

# TEST REPORT

## CERTIFICATE OF CONFORMITY

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

**Report No.:** RFBDKX-WTW-P22031172

**FCC ID:** EMJOS1

**Model No.:** S1

**Received Date:** 2022/3/30

**Test Date:** 2022/4/8 ~ 2022/4/13

**Issued Date:** 2022/5/16

**Applicant:** PRIMAX ELECTRONICS LTD.

**Address:** No. 669, Ruey Kuang Road, Neihu, Taipei, Taiwan, R.O.C.

**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:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**FCC Registration /** 198487 / TW2021

**Designation Number:**

**Approved by:** \_\_\_\_\_

*Jeremy Lin*

**Date:** \_\_\_\_\_

2022/5/16

Jeremy Lin / Project Engineer

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Prepared by : Annie Chang / Senior Specialist



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## Table of Contents

<b>Release Control Record</b> .....	<b>4</b>
<b>1 Certificate</b> .....	<b>5</b>
<b>2 Summary of Test Results</b> .....	<b>6</b>
2.1 Measurement Uncertainty .....	6
2.2 Supplementary Information .....	6
<b>3 General Information</b> .....	<b>7</b>
3.1 General Description .....	7
3.2 Antenna Description of EUT .....	7
3.3 Channel List .....	8
3.4 Test Mode Applicability and Tested Channel Detail .....	8
3.5 Duty Cycle of Test Signal .....	9
3.6 Test Program Used and Operation Descriptions .....	10
3.7 Connection Diagram of EUT and Peripheral Devices .....	10
3.8 Configuration of Peripheral Devices and Cable Connections .....	10
<b>4 Test Instruments</b> .....	<b>11</b>
4.1 RF Output Power .....	11
4.2 Power Spectral Density .....	11
4.3 6 dB Bandwidth .....	11
4.4 Conducted Out of Band Emissions .....	11
4.5 AC Power Conducted Emissions .....	12
4.6 Unwanted Emissions below 1 GHz .....	13
4.7 Unwanted Emissions above 1 GHz .....	14
<b>5 Limits of Test Items</b> .....	<b>15</b>
5.1 RF Output Power .....	15
5.2 Power Spectral Density .....	15
5.3 6 dB Bandwidth .....	15
5.4 Conducted Out of Band Emissions .....	15
5.5 AC Power Conducted Emissions .....	15
5.6 Unwanted Emissions below 1 GHz .....	15
5.7 Unwanted Emissions above 1 GHz .....	16
<b>6 Test Arrangements</b> .....	<b>17</b>
6.1 RF Output Power .....	17
6.1.1 Test Setup .....	17
6.1.2 Test Procedure .....	17
6.2 Power Spectral Density .....	17
6.2.1 Test Setup .....	17
6.2.2 Test Procedure .....	17
6.3 6 dB Bandwidth .....	18
6.3.1 Test Setup .....	18
6.3.2 Test Procedure .....	18
6.4 Conducted Out of Band Emissions .....	18
6.4.1 Test Setup .....	18
6.4.2 Test Procedure .....	18
6.5 AC Power Conducted Emissions .....	19
6.5.1 Test Setup .....	19
6.5.2 Test Procedure .....	19
6.6 Unwanted Emissions below 1 GHz .....	20
6.6.1 Test Setup .....	20
6.6.2 Test Procedure .....	21
6.7 Unwanted Emissions above 1 GHz .....	22
6.7.1 Test Setup .....	22
6.7.2 Test Procedure .....	22
<b>7 Test Results of Test Item</b> .....	<b>23</b>



7.1	RF Output Power.....	23
7.2	Power Spectral Density .....	25
7.3	6 dB Bandwidth .....	27
7.4	Conducted Out of Band Emissions .....	29
7.5	AC Power Conducted Emissions .....	32
7.6	Unwanted Emissions below 1 GHz .....	34
7.7	Unwanted Emissions above 1 GHz.....	36
<b>8</b>	<b>Pictures of Test Arrangements .....</b>	<b>57</b>
<b>9</b>	<b>Information of the Testing Laboratories .....</b>	<b>58</b>



## Release Control Record

Issue No.	Description	Date Issued
RFBDKX-WTW-P22031172	Original release.	2022/5/16

## 1 Certificate

**Product:** Level Connect

**Brand:** level

**Test Model:** S1

**Sample Status:** Engineering sample

**Applicant:** PRIMAX ELECTRONICS LTD.

**Test Date:** 2022/4/8 ~ 2022/4/13

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

**Measurement** ANSI C63.10-2013

**procedure:** 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	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
15.247(d)	Conducted Out of Band Emissions	Pass	Meet the requirement of limit.
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -11.17 dB at 0.87266 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -13.4 dB at 677.96 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -1.3 dB at 4924.00 MHz
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.63 dB
AC Power Conducted Emissions	150 kHz ~ 30 MHz	3.00 dB
Unwanted Emissions below 1 GHz	9kHz ~ 30MHz	2.38 dB
	30 MHz ~ 1 GHz	5.62 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 6 GHz	4.61 dB
	6 GHz ~ 18 GHz	5.41 dB
	18 GHz ~ 40 GHz	5.14 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	Level Connect
Brand	level
Test Model	S1
Status of EUT	Engineering sample
Power Supply Rating	AC I/P: 120Vac 60Hz 0.2A
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	Up to 72.2Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11
Output Power	238.781 mW (23.78 dBm)

Note:

1. There are Bluetooth and WLAN (2.4 GHz) technology used for the EUT.
2. Bluetooth and WLAN (2.4 GHz) technology cannot transmit at same time.
3. 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 Type	Gain (dBi)	Connector Type
FPC	0.76	I-PEX

\*The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2. The EUT incorporates a SISO function:

Modulation Mode	TX & RX Configuration	
802.11b	1TX	1TX
802.11g	1TX	1TX
802.11n (HT20)	1TX	1TX

### 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		

### 3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	The EUT had been pre-tested on the positioned of X/Z axis
Worst Case:	The worst case was found when positioned on X-plane

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

Test Item	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
AC Power Conducted Emissions	802.11g	CDD	6	BPSK	6Mb/s
Unwanted Emissions below 1 GHz	802.11g	CDD	6	BPSK	6Mb/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	MCS0
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	1, 6, 11	BPSK	MCS0
6 dB Bandwidth / Power Spectral Density / Conducted Out of Band Emissions	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	MCS0



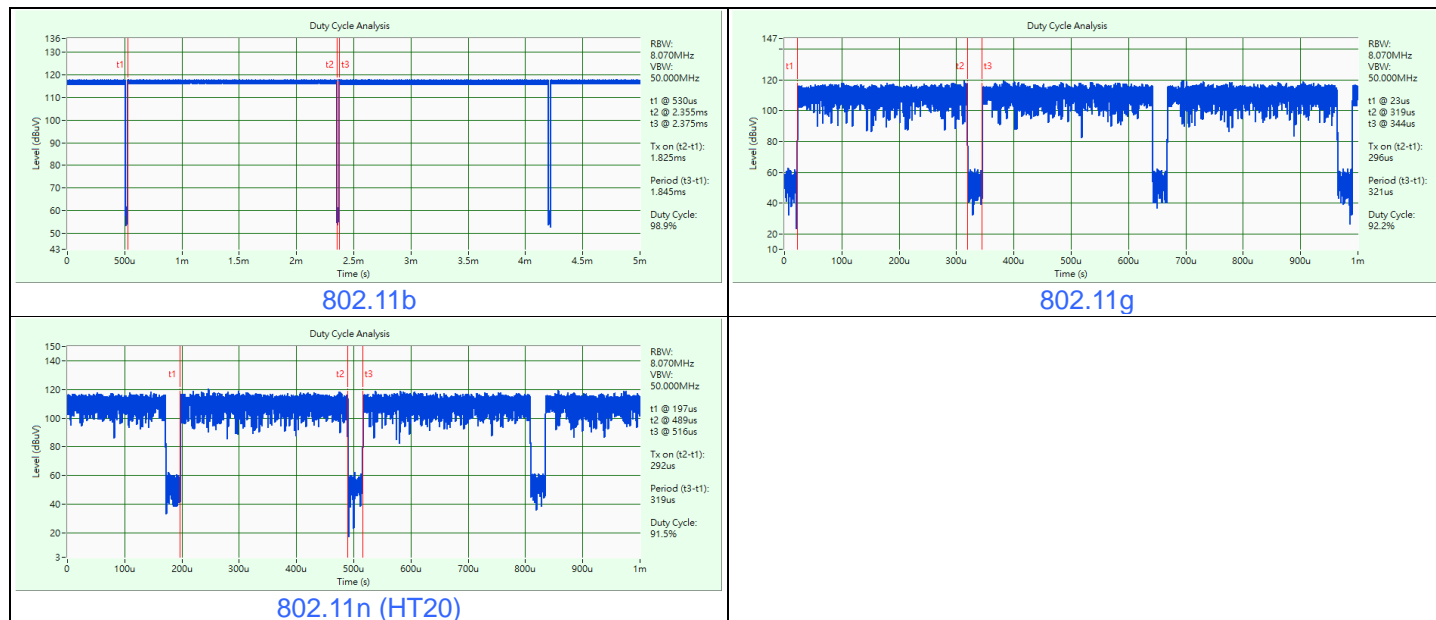
### 3.5 Duty Cycle of Test Signal

Duty cycle of test signal is  $\geq 98\%$ , duty factor is not required.  
 Duty cycle of test signal is  $< 98\%$ , duty factor shall be considered.

**802.11b:** Duty cycle =  $1.825 \text{ ms} / 1.845 \text{ ms} \times 100\% = 98.9\%$

**802.11g:** Duty cycle =  $0.296 \text{ ms} / 0.321 \text{ ms} \times 100\% = 92.2\%$ , duty factor =  $10 * \log (1/\text{Duty cycle}) = 0.35 \text{ dB}$

**802.11n (HT20):** Duty cycle =  $0.292 \text{ ms} / 0.319 \text{ ms} \times 100\% = 91.5\%$ , duty factor =  $10 * \log (1/\text{Duty cycle}) = 0.38 \text{ dB}$



### 3.6 Test Program Used and Operation Descriptions

Controlling software (DA16200 DA16000 AT GUI Tool v1.10) 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

The EUT has been tested as an independent unit together without other necessary accessories or support units.

## 4 Test Instruments

The calibration interval of the all test instruments are 12/24 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
MIMO Powermeasurement Test set (4X4) KEYSIGHT	U2021XA	U2021XA_001	2021/6/16	2022/6/15
MXG Vector Signal Generator KEYSIGHT	N5182B	MY53052658	2021/5/19	2022/5/18
Peak Power meter Anritsu	ML2495A	0842014	2021/4/15	2022/4/14
Pulse Power Sensor Anritsu	MA2411B	0738404	2021/4/15	2022/4/14
Spectrum Analyzer R&S	FSV40	101544	2021/5/24	2022/5/23
		101042	2021/9/9	2022/9/8
Spectrum Analyzer KEYSIGHT	N9030A	MY54490260	2021/7/23	2022/7/22
Temperature & Humidity Chamber TERCHY	MHU-225AU	920409	2021/7/2	2022/7/1
True RMS Clamp Meter Fluke	325	31130711WS	2021/6/2	2022/6/1

Notes:

1. The test was performed in LK - Oven
2. Tested Date: 2022/4/8

### 4.2 Power Spectral Density

Refer to section 4.1 to get information of the instruments.

### 4.3 6 dB Bandwidth

Refer to section 4.1 to get information of the instruments.

### 4.4 Conducted Out of Band Emissions

Refer to section 4.1 to get information of the instruments.

#### 4.5 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 Ohms Terminator LYNICS	0900510	E1-01-305	2022/2/9	2023/2/8
Attenuator STI	STI02-2200-10	NO.4	2021/9/3	2022/9/2
DC LISN Schwarzbeck	NNLK 8121	8121-808	2021/4/18	2022/4/17
DC LISN R&S	ESH3-Z6	844950/018	2021/7/25	2022/7/24
		100219	2021/7/25	2022/7/24
High Voltage Probe Schwarzbeck	TK9420	00982	2021/12/24	2022/12/23
Isolation Transformer Erika Fiedler	D-65396	017	2021/9/9	2022/9/8
LISN Schwarzbeck	NSLK 8128	8128-244	2021/11/11	2022/11/10
	NNLK8129	8129229	2021/5/20	2022/5/19
	NNLK 8121	8121-731	2021/4/28	2022/4/27
LISN R&S	ENV216	101196	2021/4/26	2022/4/25
	ESH3-Z5	100220	2021/11/25	2022/11/24
RF Coaxial Cable Commate	5D-FB	Cable-CO5-01	2022/1/28	2023/1/27
Software BVADT	Cond_V7.3.7.4	N/A	N/A	N/A
Test Receiver R&S	ESR3	102412	2022/1/22	2023/1/21

Notes:

1. The test was performed in Linkou Conduction 5.
2. Tested Date: 2022/4/13

#### 4.6 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	137	2021/10/27	2022/10/26
Coupling/Dcoupling Network Schwarzbeck	CDNE-M2	00097	2021/5/6	2022/5/5
	CDNE-M3	00091	2021/5/6	2022/5/5
Pre_Amplifier HP	8447D	2432A03504	2022/2/17	2023/2/16
RF Coaxial Cable Pacific	8D-FB	Cable-CH6-02	2021/7/13	2022/7/12
Software BVADT	Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	101544	2021/5/24	2022/5/23
Test Receiver Agilent	N9038A	MY51210137	2021/6/16	2022/6/15
Tower ADT	AT100	0306	N/A	N/A
Turn Table ADT	TT100	0306	N/A	N/A
Pre_Amplifier EMCI	EMC001340	980269	2021/6/29	2022/6/28
LOOP ANTENNA EMCI	LPA600	270	2021/9/2	2023/9/1

Notes:

1. The test was performed in Linkou 966 Chamber 6 (CH 6) , The test site validated date: 2021/11/4 (NSA)
2. Tested Date: 2022/4/13

#### 4.7 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
BandPass Filter MICRO-TRONICS	BRM17690	005	2021/5/28	2022/5/27
Boresight antenna tower fixture BV	BAF-02	6	N/A	N/A
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	2021/5/28	2022/5/27
Horn Antenna ETS-Lindgren	3117-PA	00215857	2021/11/14	2022/11/13
Horn Antenna EMCO	3115	00028257	2021/11/14	2022/11/13
		00027024	2021/11/14	2022/11/13
Horn Antenna Schwarzbeck	BBHA 9170	212	2021/10/13	2022/10/12
Notch filter MICRO-TRONICS	BRC50703-01	010	2021/5/28	2022/5/27
Pre_Amplifier EMCI	EMC0126545	980076	2022/2/17	2023/2/16
	EMC184045B	980235	2022/2/17	2023/2/16
Pre-amplifier HP	8449B	3008A01201	2022/2/17	2023/2/16
Pre-amplifier (18GHz-40GHz) EMCI	EMC184045B	980175	2021/9/4	2022/9/3
RF Coaxial Cable HUBER SUHNER	SF-102	Cable-CH6-01	2021/7/8	2022/7/7
RF Coaxial Cable EM	EM102-KMKM-3.5+1M	EM102-KMKM-3.5+1M-01	2021/7/8	2022/7/7
RF Coaxial Cable WOKEN	WC01	Cable-CH10-03	2021/7/8	2022/7/7
RF Coaxial Cable Rosnol	K1K50-UP0279-K1K50-3000	Cable-CH10(3m)-04	2021/7/8	2022/7/7
Software BVADT	Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer Agilent	E4446A	MY51100009	2021/6/29	2022/6/28
Spectrum Analyzer KEYSIGHT	N9030A	MY54490260	2021/7/23	2022/7/22
Spectrum Analyzer R&S	FSV40	101544	2021/5/24	2022/5/23
		101042	2021/9/9	2022/9/8
Test Receiver Agilent	N9038A	MY51210137	2021/6/16	2022/6/15
Tower ADT	AT100	0306	N/A	N/A
Turn Table ADT	TT100	0306	N/A	N/A

Notes:

1. The test was performed in Linkou 966 Chamber 6 (CH 6).
2. Tested Date: 2022/4/8 ~ 2022/4/9

## 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)

### 5.2 Power Spectral Density

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz.

### 5.3 6 dB Bandwidth

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

### 5.4 Conducted Out of Band Emissions

Below 20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

### 5.5 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.

### 5.6 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 20 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).

## 5.7 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 20 dB below the highest level of the desired power:

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

Notes:

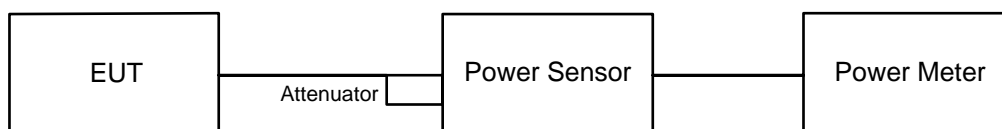
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted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

##### Peak Power:

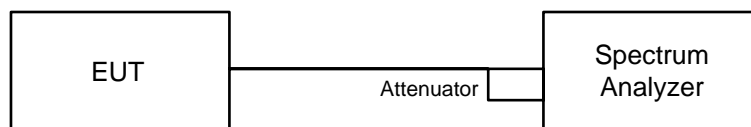
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

##### 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 Power Spectral Density

#### 6.2.1 Test Setup

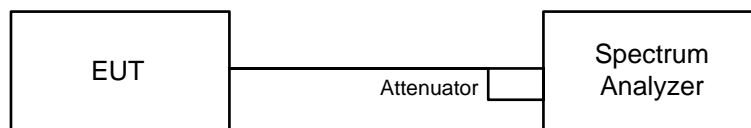


#### 6.2.2 Test Procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d. Set the VBW  $\geq 3 \times \text{RBW}$ .
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

### 6.3 6 dB Bandwidth

#### 6.3.1 Test Setup

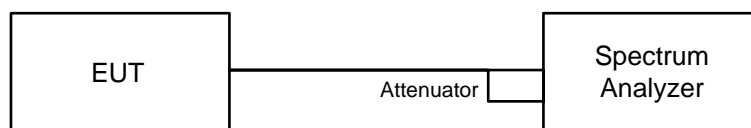


#### 6.3.2 Test Procedure

- Set resolution bandwidth (RBW) = 100 kHz.
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 6.4 Conducted Out of Band Emissions

#### 6.4.1 Test Setup



#### 6.4.2 Test Procedure

##### MEASUREMENT PROCEDURE REF

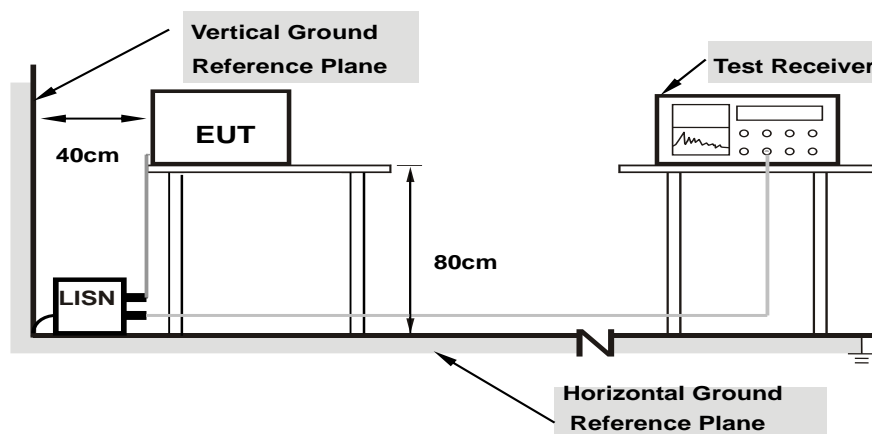
- Set the RBW = 100 kHz.
- Set the VBW  $\geq 300$  kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

##### MEASUREMENT PROCEDURE OOBE

- 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.

## 6.5 AC Power Conducted Emissions

### 6.5.1 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).

### 6.5.2 Test Procedure

- The EUT was 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.

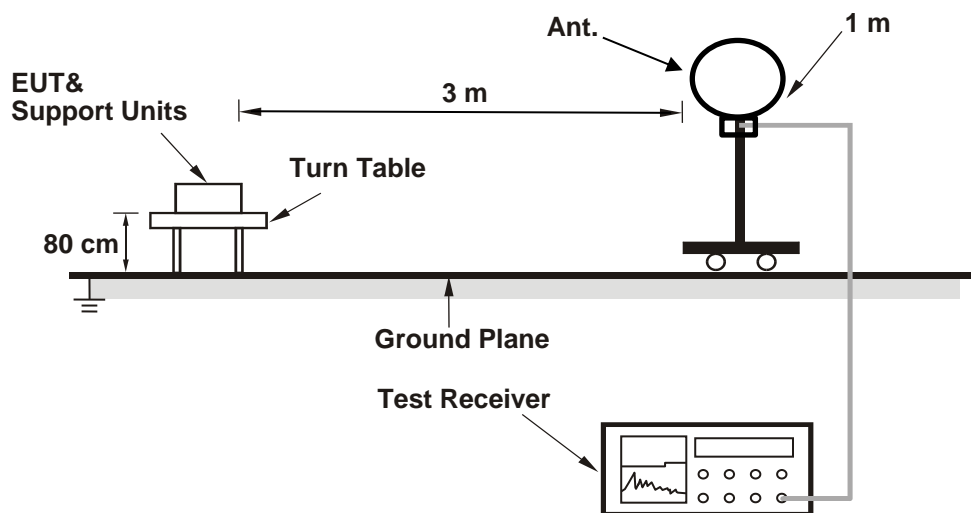
**Note:**

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.

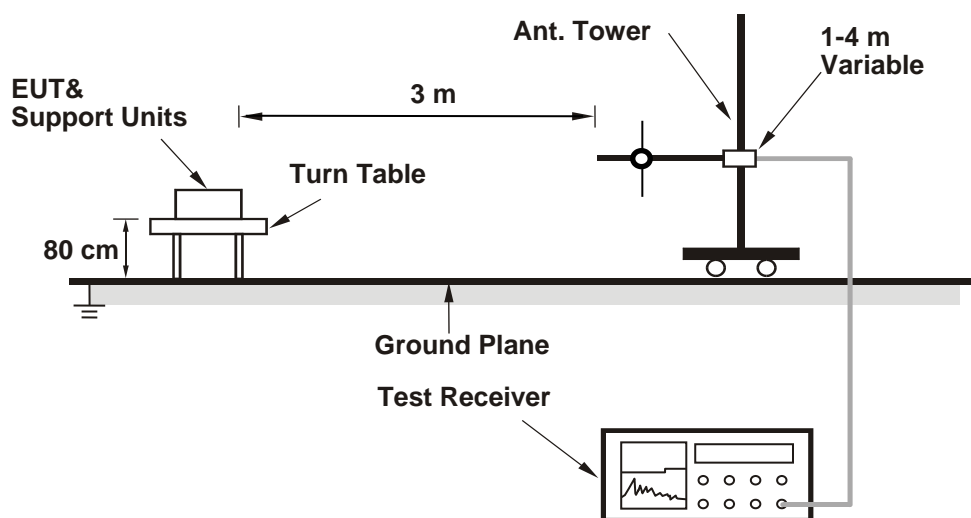
## 6.6 Unwanted Emissions below 1 GHz

### 6.6.1 Test Setup

#### For Radiated emission below 30 MHz



#### For Radiated emission above 30 MHz



## 6.6.2 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.

#### Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. 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.

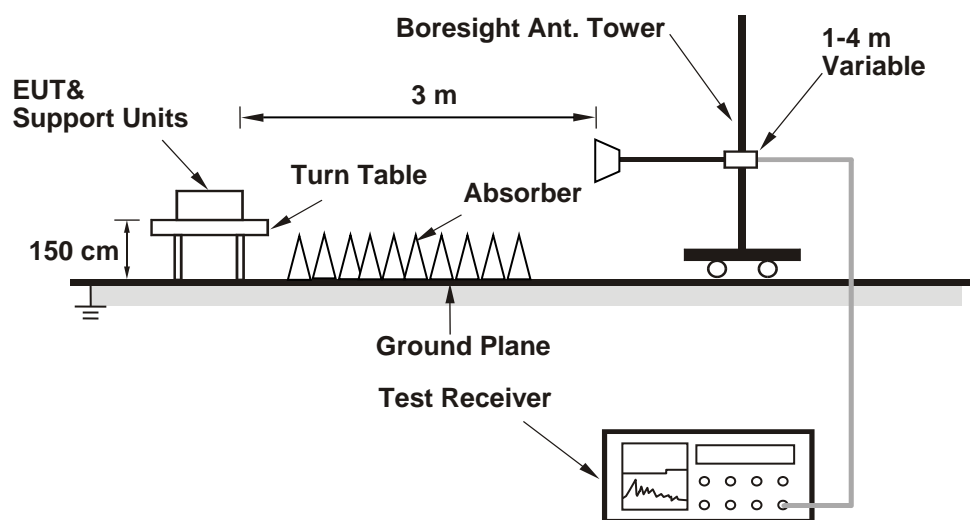
#### Notes:

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.

## 6.7 Unwanted Emissions above 1 GHz

### 6.7.1 Test Setup

#### For Radiated emission above 1 GHz



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

### 6.7.2 Test Procedure

- 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.
- 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) at frequency above 1 GHz.
- 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.

## 7 Test Results of Test Item

### 7.1 RF Output Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 76% RH	Tested By:	Dalen Dai
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#### For Peak Power

##### 802.11b

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2412	101.391	20.06	30	Pass
6	2437	95.060	19.78	30	Pass
11	2462	89.950	19.54	30	Pass

Note: The antenna gain is 0.76 dBi < 6 dBi, so the output power limit shall not be reduced.

##### 802.11g

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2412	144.212	21.59	30	Pass
6	2437	238.781	23.78	30	Pass
11	2462	183.654	22.64	30	Pass

Note: The antenna gain is 0.76 dBi < 6 dBi, so the output power limit shall not be reduced.

##### 802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2412	142.889	21.55	30	Pass
6	2437	228.560	23.59	30	Pass
11	2462	128.825	21.10	30	Pass

Note: The antenna gain is 0.76 dBi < 6 dBi, so the output power limit shall not be reduced.

**For Average Power**

**802.11b**

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	60.534	17.82
6	2437	56.885	17.55
11	2462	53.456	17.28

**802.11g**

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	29.648	14.72
6	2437	48.753	16.88
11	2462	37.670	15.76

**802.11n (HT20)**

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	28.576	14.56
6	2437	45.709	16.60
11	2462	26.062	14.16



## 7.2 Power Spectral Density

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 76% RH	Tested By:	Dalen Dai
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### 802.11b

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2412	-2.13	8.00	Pass
6	2437	-2.56	8.00	Pass
11	2462	-2.76	8.00	Pass

Note: The antenna gain is 0.76 dBi < 6 dBi, so the power density limit shall not be reduced.

### 802.11g

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2412	-11.04	8.00	Pass
6	2437	-8.44	8.00	Pass
11	2462	-10.60	8.00	Pass

Note: The antenna gain is 0.76 dBi < 6 dBi, so the power density limit shall not be reduced.

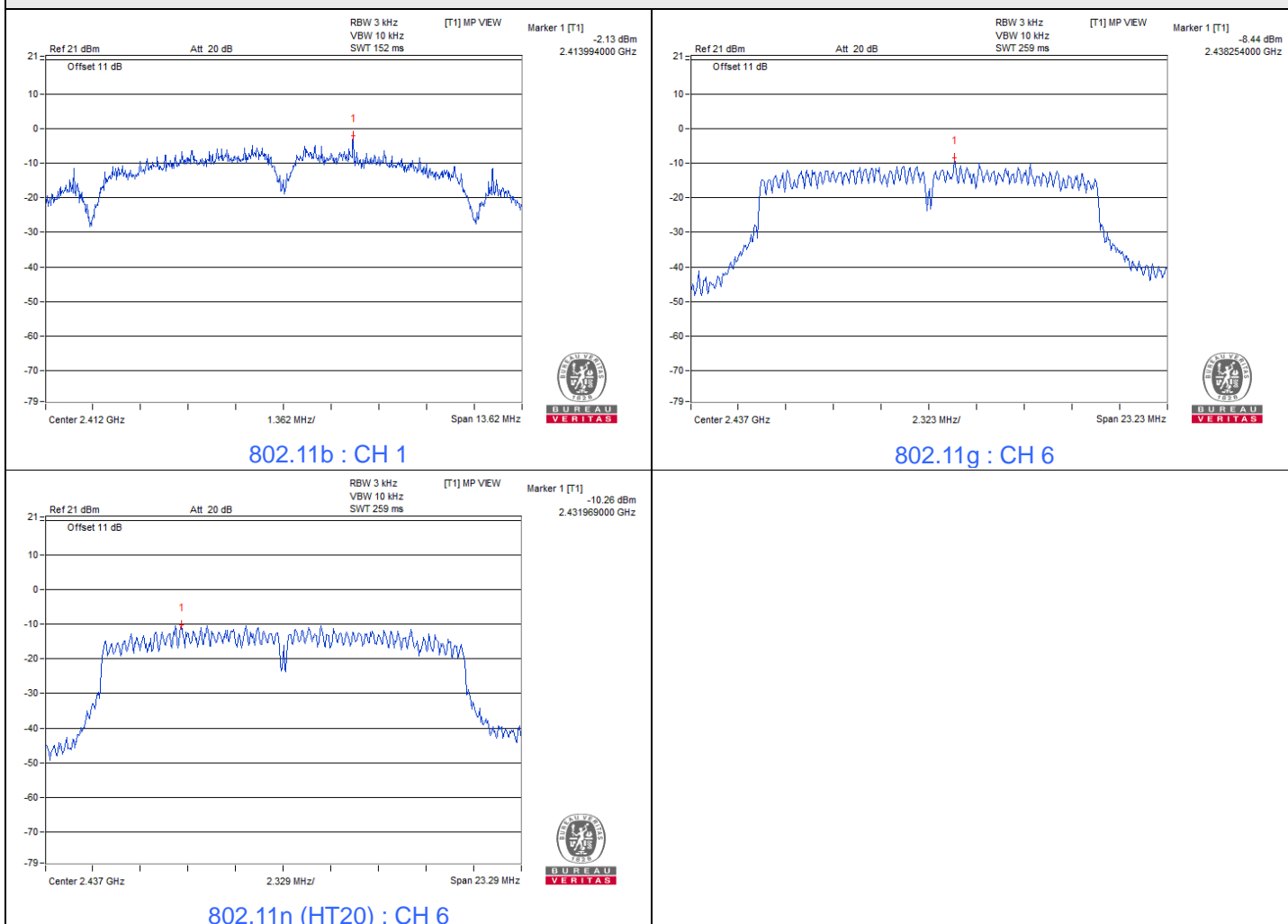
### 802.11n (HT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2412	-12.27	8.00	Pass
6	2437	-10.26	8.00	Pass
11	2462	-12.60	8.00	Pass

Note: The antenna gain is 0.76 dBi < 6 dBi, so the power density limit shall not be reduced.



### Spectrum Plot of Maximum Value



### 7.3 6 dB Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 76% RH	Tested By:	Dalen Dai
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#### 802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	9.08	0.5	Pass
6	2437	8.62	0.5	Pass
11	2462	8.57	0.5	Pass

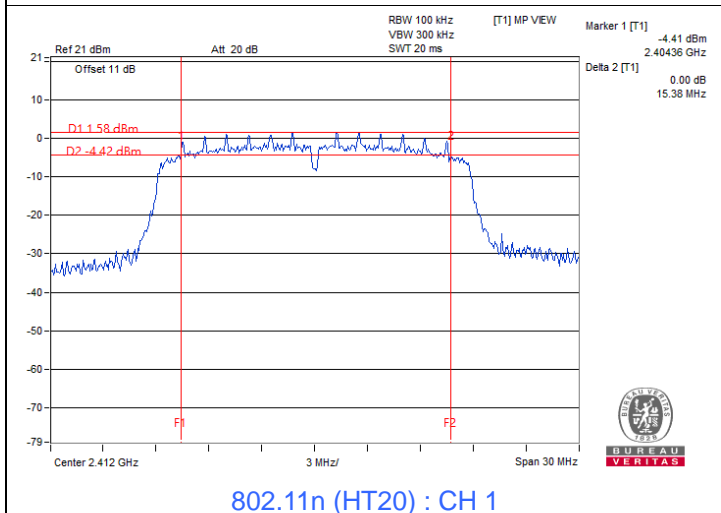
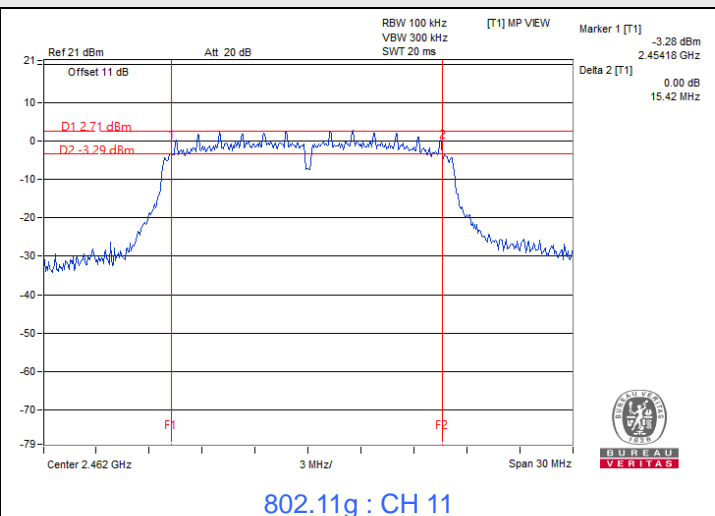
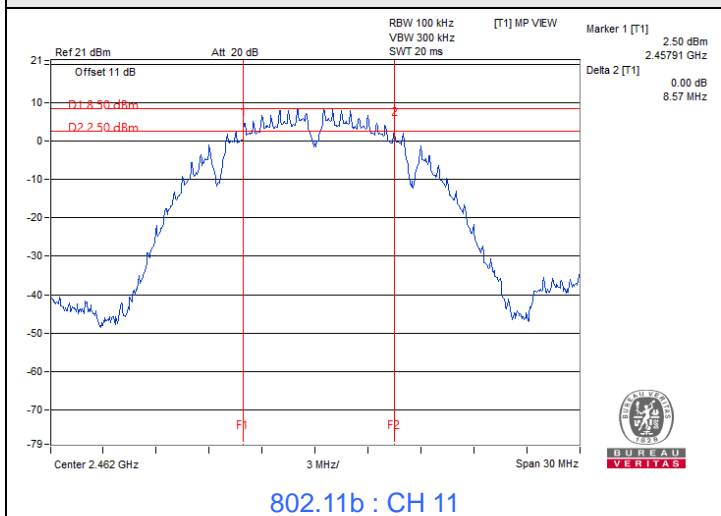
#### 802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	15.44	0.5	Pass
6	2437	15.49	0.5	Pass
11	2462	15.42	0.5	Pass

#### 802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	15.38	0.5	Pass
6	2437	15.53	0.5	Pass
11	2462	15.53	0.5	Pass

### Spectrum Plot of Minimum Value

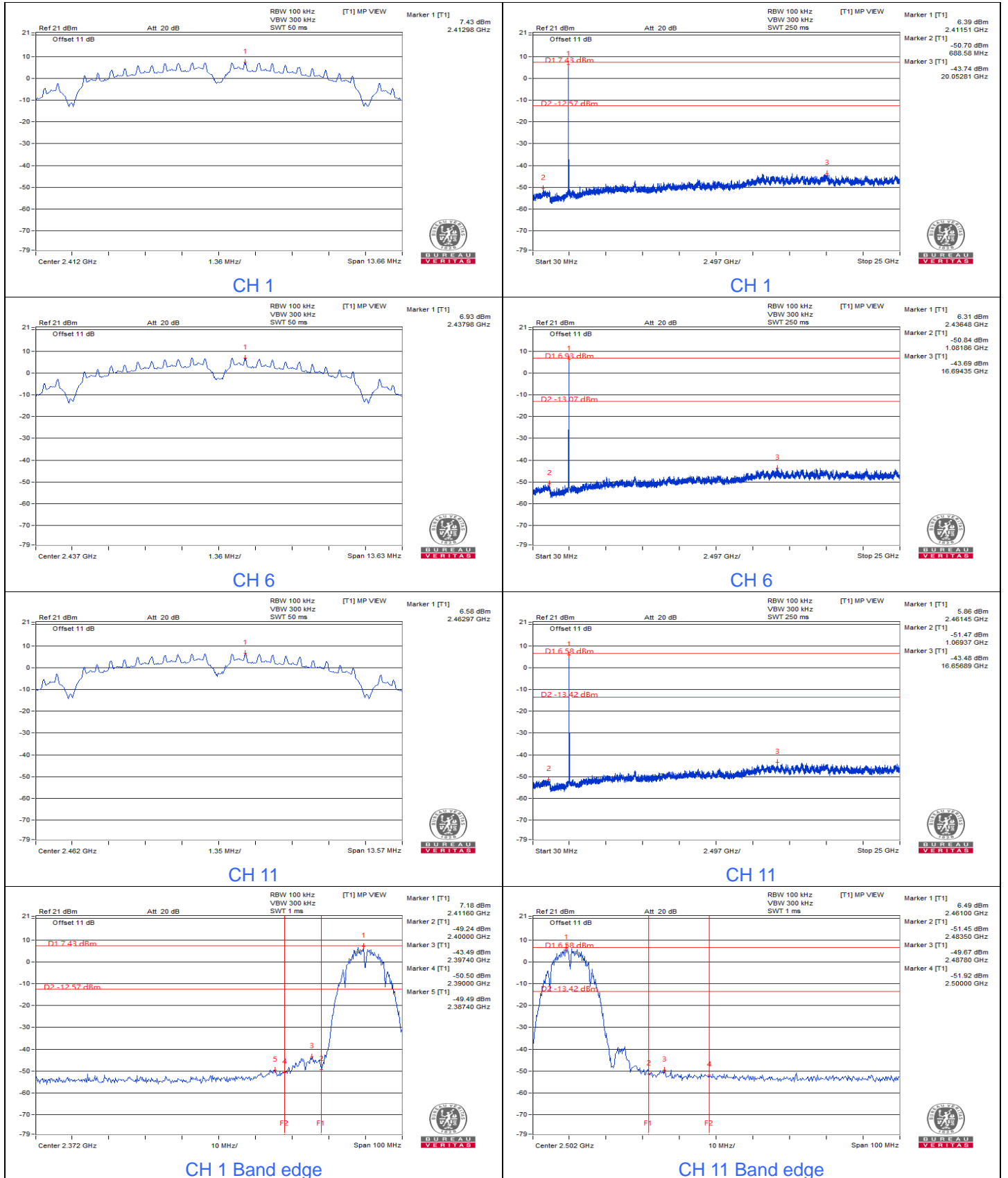




### 7.4 Conducted Out of Band Emissions

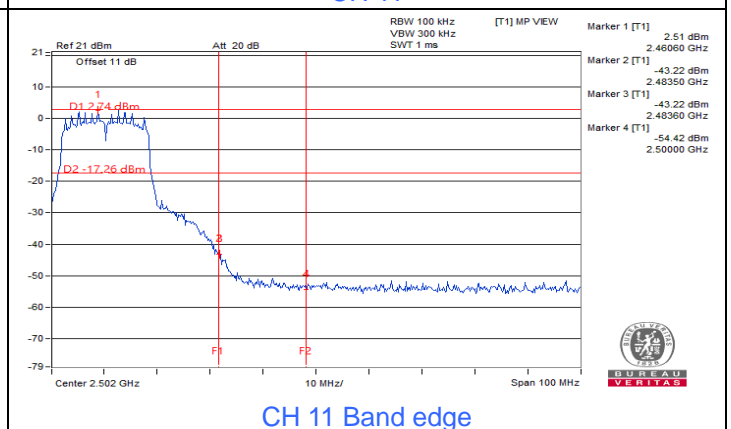
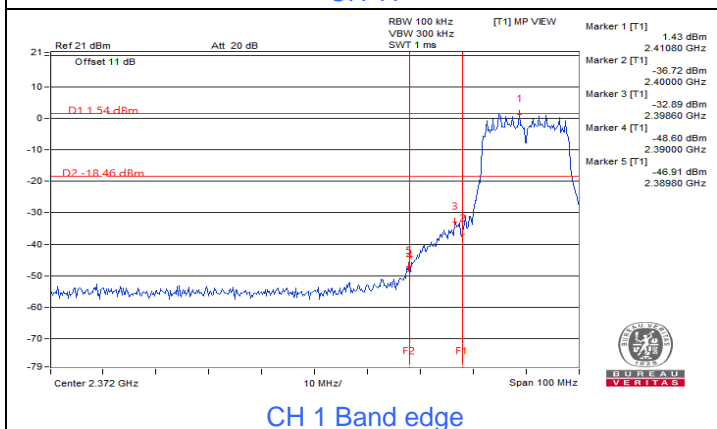
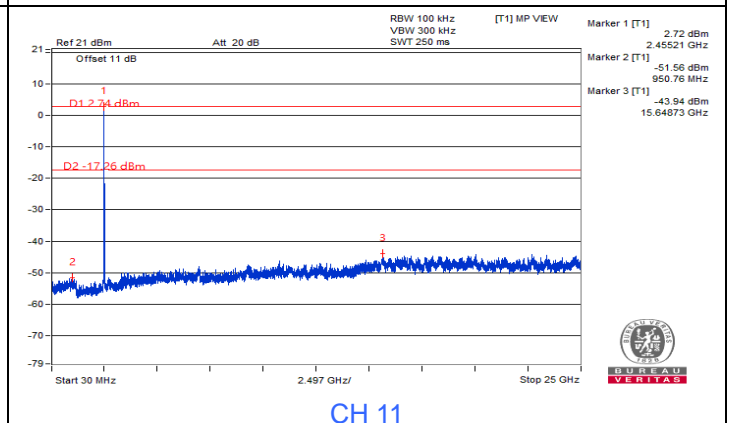
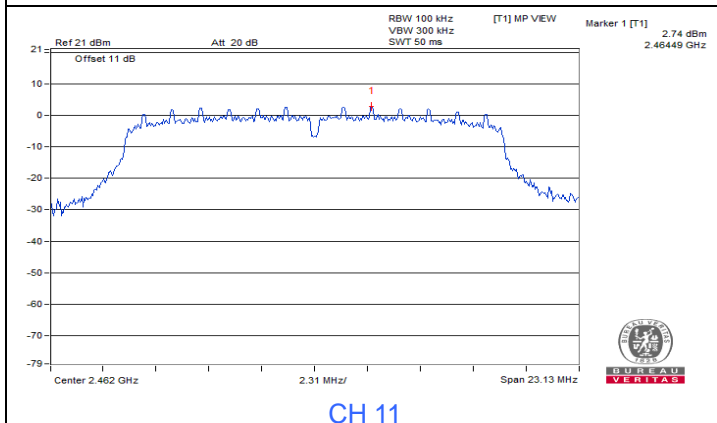
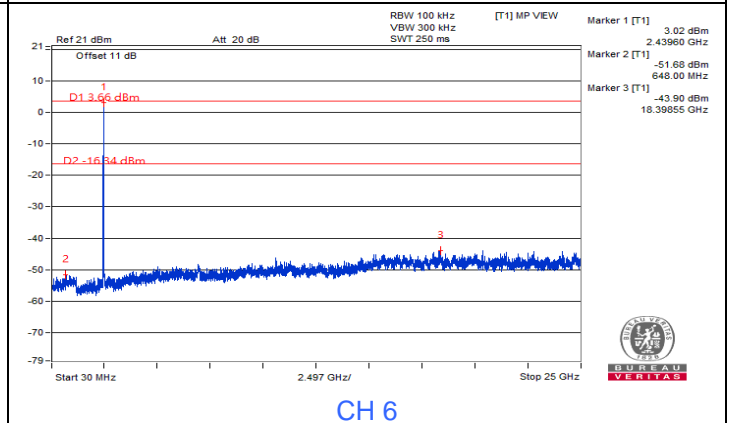
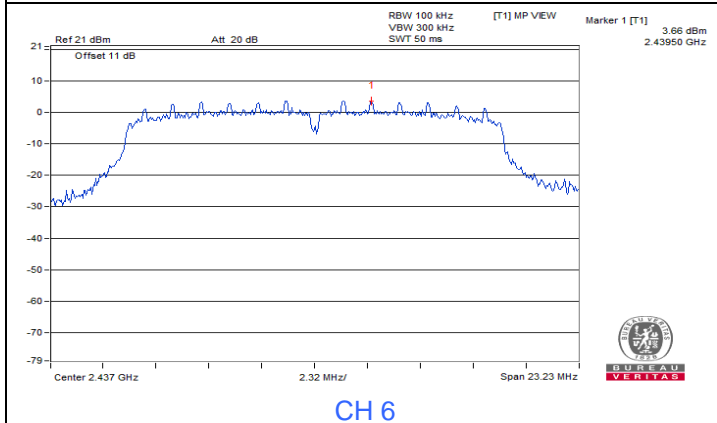
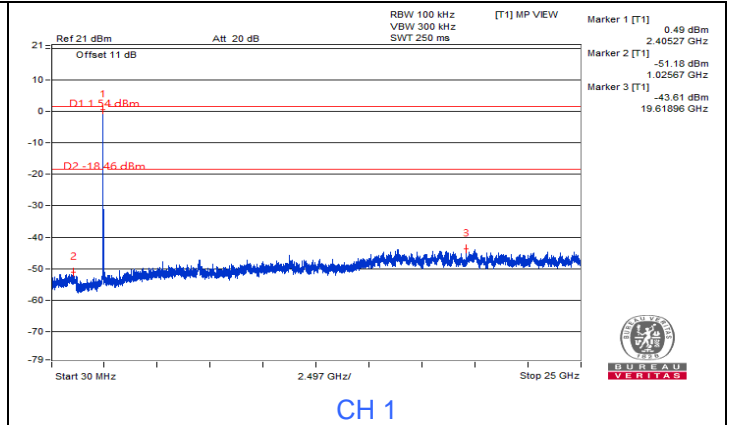
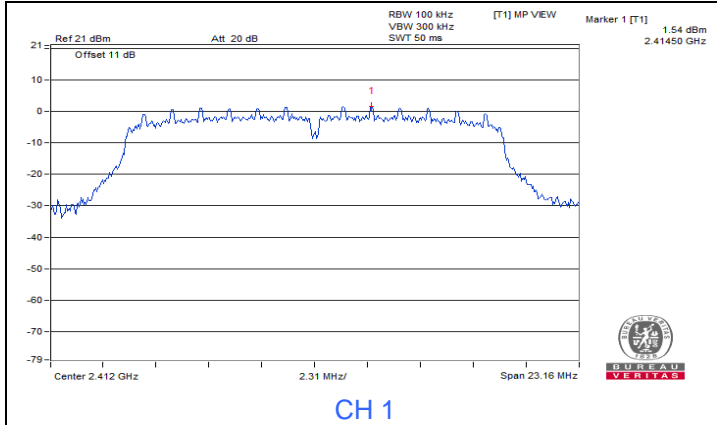
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 76% RH	Tested By:	Dalen Dai
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#### 802.11b



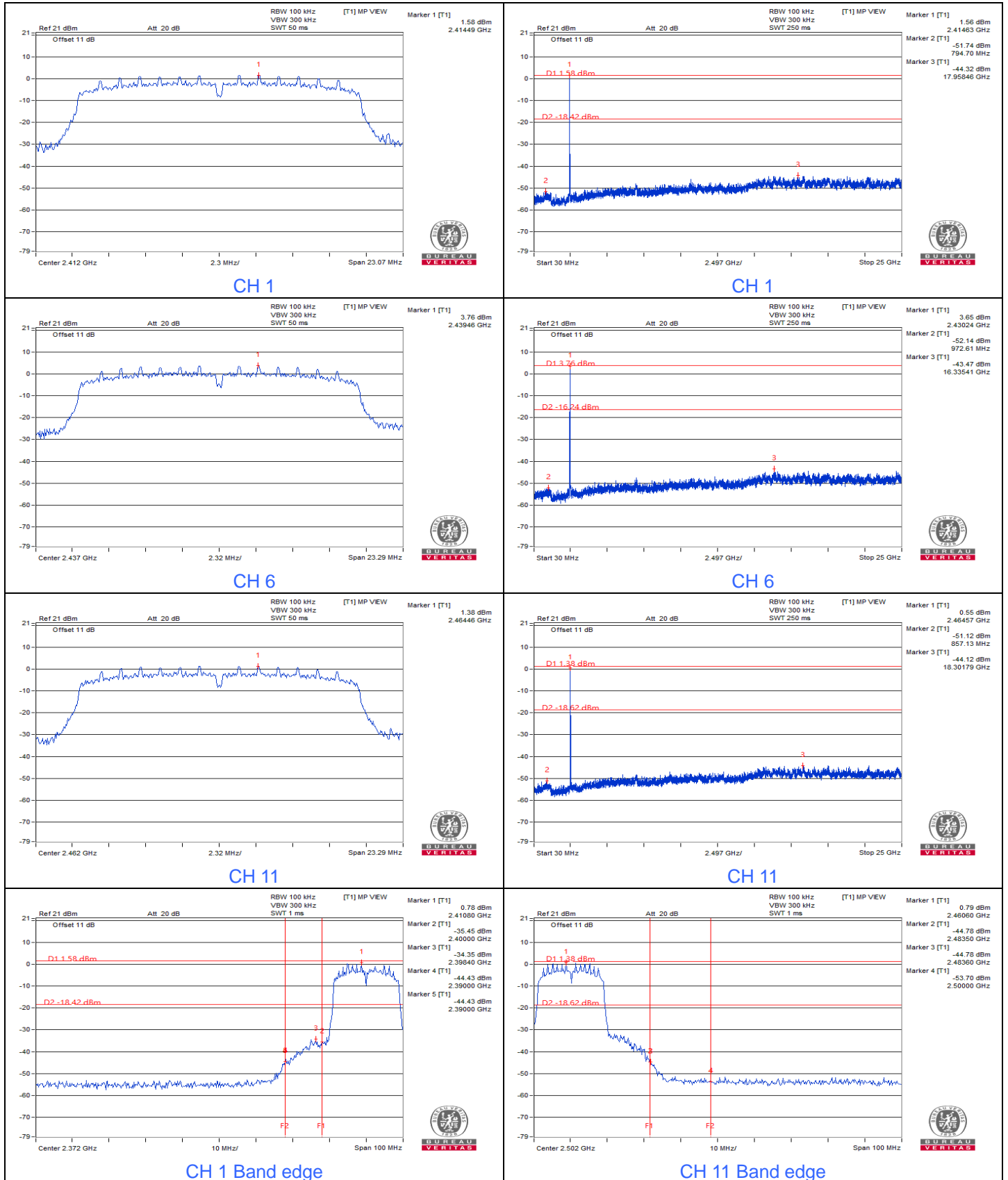


802.11g





### 802.11n (HT20)



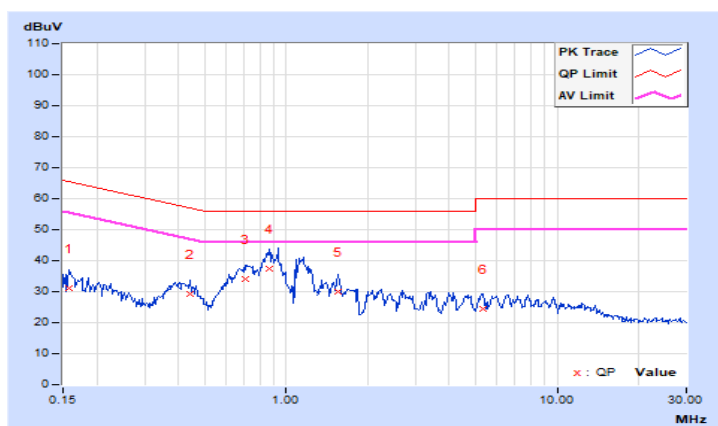
## 7.5 AC Power Conducted Emissions

RF Mode	TX 802.11g	Channel	CH 6 : 2437 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	Pirar Hsieh		

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	0.15781	9.88	21.12	13.72	31.00	23.60	65.58	55.58	-34.58	-31.98
2	0.43906	9.91	19.30	14.06	29.21	23.97	57.08	47.08	-27.87	-23.11
3	0.70469	9.94	24.27	18.63	34.21	28.57	56.00	46.00	-21.79	-17.43
4	0.86484	9.95	27.52	21.41	37.47	31.36	56.00	46.00	-18.53	-14.64
5	1.54688	9.99	19.87	13.38	29.86	23.37	56.00	46.00	-26.14	-22.63
6	5.31641	10.18	14.37	7.92	24.55	18.10	60.00	50.00	-35.45	-31.90

### 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 802.11g	Channel	CH 6 : 2437 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	Pirar Hsieh		

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	0.15781	9.89	17.19	10.97	27.08	20.86	65.58	55.58	-38.50	-34.72
2	0.41953	9.94	16.56	11.60	26.50	21.54	57.46	47.46	-30.96	-25.92
3	0.68125	9.95	24.45	17.10	34.40	27.05	56.00	46.00	-21.60	-18.95
<b>4</b>	<b>0.87266</b>	<b>9.96</b>	<b>30.97</b>	<b>24.87</b>	<b>40.93</b>	<b>34.83</b>	<b>56.00</b>	<b>46.00</b>	<b>-15.07</b>	<b>-11.17</b>
5	1.18750	9.98	28.34	21.12	38.32	31.10	56.00	46.00	-17.68	-14.90
6	4.67969	10.16	12.55	6.58	22.71	16.74	56.00	46.00	-33.29	-29.26

**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



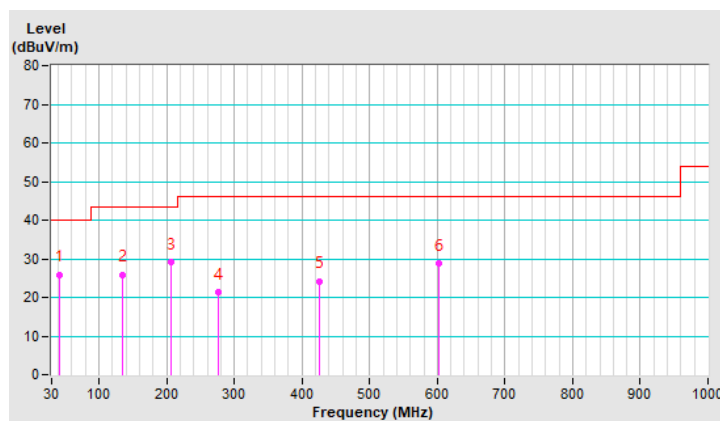
## 7.6 Unwanted Emissions below 1 GHz

RF Mode	TX 802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested By	Ian Chang		

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	41.64	25.7 QP	40.0	-14.3	2.98 H	181	34.7	-9.0
2	133.79	25.8 QP	43.5	-17.7	2.74 H	156	34.8	-9.0
3	205.57	29.0 QP	43.5	-14.5	2.43 H	126	39.3	-10.3
4	275.41	21.2 QP	46.0	-24.8	2.14 H	98	27.6	-6.4
5	424.79	24.1 QP	46.0	-21.9	1.88 H	72	26.9	-2.8
6	602.30	28.7 QP	46.0	-17.3	3.31 H	213	27.8	0.9

### 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 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.

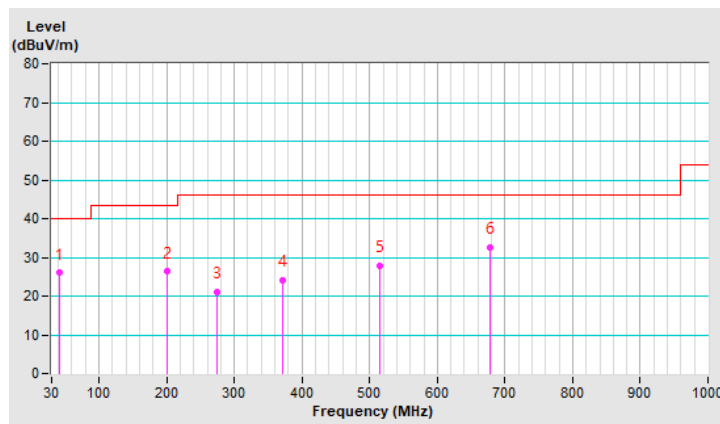


<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	9 kHz ~ 1 GHz	<b>Detector Function &amp; Bandwidth</b>	(QP) RB = 120kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	25°C, 69% RH
<b>Tested By</b>	Ian Chang		

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	40.67	26.0 QP	40.0	-14.0	1.00 V	94	35.1	-9.1
2	199.75	26.3 QP	43.5	-17.2	1.72 V	176	36.8	-10.5
3	274.44	21.1 QP	46.0	-24.9	2.87 V	290	27.5	-6.4
4	371.44	24.0 QP	46.0	-22.0	2.67 V	270	28.2	-4.2
5	515.00	27.8 QP	46.0	-18.2	3.13 V	316	29.0	-1.2
<b>6</b>	<b>677.96</b>	<b>32.6 QP</b>	<b>46.0</b>	<b>-13.4</b>	<b>3.42 V</b>	<b>344</b>	<b>30.2</b>	<b>2.4</b>

**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.



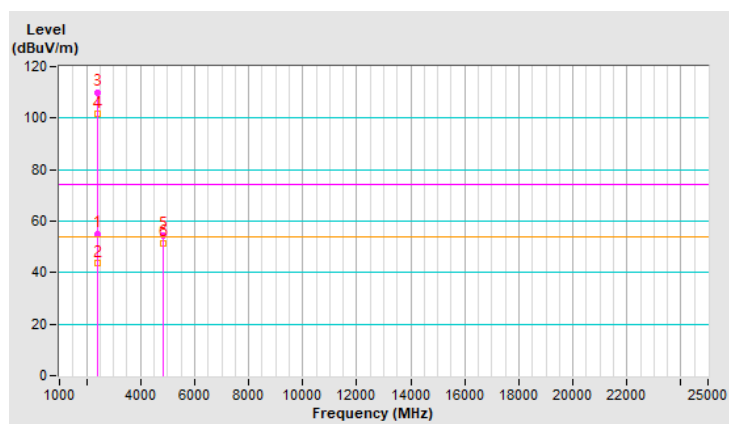
## 7.7 Unwanted Emissions above 1 GHz

<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

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	55.2 PK	74.0	-18.8	1.23 H	335	57.5	-2.3
2	2390.00	43.5 AV	54.0	-10.5	1.23 H	335	45.8	-2.3
3	*2412.00	109.9 PK			1.23 H	335	112.1	-2.2
4	*2412.00	101.5 AV			1.23 H	335	103.7	-2.2
5	4824.00	54.5 PK	74.0	-19.5	3.46 H	147	48.9	5.6
6	4824.00	51.2 AV	54.0	-2.8	3.46 H	147	45.6	5.6

### 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.

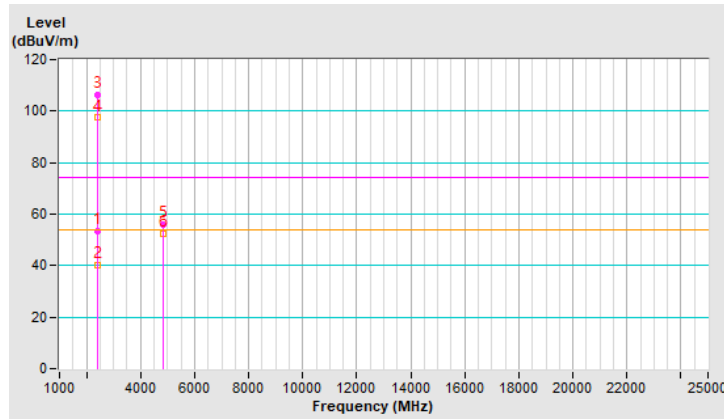


<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

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	53.5 PK	74.0	-20.5	1.54 V	211	55.8	-2.3
2	2390.00	40.3 AV	54.0	-13.7	1.54 V	211	42.6	-2.3
3	*2412.00	106.2 PK			1.54 V	211	108.4	-2.2
4	*2412.00	97.4 AV			1.54 V	211	99.6	-2.2
5	4824.00	55.9 PK	74.0	-18.1	1.49 V	202	50.3	5.6
6	4824.00	52.3 AV	54.0	-1.7	1.49 V	202	46.7	5.6

**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.



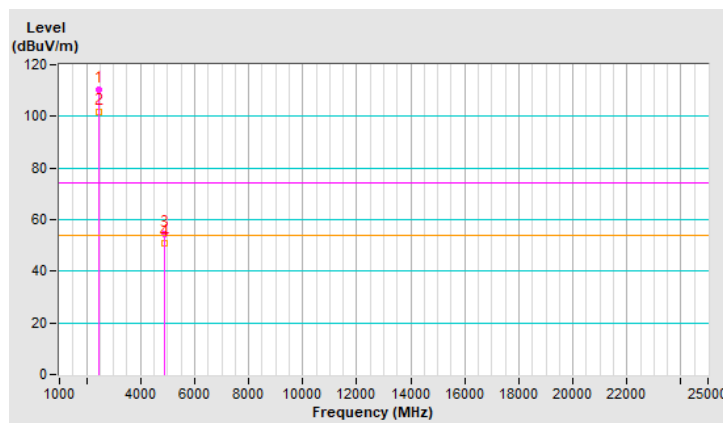
<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	110.2 PK			1.38 H	319	112.4	-2.2
2	*2437.00	101.8 AV			1.38 H	319	104.0	-2.2
3	4874.00	54.3 PK	74.0	-19.7	3.36 H	151	48.7	5.6
4	4874.00	50.7 AV	54.0	-3.3	3.36 H	151	45.1	5.6

**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.

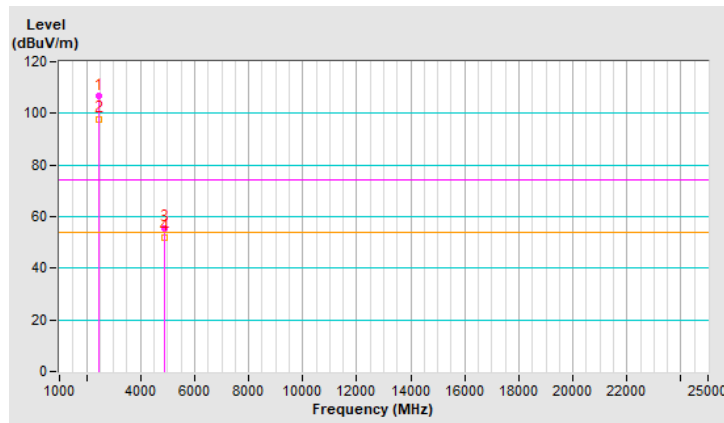


<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

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	106.6 PK			1.58 V	220	108.8	-2.2
2	*2437.00	97.7 AV			1.58 V	220	99.9	-2.2
3	4874.00	55.5 PK	74.0	-18.5	2.39 V	276	49.9	5.6
4	4874.00	52.0 AV	54.0	-2.0	2.39 V	276	46.4	5.6

**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.



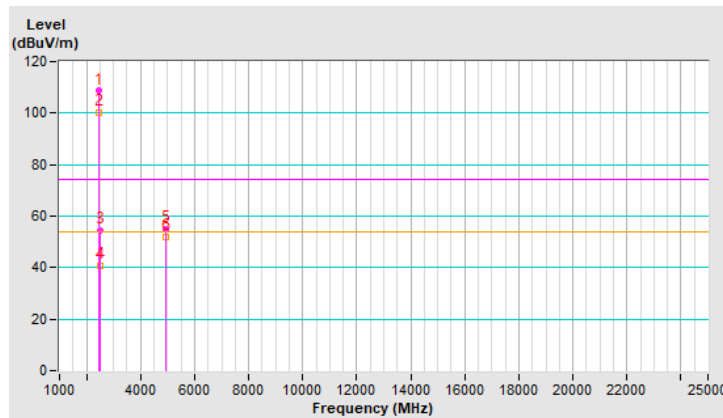
<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	108.6 PK			1.06 H	296	110.8	-2.2
2	*2462.00	100.1 AV			1.06 H	296	102.3	-2.2
3	2483.50	54.3 PK	74.0	-19.7	1.06 H	296	56.4	-2.1
4	2483.50	40.9 AV	54.0	-13.1	1.06 H	296	43.0	-2.1
5	4924.00	54.9 PK	74.0	-19.1	3.33 H	120	49.2	5.7
6	4924.00	52.0 AV	54.0	-2.0	3.33 H	120	46.3	5.7

**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.





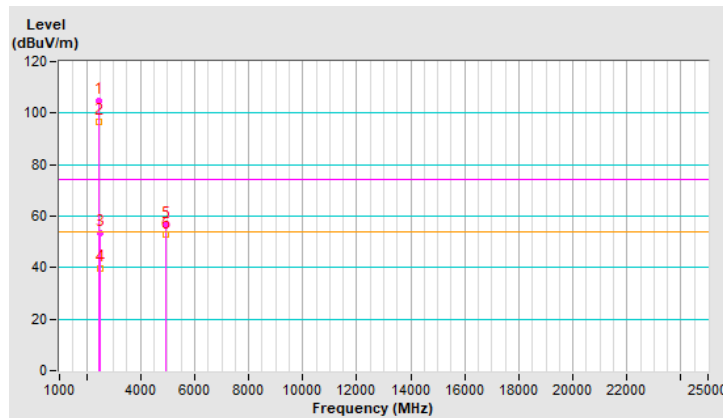
<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	104.9 PK			1.66 V	225	107.1	-2.2
2	*2462.00	96.7 AV			1.66 V	225	98.9	-2.2
3	2483.50	53.3 PK	74.0	-20.7	1.66 V	225	55.4	-2.1
4	2483.50	39.8 AV	54.0	-14.2	1.66 V	225	41.9	-2.1
5	4924.00	56.4 PK	74.0	-17.6	1.96 V	18	50.7	5.7
6	<b>4924.00</b>	<b>52.7 AV</b>	<b>54.0</b>	<b>-1.3</b>	<b>1.96 V</b>	<b>18</b>	<b>47.0</b>	<b>5.7</b>

**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.



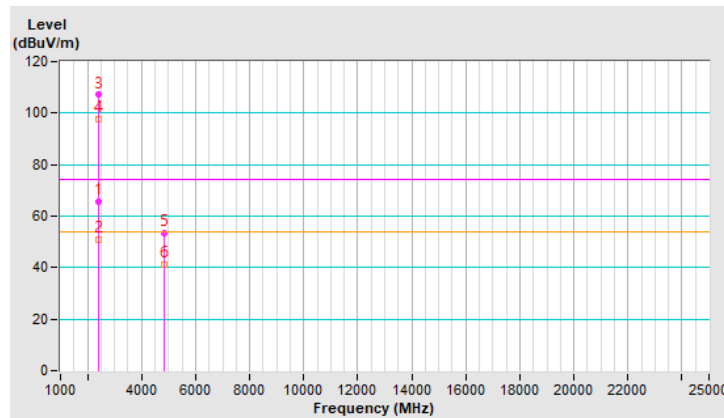
<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	65.6 PK	74.0	-8.4	1.22 H	298	67.9	-2.3
2	2390.00	50.9 AV	54.0	-3.1	1.22 H	298	53.2	-2.3
3	*2412.00	107.1 PK			1.22 H	298	109.3	-2.2
4	*2412.00	97.8 AV			1.22 H	298	100.0	-2.2
5	4824.00	53.3 PK	74.0	-20.7	1.04 H	346	47.7	5.6
6	4824.00	41.3 AV	54.0	-12.7	1.04 H	346	35.7	5.6

**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.

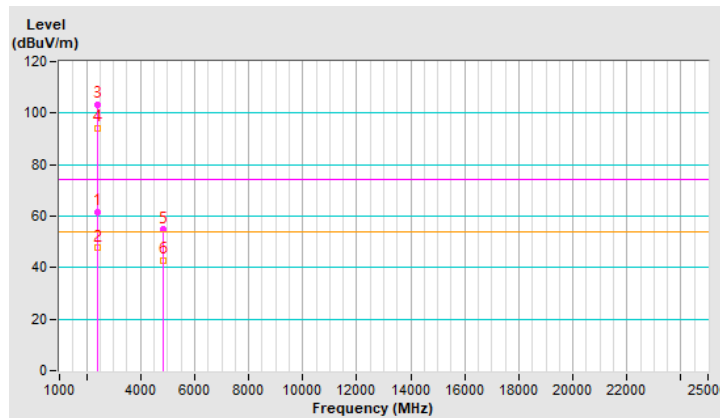


<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

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	61.7 PK	74.0	-12.3	1.52 V	200	64.0	-2.3
2	2390.00	47.6 AV	54.0	-6.4	1.52 V	200	49.9	-2.3
3	*2412.00	103.3 PK			1.52 V	200	105.5	-2.2
4	*2412.00	93.9 AV			1.52 V	200	96.1	-2.2
5	4824.00	54.7 PK	74.0	-19.3	3.36 V	17	49.1	5.6
6	4824.00	42.9 AV	54.0	-11.1	3.36 V	17	37.3	5.6

**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.



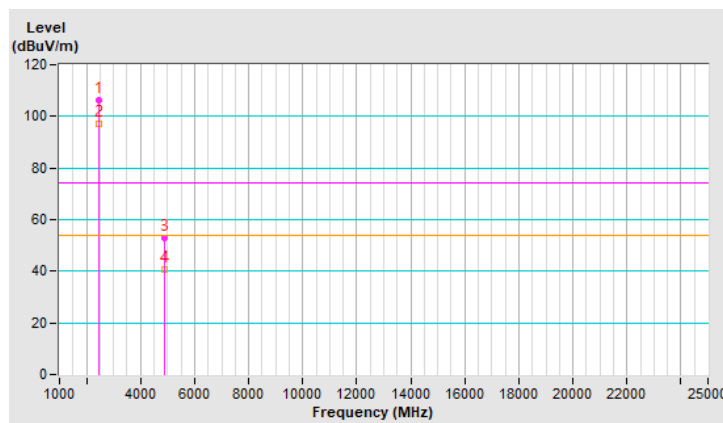
<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	106.5 PK			1.21 H	327	108.7	-2.2
2	*2437.00	97.1 AV			1.21 H	327	99.3	-2.2
3	4874.00	52.9 PK	74.0	-21.1	1.06 H	352	47.3	5.6
4	4874.00	40.9 AV	54.0	-13.1	1.06 H	352	35.3	5.6

**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.



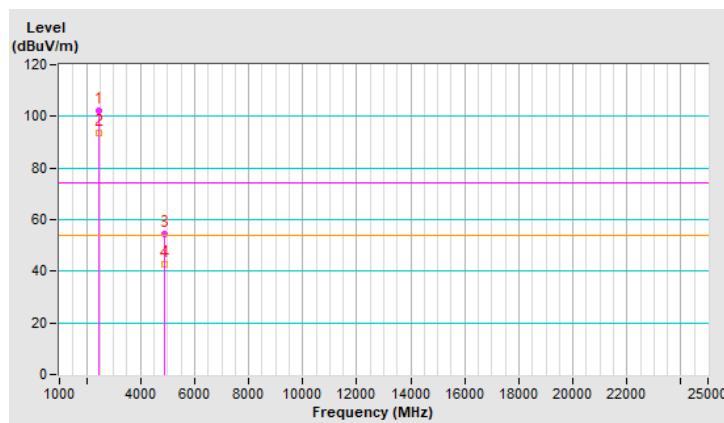
<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	102.4 PK			1.49 V	195	104.6	-2.2
2	*2437.00	93.5 AV			1.49 V	195	95.7	-2.2
3	4874.00	54.6 PK	74.0	-19.4	3.23 V	34	49.0	5.6
4	4874.00	42.9 AV	54.0	-11.1	3.23 V	34	37.3	5.6

**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.



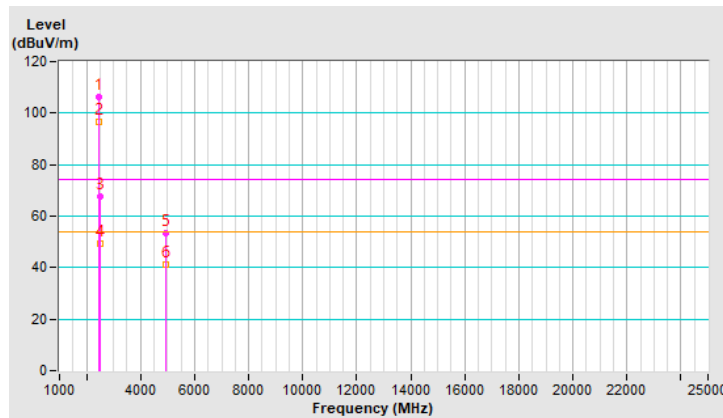
<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	106.5 PK			1.20 H	323	108.7	-2.2
2	*2462.00	96.6 AV			1.20 H	323	98.8	-2.2
3	2483.50	67.7 PK	74.0	-6.3	1.20 H	323	69.8	-2.1
4	2483.50	49.4 AV	54.0	-4.6	1.20 H	323	51.5	-2.1
5	4924.00	53.4 PK	74.0	-20.6	1.01 H	328	47.7	5.7
6	4924.00	41.3 AV	54.0	-12.7	1.01 H	328	35.6	5.7

**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.



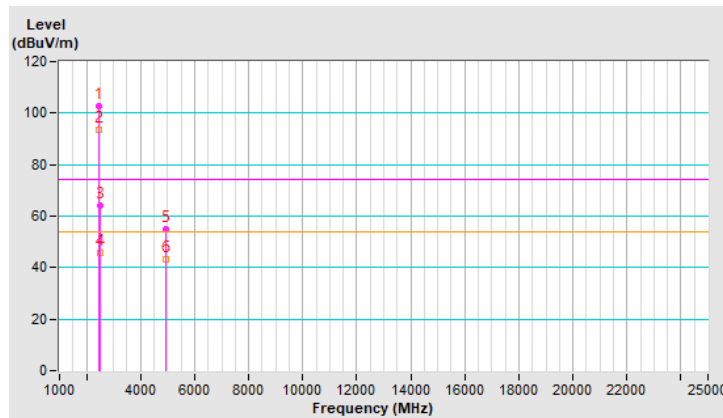
<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	102.7 PK			1.54 V	211	104.9	-2.2
2	*2462.00	93.6 AV			1.54 V	211	95.8	-2.2
3	2483.50	64.1 PK	74.0	-9.9	1.54 V	211	66.2	-2.1
4	2483.50	45.9 AV	54.0	-8.1	1.54 V	211	48.0	-2.1
5	4924.00	55.0 PK	74.0	-19.0	3.20 V	25	49.3	5.7
6	4924.00	43.2 AV	54.0	-10.8	3.20 V	25	37.5	5.7

**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.



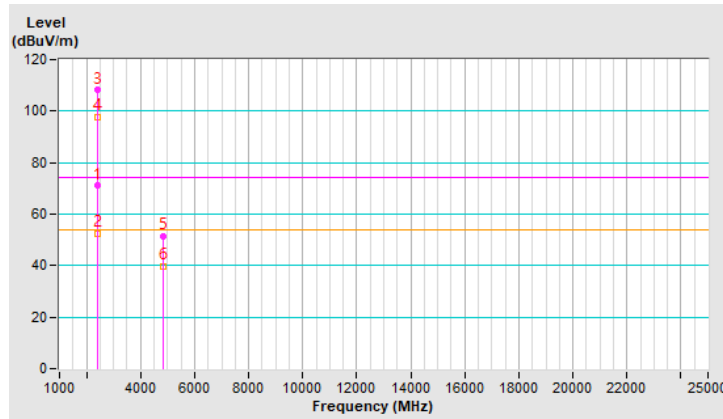
<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	70.9 PK	74.0	-3.1	1.23 H	297	73.2	-2.3
2	2390.00	52.5 AV	54.0	-1.5	1.23 H	297	54.8	-2.3
3	*2412.00	108.1 PK			1.23 H	297	110.3	-2.2
4	*2412.00	97.8 AV			1.23 H	297	100.0	-2.2
5	4824.00	51.4 PK	74.0	-22.6	2.41 H	135	45.8	5.6
6	4824.00	39.8 AV	54.0	-14.2	2.41 H	135	34.2	5.6

**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.



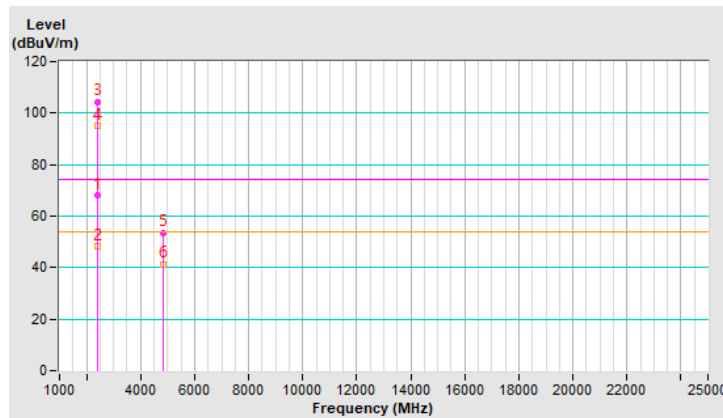


<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

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	67.9 PK	74.0	-6.1	1.47 V	211	70.2	-2.3
2	2390.00	48.1 AV	54.0	-5.9	1.47 V	211	50.4	-2.3
3	*2412.00	104.2 PK			1.47 V	211	106.4	-2.2
4	*2412.00	94.9 AV			1.47 V	211	97.1	-2.2
5	4824.00	53.5 PK	74.0	-20.5	1.40 V	217	47.9	5.6
6	4824.00	41.3 AV	54.0	-12.7	1.40 V	217	35.7	5.6

**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.



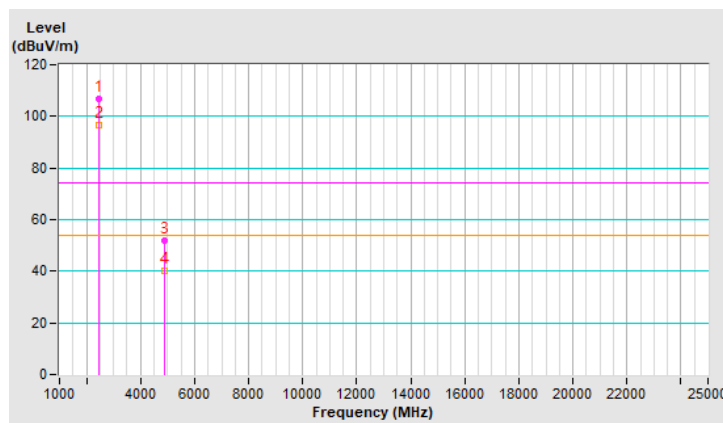
<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	107.0 PK			1.21 H	330	109.2	-2.2
2	*2437.00	96.9 AV			1.21 H	330	99.1	-2.2
3	4874.00	51.7 PK	74.0	-22.3	2.45 H	140	46.1	5.6
4	4874.00	40.3 AV	54.0	-13.7	2.45 H	140	34.7	5.6

**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.

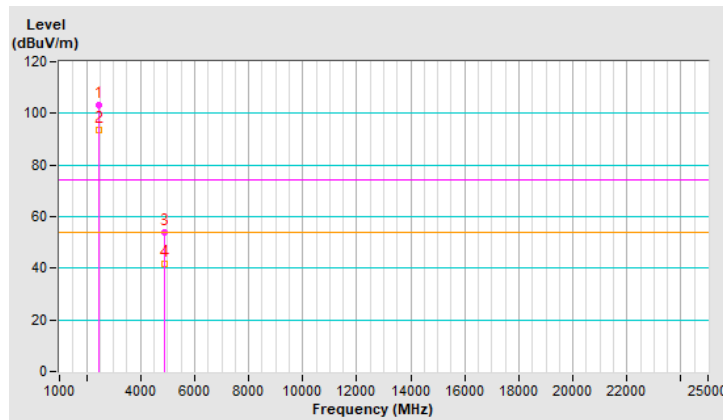


<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

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	103.3 PK			1.43 V	219	105.5	-2.2
2	*2437.00	93.5 AV			1.43 V	219	95.7	-2.2
3	4874.00	53.8 PK	74.0	-20.2	1.34 V	209	48.2	5.6
4	4874.00	41.8 AV	54.0	-12.2	1.34 V	209	36.2	5.6

**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.



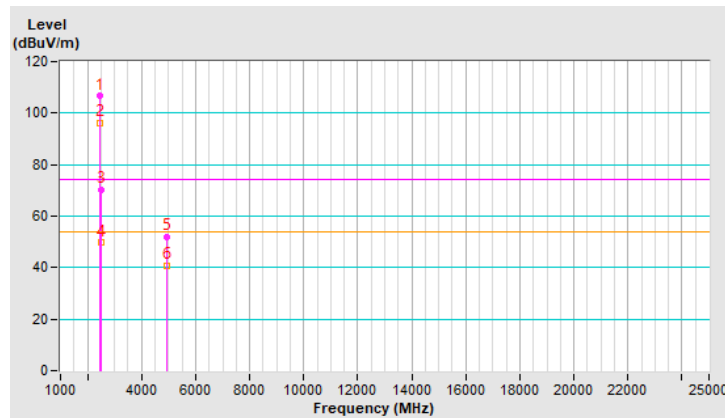
<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**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	106.6 PK			1.22 H	275	108.8	-2.2
2	*2462.00	96.2 AV			1.22 H	275	98.4	-2.2
3	2483.50	70.4 PK	74.0	-3.6	1.22 H	275	72.5	-2.1
4	2483.50	49.6 AV	54.0	-4.4	1.22 H	275	51.7	-2.1
5	4924.00	52.0 PK	74.0	-22.0	2.48 H	142	46.3	5.7
6	4924.00	40.7 AV	54.0	-13.3	2.48 H	142	35.0	5.7

**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.



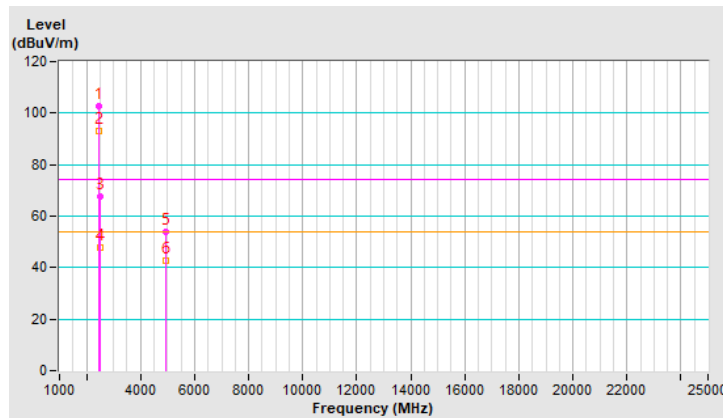
<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power</b>	120 Vac, 60 Hz	<b>Environmental Conditions</b>	19°C, 70% RH
<b>Tested By</b>	Jed Wu		

**Antenna Polarity & Test Distance : Vertical at 3 m**

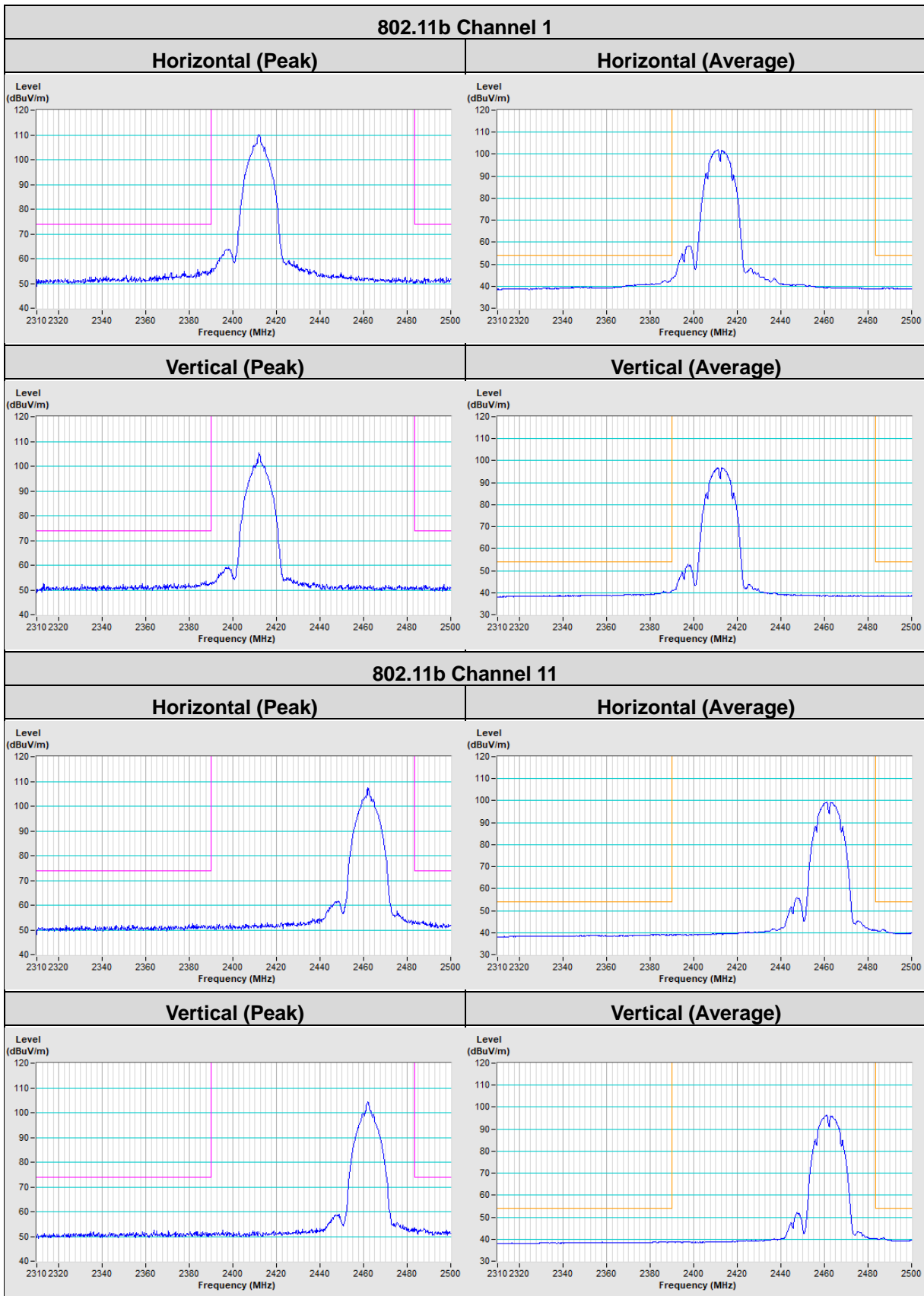
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	102.8 PK			1.56 V	205	105.0	-2.2
2	*2462.00	93.0 AV			1.56 V	205	95.2	-2.2
3	2483.50	67.8 PK	74.0	-6.2	1.56 V	205	69.9	-2.1
4	2483.50	47.8 AV	54.0	-6.2	1.56 V	205	49.9	-2.1
5	4924.00	54.0 PK	74.0	-20.0	1.32 V	222	48.3	5.7
6	4924.00	42.6 AV	54.0	-11.4	1.32 V	222	36.9	5.7

**Remarks:**

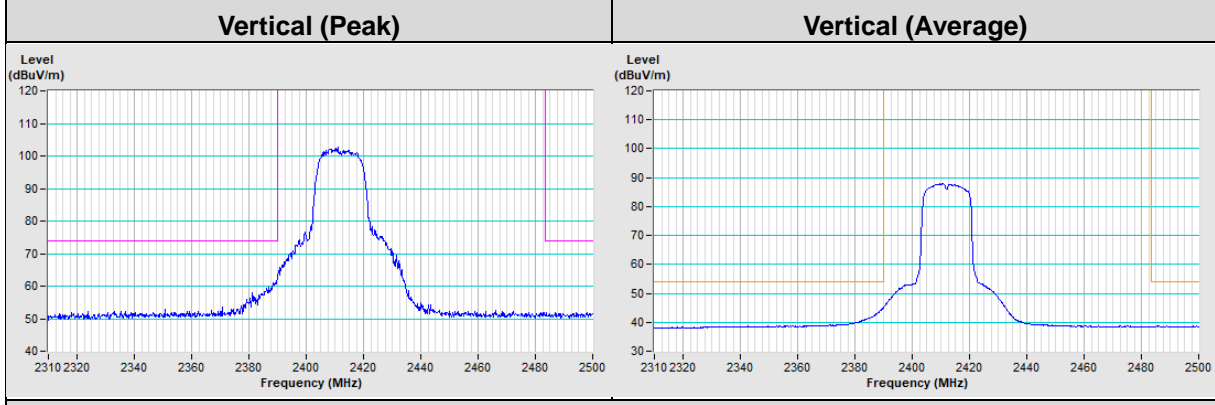
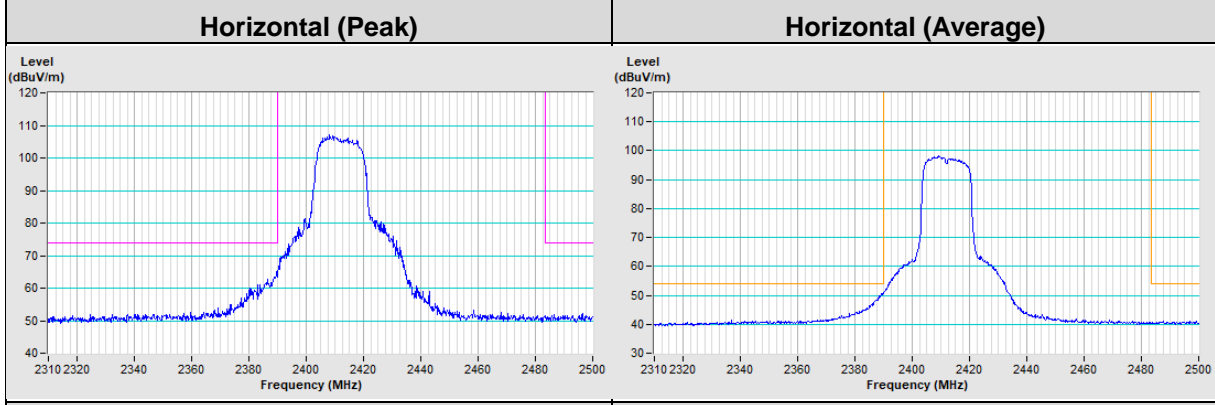
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* " : Fundamental frequency.



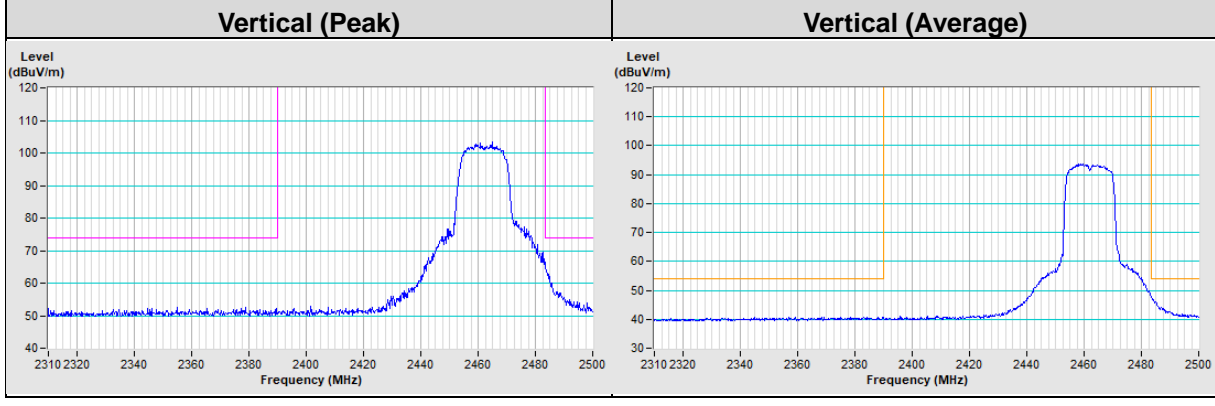
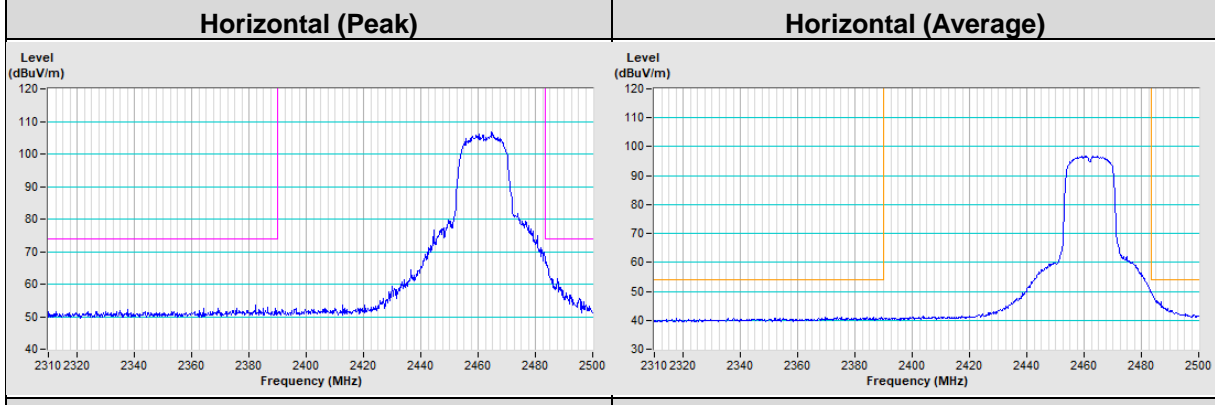
Plot of Band Edge



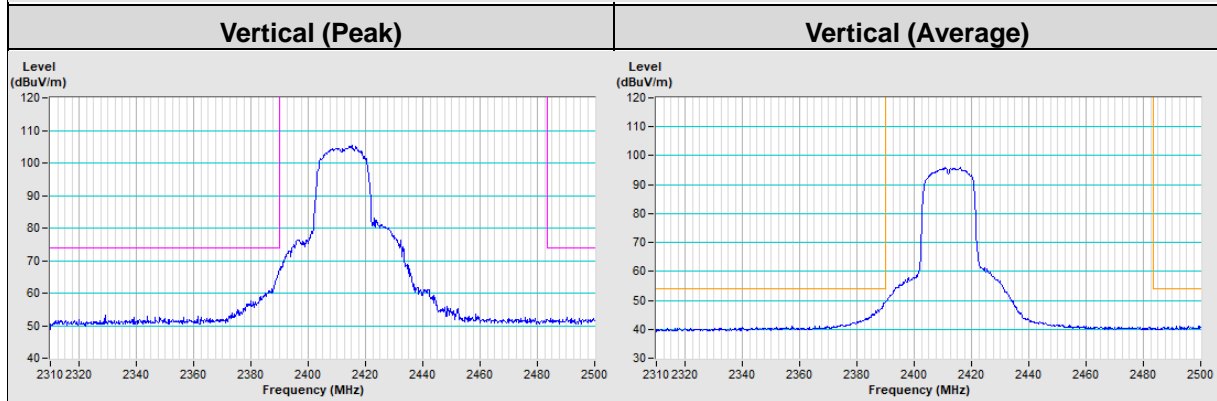
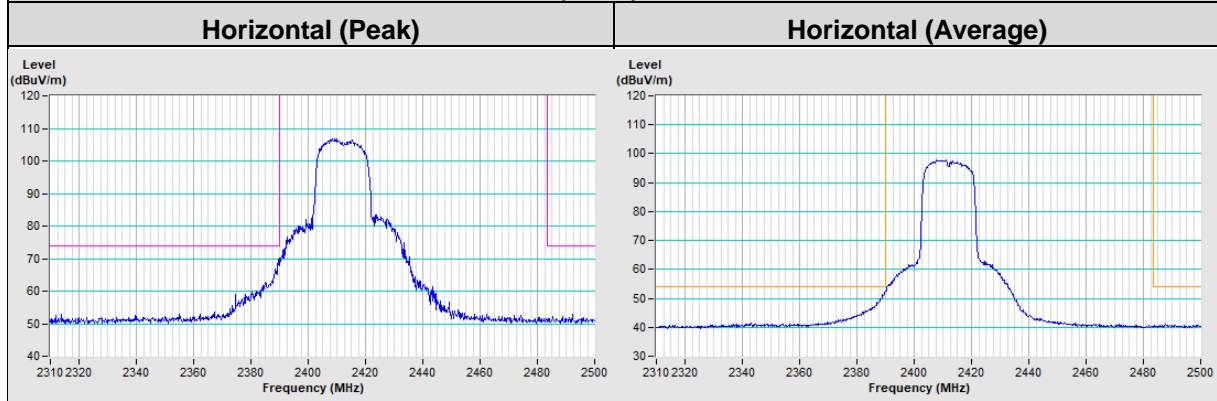
### 802.11g Channel 1



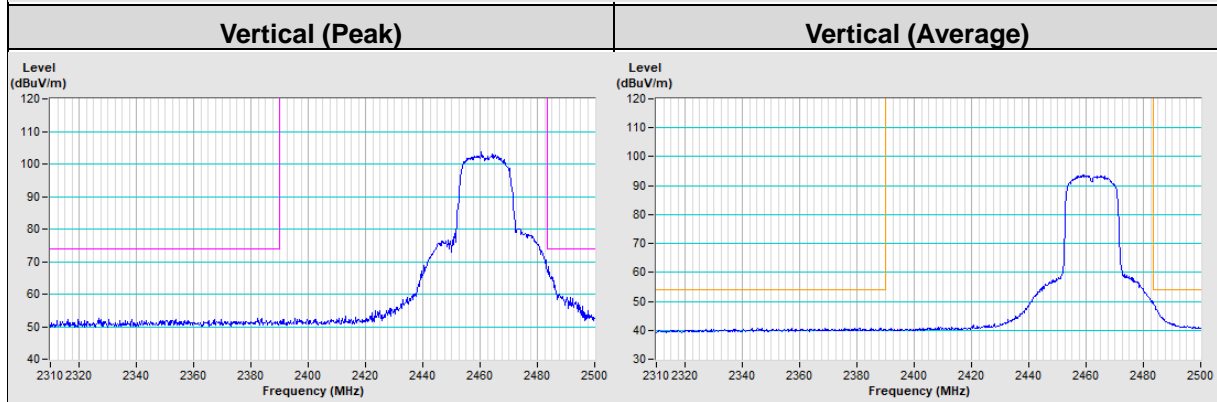
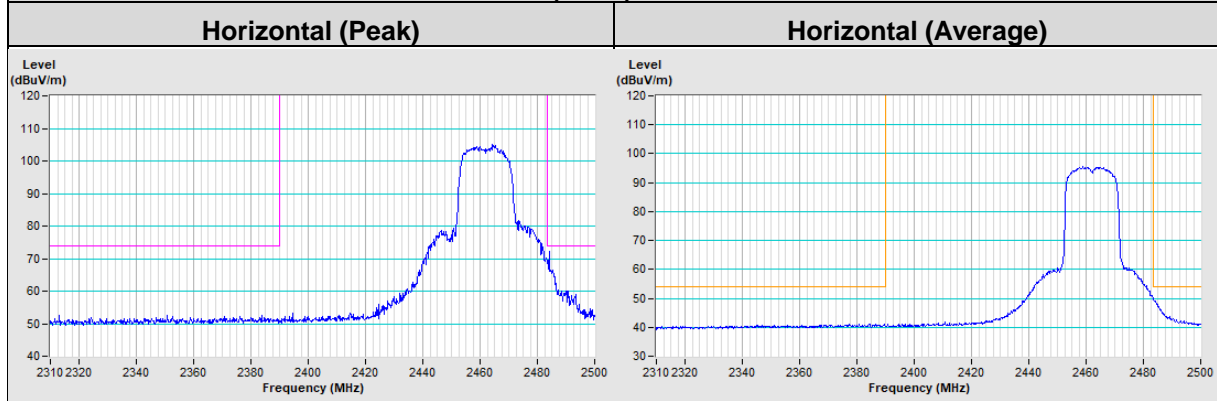
### 802.11g Channel 11



### 802.11n (HT20) Channel 1



### 802.11n (HT20) Channel 11





## 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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