332	33.6	32.0
2	2390.00	51.6 AV	54.0	-2.4	3.63 V	332	19.6	32.0
3	*2422.00	101.4 PK			3.63 V	332	69.5	31.9
4	*2422.00	93.4 AV			3.63 V	332	61.5	31.9
5	4844.00	48.9 PK	74.0	-25.1	1.25 V	132	46.0	2.9
6	4844.00	35.0 AV	54.0	-19.0	1.25 V	132	32.1	2.9

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.

RF Mode	TX 802.11n (HT40)	Channel	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	2390.00	68.6 PK	74.0	-5.4	1.12 H	16	36.6	32.0
2	2390.00	53.1 AV	54.0	-0.9	1.12 H	16	21.1	32.0
3	*2437.00	107.6 PK			1.12 H	16	75.7	31.9
4	*2437.00	97.3 AV			1.12 H	16	65.4	31.9
5	2483.50	65.3 PK	74.0	-8.7	1.12 H	16	33.3	32.0
6	2483.50	52.1 AV	54.0	-1.9	1.12 H	16	20.1	32.0
7	4874.00	50.7 PK	74.0	-23.3	2.68 H	244	47.9	2.8
8	4874.00	38.9 AV	54.0	-15.1	2.68 H	244	36.1	2.8
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	2390.00	61.5 PK	74.0	-12.5	3.30 V	318	29.5	32.0
2	2390.00	48.8 AV	54.0	-5.2	3.30 V	318	16.8	32.0
3	*2437.00	106.8 PK			3.30 V	318	74.9	31.9
4	*2437.00	96.7 AV			3.30 V	318	64.8	31.9
5	2483.50	65.8 PK	74.0	-8.2	3.30 V	318	33.8	32.0
6	2483.50	52.4 AV	54.0	-1.6	3.30 V	318	20.4	32.0
7	4874.00	49.4 PK	74.0	-24.6	1.42 V	155	46.6	2.8
8	4874.00	38.2 AV	54.0	-15.8	1.42 V	155	35.4	2.8

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	TX 802.11n (HT40)	Channel	CH 9：2452 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Tim-chen		

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	*2452.00	104.8 PK			1.54 H	161	72.8	32.0
2	*2452.00	95.7 AV			1.54 H	161	63.7	32.0
3	2483.50	67.4 PK	74.0	-6.6	1.54 H	161	35.4	32.0
4	2483.50	53.8 AV	54.0	-0.2	1.54 H	161	21.8	32.0
5	4904.00	49.1 PK	74.0	-24.9	3.52 H	78	46.2	2.9
6	4904.00	34.5 AV	54.0	-19.5	3.52 H	78	31.6	2.9
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	*2452.00	102.0 PK			3.26 V	306	70.0	32.0
2	*2452.00	92.9 AV			3.26 V	306	60.9	32.0
3	2483.50	64.6 PK	74.0	-9.4	3.26 V	306	32.6	32.0
4	2483.50	52.1 AV	54.0	-1.9	3.26 V	306	20.1	32.0
5	4904.00	48.7 PK	74.0	-25.3	1.05 V	128	45.8	2.9
6	4904.00	33.1 AV	54.0	-20.9	1.05 V	128	30.2	2.9

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.

802.11b Channel 1

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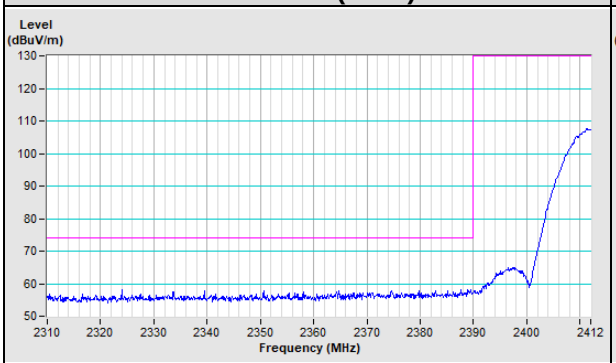

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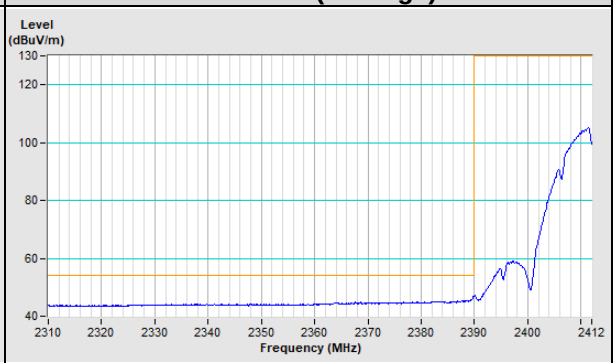

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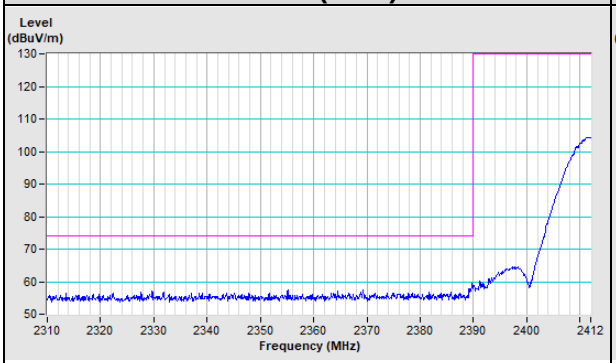

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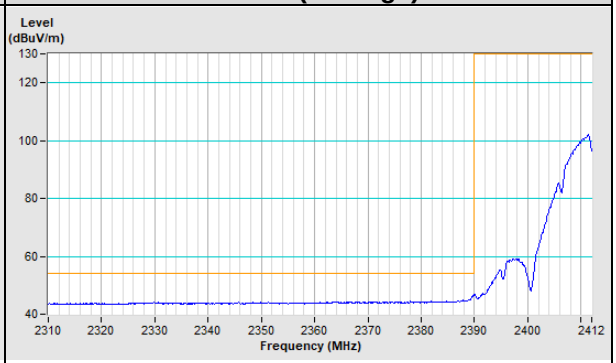
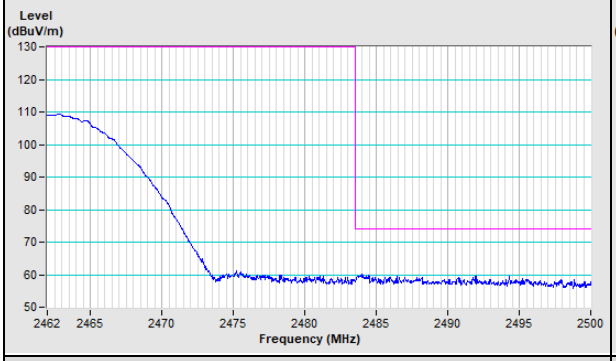


802.11b Channel 11

Horizontal (Peak)



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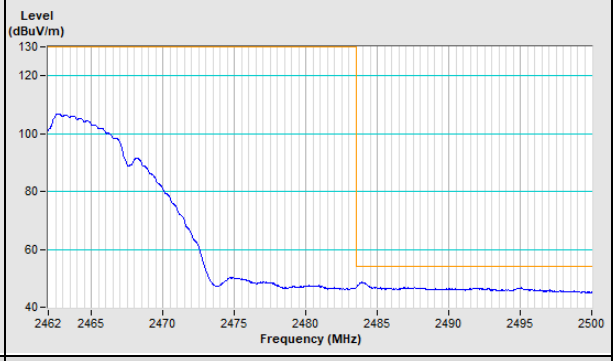

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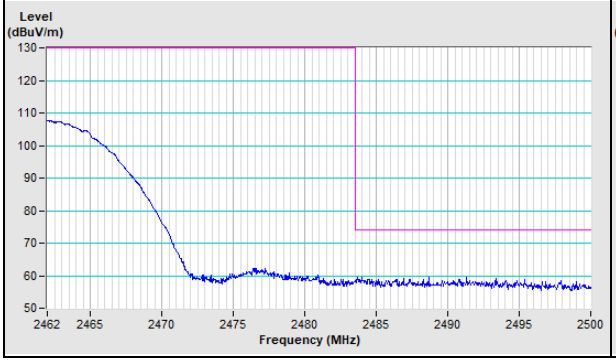

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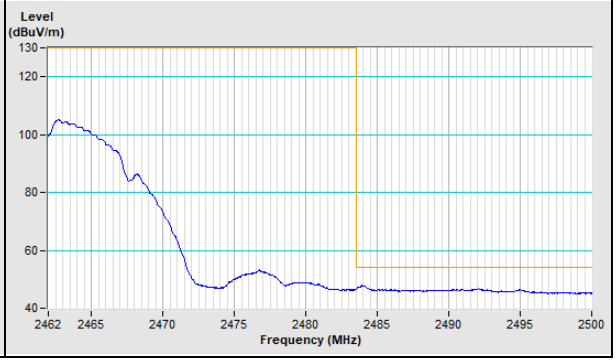
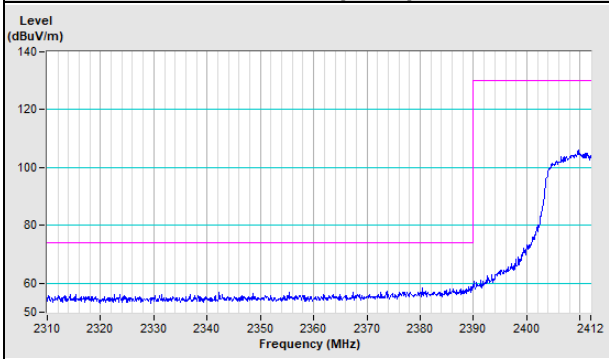


802.11g Channel 1

Horizontal (Peak)



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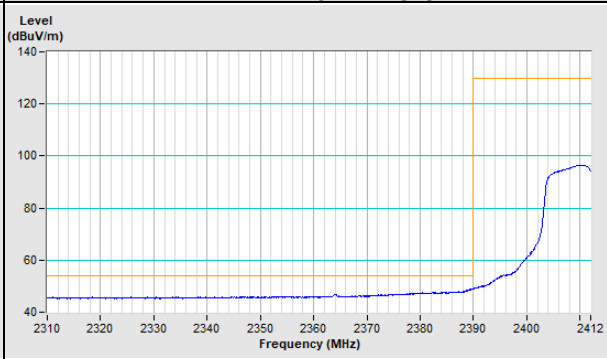

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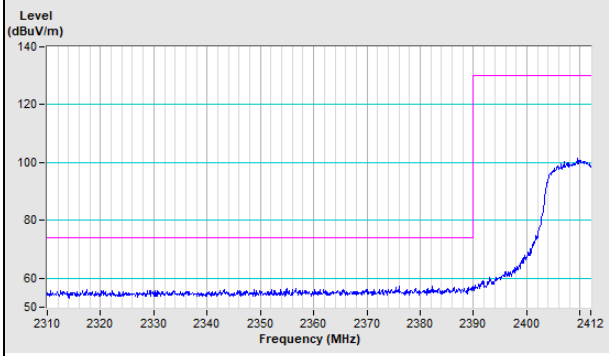

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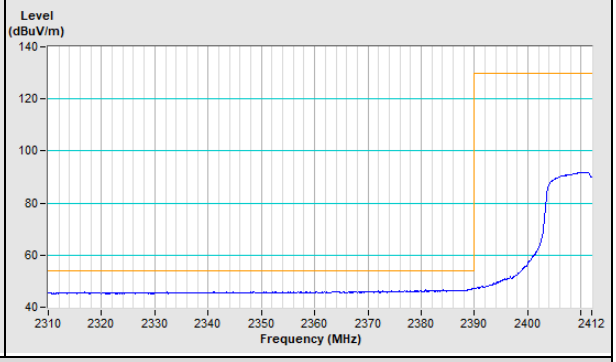
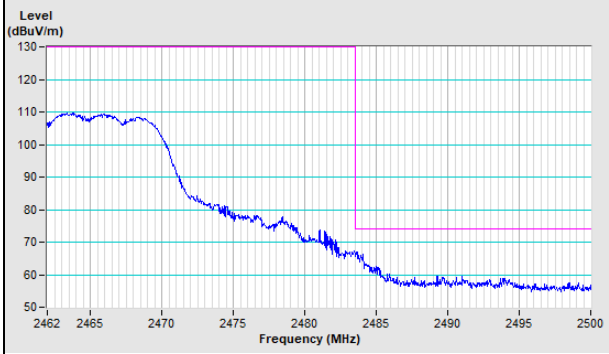


802.11g Channel 11

Horizontal (Peak)



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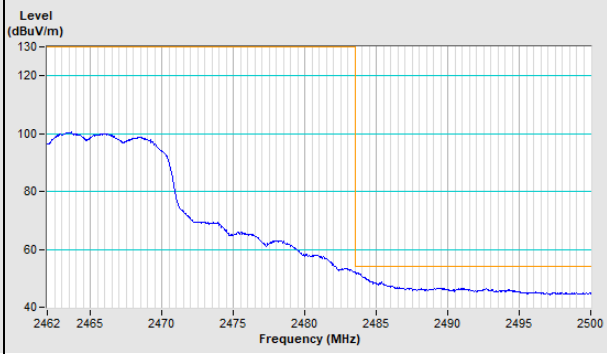
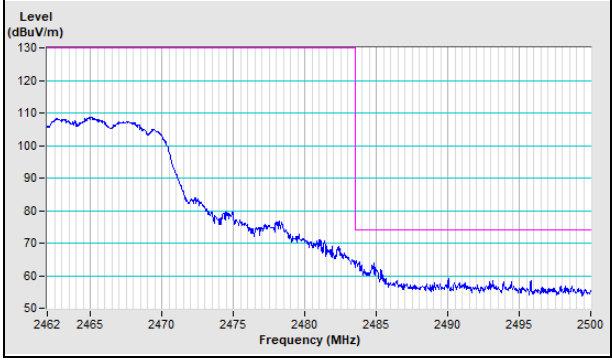


Vertical (Peak)



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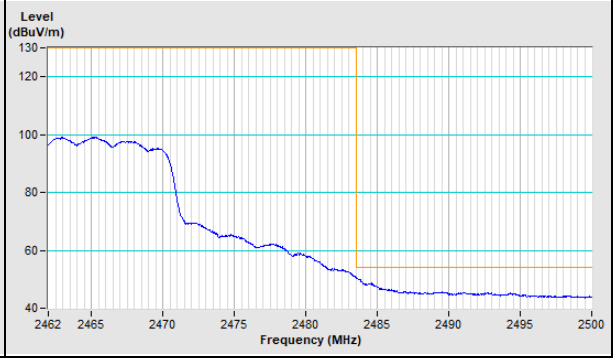
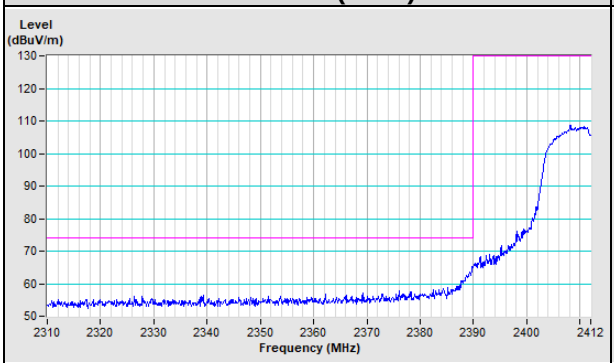


802.11n (HT20) Channel 1

Horizontal (Peak)



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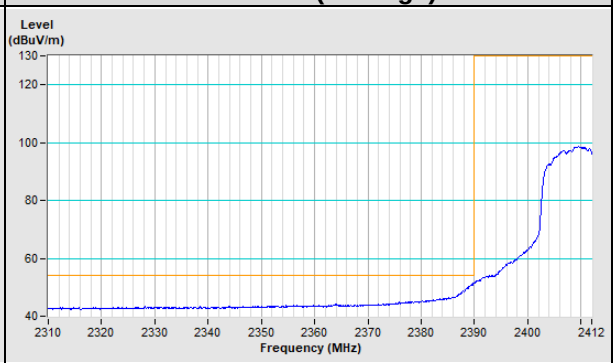

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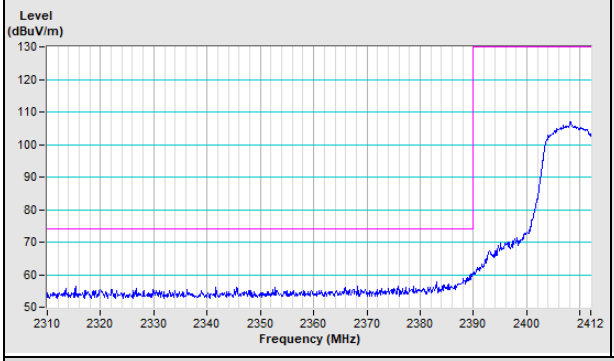

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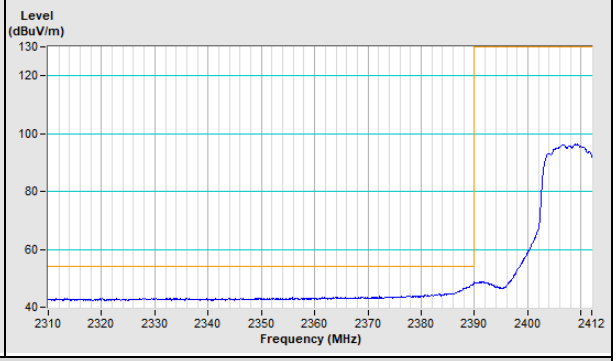
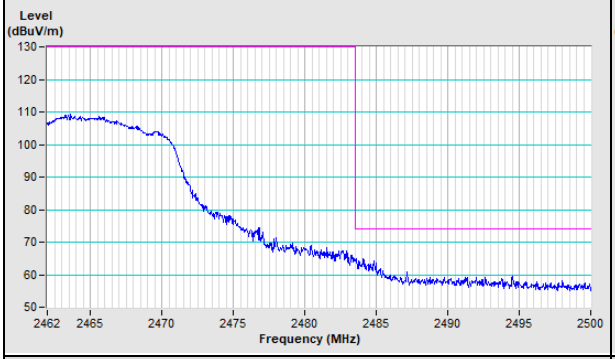
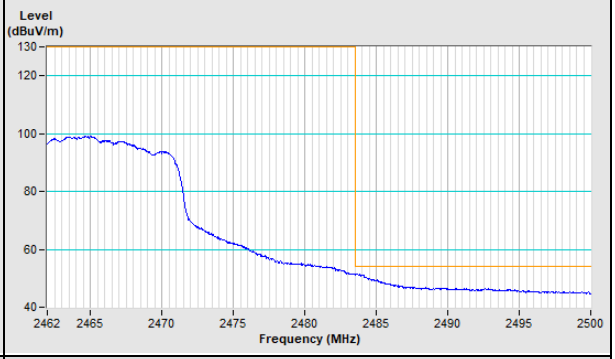


802.11n (HT20) Channel 11

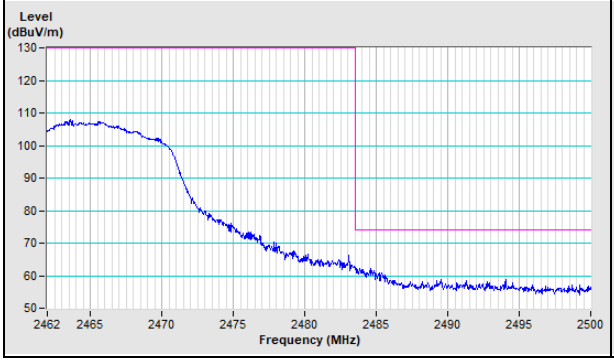
Horizontal (Peak)



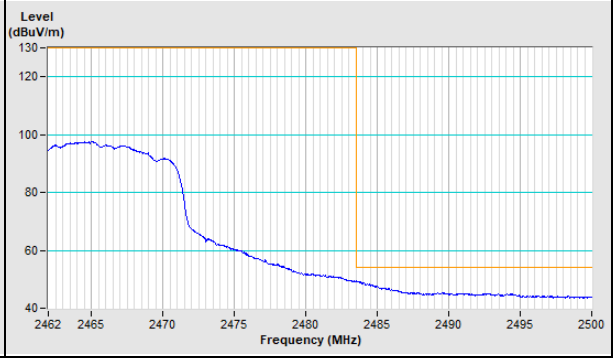
Horizontal (Average)



Vertical (Peak)

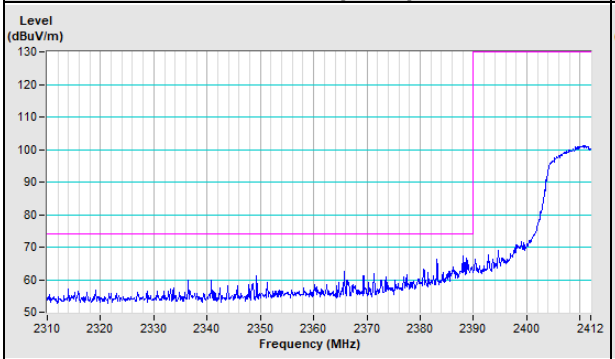


Vertical (Average)

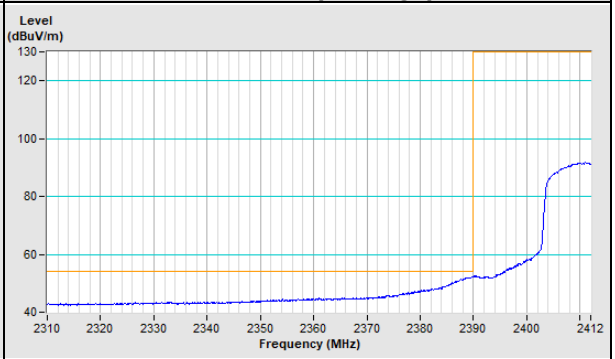


802.11n (HT40) Channel 3

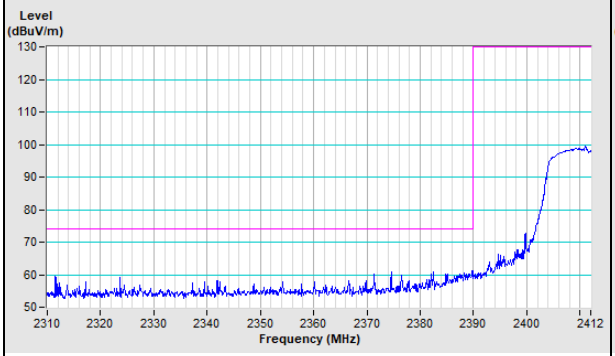
Horizontal (Peak)



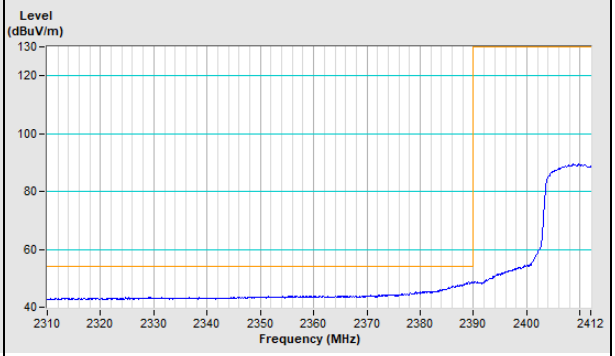
Horizontal (Average)



Vertical (Peak)

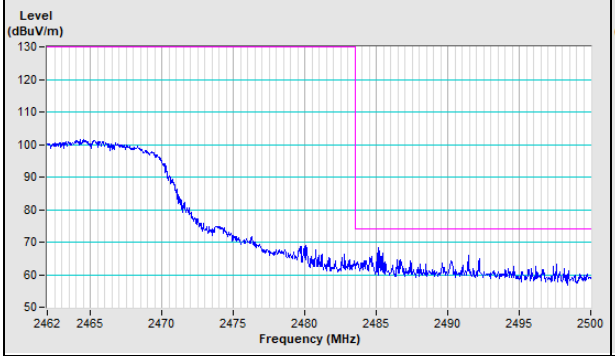


Vertical (Average)

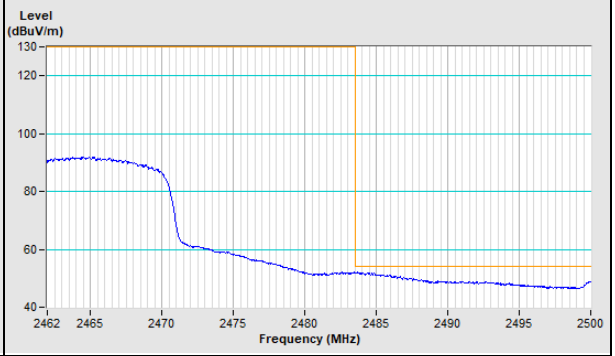


802.11n (HT40) Channel 6

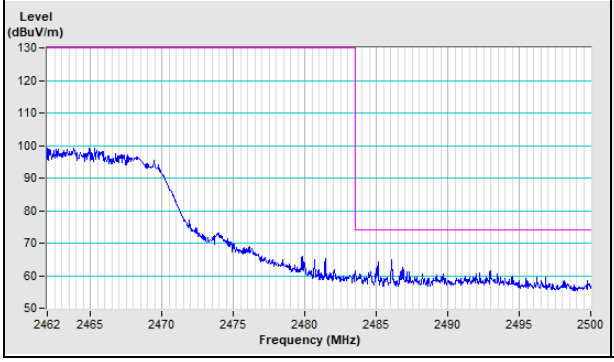
Horizontal (Peak)



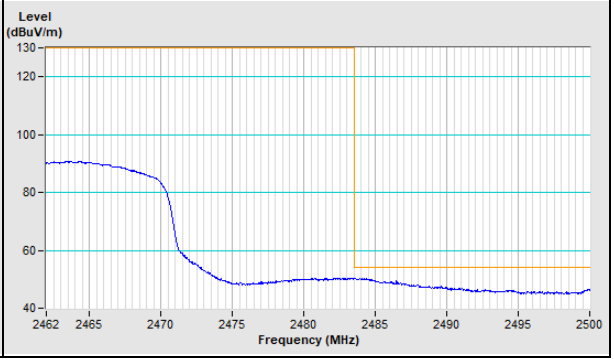
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



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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