

TEST REPORT

CERTIFICATE OF CONFORMITY

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

Report No.: RFBFPJ-WTW-P22060392

FCC ID: SWX-UCEVS

Model No.: UC-EV-Station

Received Date: 2022/3/21

Test Date: 2022/7/14 ~ 2022/8/4

Issued Date: 2022/9/2

Applicant: Ubiquiti Inc.

Address: 685 Third Avenue, New York, New York 10017 USA

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. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

FCC Registration / Test Location:788550 / TW0003 for Test Location(1)

Designation Number: 198487 / TW2021 for Test Location(2)

Approved by: _____

Jeremy Lin

, Date: _____

2022/9/2

Jeremy Lin / Project Engineer

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Prepared by : Gina Liu / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBFPJ-WTW-P22060392	Original release.	2022/9/2

1 Certificate

Product: UniFi Connect EV Station

Brand:   

Test Model: UC-EV-Station

Sample Status: Engineering sample

Applicant: Ubiquiti Inc.

Test Date: 2022/7/14 ~ 2022/8/4

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 -1.34 dB at 0.64059 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -1.1 dB at 80.40 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.2 dB at 2390.00, 2483.50 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	2.79 dB
AC Power Conducted Emissions	-	2.94 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	UniFi Connect EV Station
Brand	
Test Model	UC-EV-Station
Status of EUT	Engineering sample
Power Supply Rating	200-240 Vac
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 150.0 Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	186.638 mW (22.71 dBm)

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

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna No.	Model name	Gain (dBi)	Antenna Type	Connector Type
		2400~2483.5 MHz		
1	117-03712	3.1	Dipole	IPEX

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

2. The EUT incorporates a SISO function:

2.4 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX

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:	1. Worst Condition: Z-axis 2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.

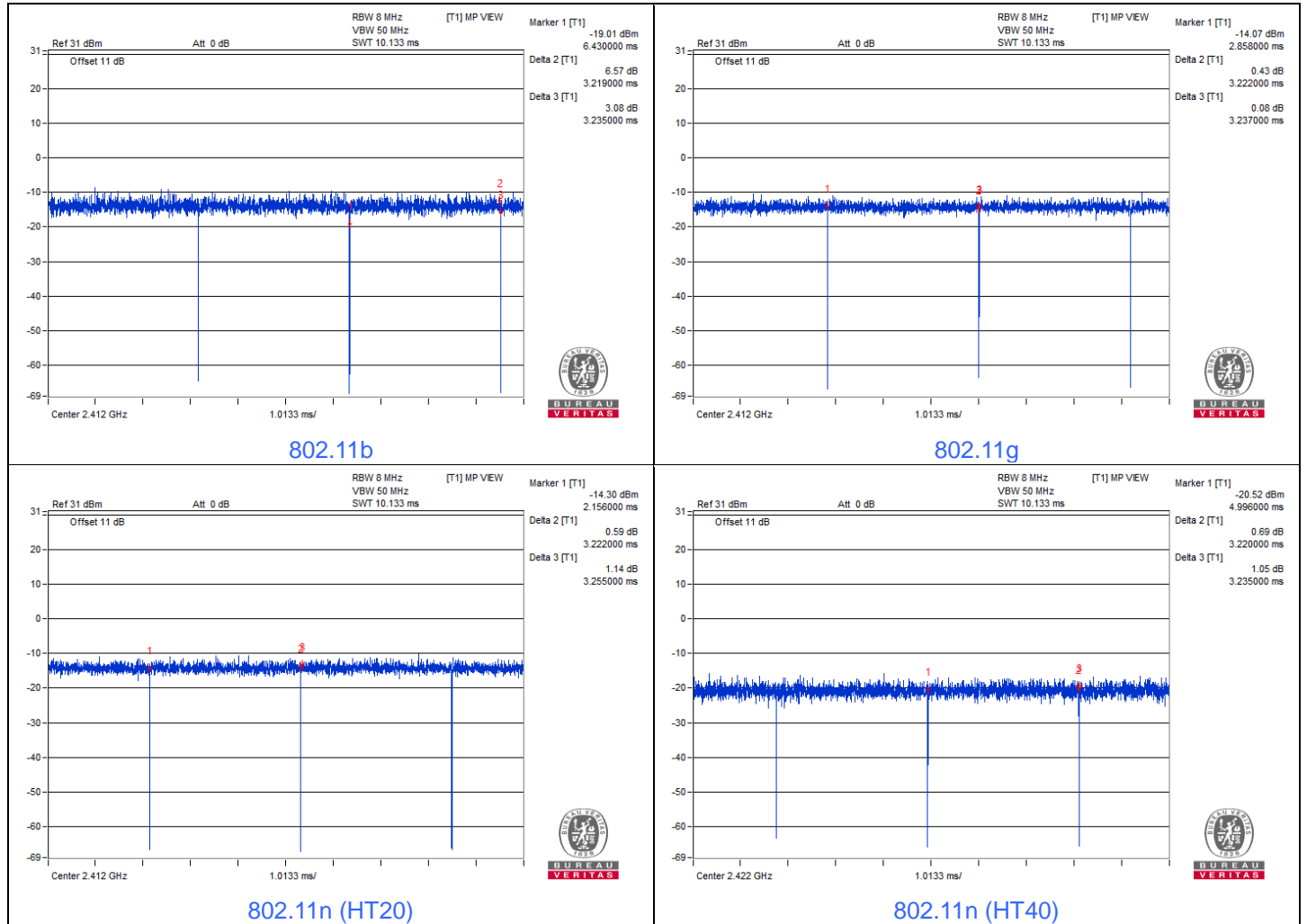
Following channel(s) was (were) selected for the final test as listed below:

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power / Power Spectral Density	802.11b	1, 6, 11	DBPSK	1Mb/s
	802.11g	1, 6, 11	BPSK	6Mb/s
	802.11n (HT20)	1, 6, 11	BPSK	MCS0
	802.11n (HT40)	3, 6, 9	BPSK	MCS0
6 dB Bandwidth / Conducted Out of Band Emissions	802.11b	1, 6, 11	DBPSK	1Mb/s
	802.11g	1, 6, 11	BPSK	6Mb/s
	802.11n (HT20)	1, 6, 11	BPSK	MCS0
	802.11n (HT40)	3, 6, 9	BPSK	MCS0
AC Power Conducted Emissions	802.11n (HT20)	1	BPSK	MCS0
Unwanted Emissions below 1 GHz	802.11n (HT20)	1	BPSK	MCS0
Unwanted Emissions above 1 GHz	802.11b	1, 6, 11	DBPSK	1Mb/s
	802.11g	1, 6, 11	BPSK	6Mb/s
	802.11n (HT20)	1, 6, 11	BPSK	MCS0
	802.11n (HT40)	3, 6, 9	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.

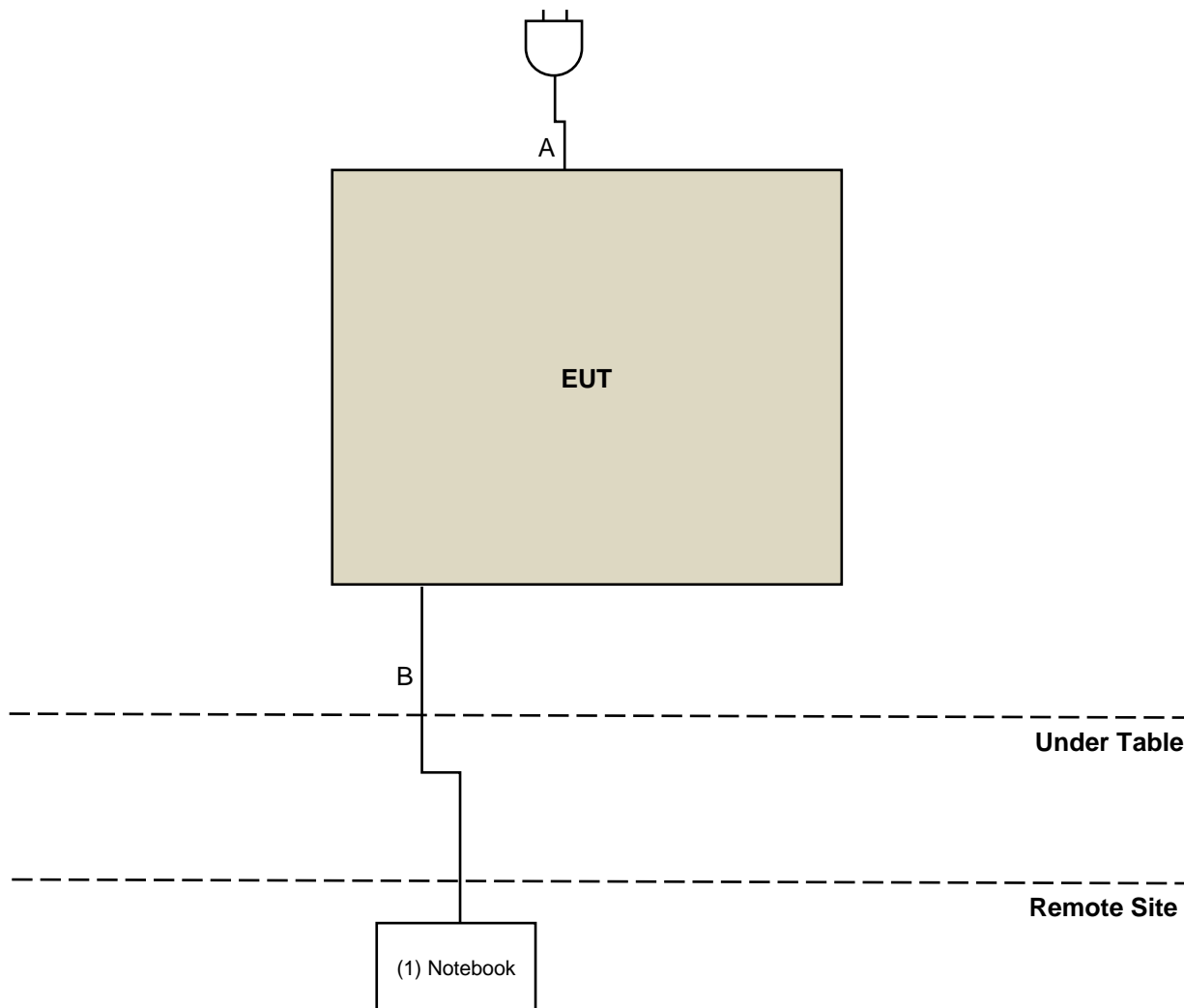
- 802.11b:** Duty cycle = $3.219 \text{ ms} / 3.235 \text{ ms} \times 100\% = 99.5\%$
- 802.11g:** Duty cycle = $3.222 \text{ ms} / 3.237 \text{ ms} \times 100\% = 99.5\%$
- 802.11n (HT20):** Duty cycle = $3.222 \text{ ms} / 3.255 \text{ ms} \times 100\% = 99.0\%$
- 802.11n (HT40):** Duty cycle = $3.22 \text{ ms} / 3.235 \text{ ms} \times 100\% = 99.5\%$



3.6 Test Program Used and Operation Descriptions

Controlling software QRCT V4.0.00195.0 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
1	Notebook	DELL	E5410	1HC2XM1	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
A	Power Cable	1	1M	NO	N/A	Provided by client
B	LAN	1	3M	NO	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: 2022/7/20

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/7/19

4.3 6 dB Bandwidth

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/7/20

4.4 Conducted Out of Band Emissions

Refer to section 4.3 to get information of the instruments.

4.5 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal LYNICS	0900510	E1-011285	2021/10/1	2022/9/30
		E1-011286	2021/10/1	2022/9/30
		E1-011484	2022/6/26	2023/6/25
Attenuator STI	STI02-2200-10	NO.1	2021/9/15	2022/9/14
DC LISN Schwarzbeck	NNLK 8121	8121-808	2022/4/29	2023/4/28
Isolation Transformer Erika Fiedler	D-65396	017	2021/9/9	2022/9/8
LISN R&S	ENV216	101196	2022/5/24	2023/5/23
		101197	2022/7/5	2023/7/4
LISN Schwarzbeck	NNLK 8121	8121-731	2022/5/26	2023/5/25
	NNLK8129	8129229	2022/6/8	2023/6/7
RF Coaxial Cable Commate	5D-FB	Cable-CO10-01	2022/2/9	2023/2/8
Software BVADT	Cond_V7.3.7.4	N/A	N/A	N/A
Test Receiver R&S	ESR3	102414	2021/12/20	2022/12/19

Notes:

1. The test was performed in Linkou Conduction 10.
2. Tested Date: 2022/8/4

4.6 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFA-515BSN	N/A	N/A	N/A
Bi-log Broadband Antenna Schwarzbeck	VULB9168	9168-1214	2021/10/27	2022/10/26
Loop Antenna EMCI	EM-6879	269	2021/9/16	2022/9/15
MXA Signal Analyzer KEYSIGHT	N9020B	MY60110513	2021/12/24	2022/12/23
MXE EMI Receiver KEYSIGHT	N9038B	MY60180018	2022/2/18	2023/2/17
Pre-amplifier EMCI	EMC001340	980201	2021/9/15	2022/9/14
Pre_Amplifier EMCI	EMC330N	980798	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	201248	2022/1/17	2023/1/16
	EMCCFD400-NM-NM- 3000	201249	2022/1/17	2023/1/16
	EMCCFD400-NM-NM- 9000	201251	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208676	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 9.
2. Tested Date: 2022/7/21

4.7 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFA-515BSN	N/A	N/A	N/A
Horn Antenna RFSPIN	DRH18-E	210104A18E	2021/11/14	2022/11/13
Horn Antenna Schwarzbeck	BBHA 9170	9170-1048	2021/11/14	2022/11/13
MXA Signal Analyzer KEYSIGHT	N9020B	MY60110513	2021/12/24	2022/12/23
MXE EMI Receiver KEYSIGHT	N9038B	MY60180018	2022/2/18	2023/2/17
Pre_Amplifier EMCI	EMC118A45SE	980809	2021/12/30	2022/12/29
	EMC184045SE	980786	2022/1/17	2023/1/16
RF Coaxial Cable EMCI	EMC101G-KM-KM-2000	201255	2022/1/17	2023/1/16
	EMC101G-KM-KM-3000	201258	2022/1/17	2023/1/16
	EMC101G-KM-KM-5000	201261	2022/1/17	2023/1/16
	EMC104-SM-SM-1000	210103	2022/1/17	2023/1/16
	EMC104-SM-SM-3000	201232	2022/1/17	2023/1/16
	EMC104-SM-SM-9000	201244	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208676	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 9.
2. Tested Date: 2022/7/14 ~ 2022/7/15

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

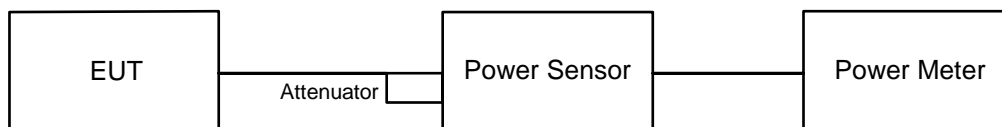
Notes:

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:

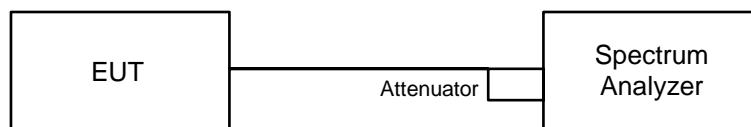
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

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

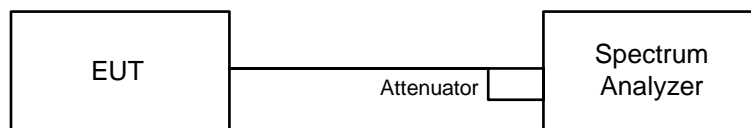


6.2.2 Test Procedure

- 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 kHz.
- d. Set the VBW $\geq 3 \times$ 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

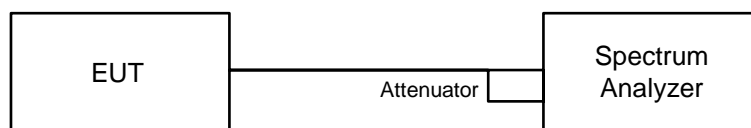


6.3.2 Test Procedure

- 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

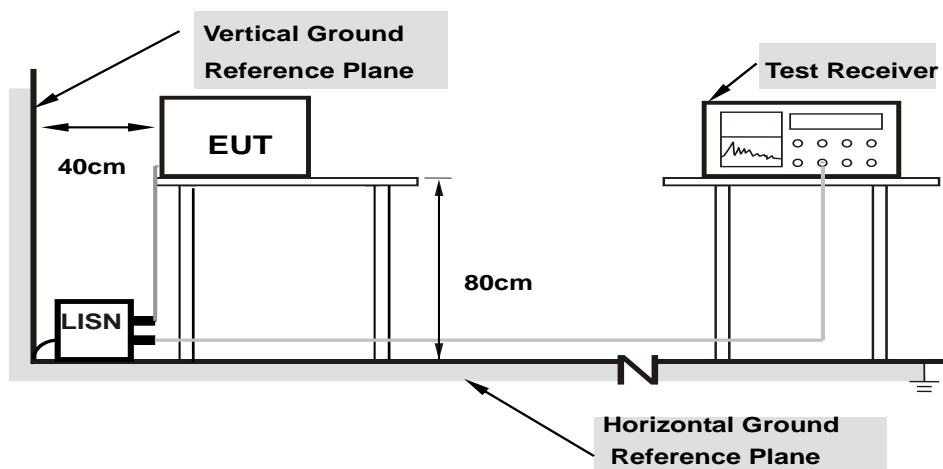
- Set the RBW = 100 kHz.
- Set the VBW ≥ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

- Set RBW = 100 kHz.
- Set VBW ≥ 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

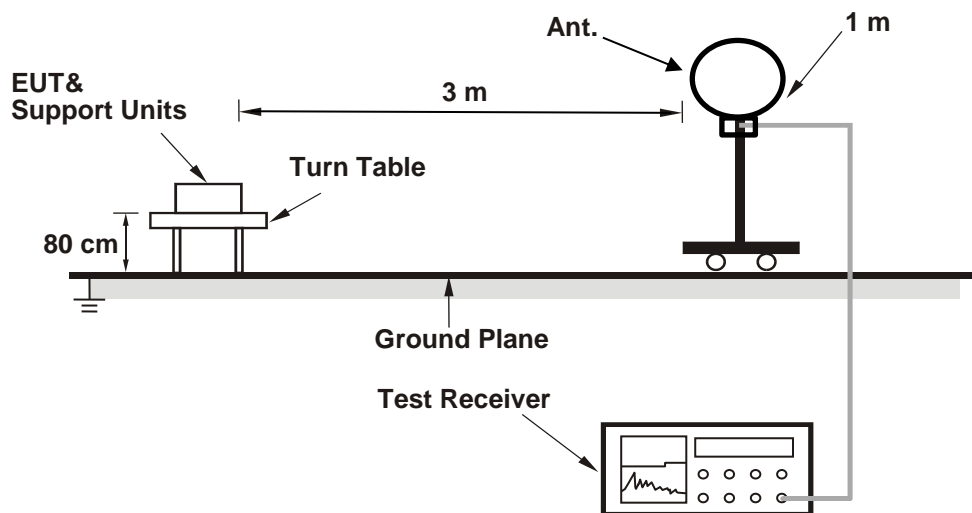
- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The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

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

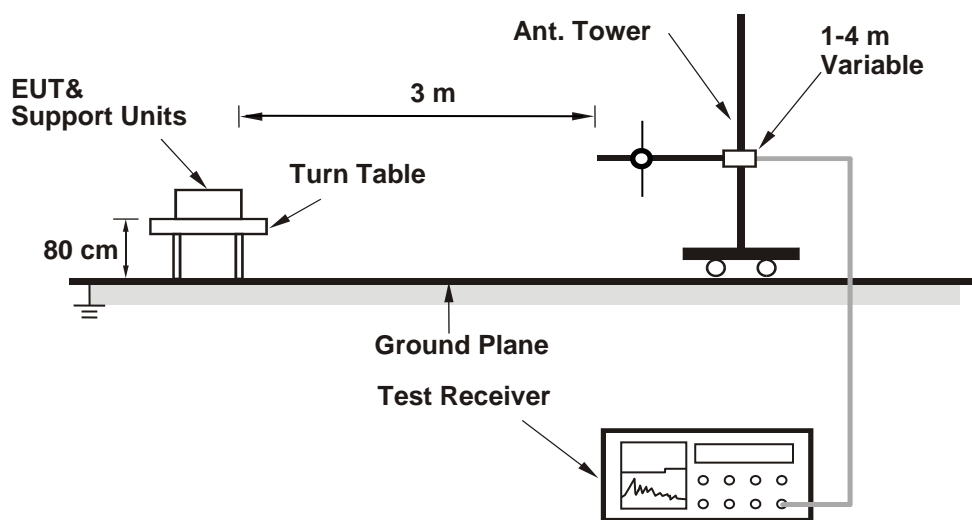
6.6 Unwanted Emissions below 1 GHz

6.6.1 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).

6.6.2 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, 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.

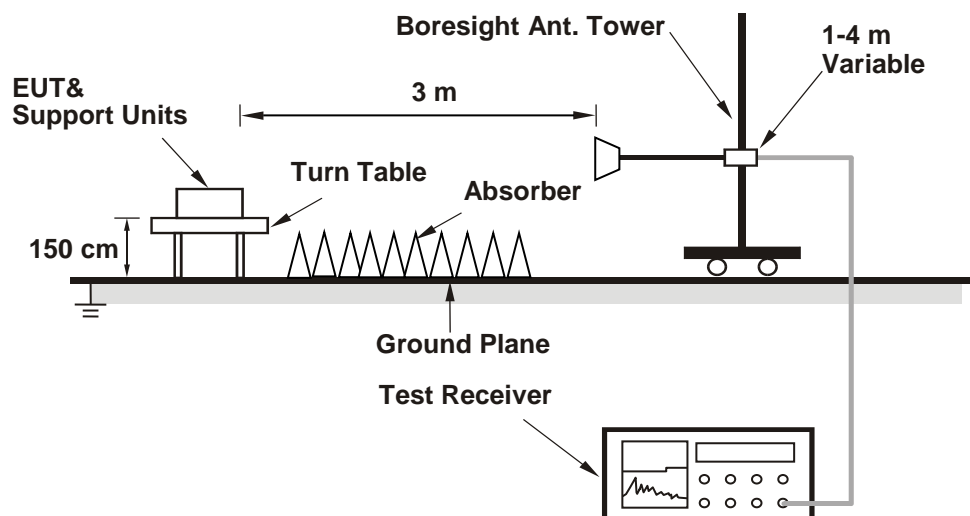
Notes:

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.

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

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	220 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Chun Wu
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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	135.519	21.32	30	Pass
6	2437	119.95	20.79	30	Pass
11	2462	148.936	21.73	30	Pass

Note: The antenna gain is 3.1 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	179.887	22.55	30	Pass
6	2437	161.065	22.07	30	Pass
11	2462	184.927	22.67	30	Pass

Note: The antenna gain is 3.1 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	186.638	22.71	30	Pass
6	2437	170.608	22.32	30	Pass
11	2462	180.302	22.56	30	Pass

Note: The antenna gain is 3.1 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
3	2422	183.231	22.63	30	Pass
6	2437	176.604	22.47	30	Pass
9	2452	61.518	17.89	30	Pass

Note: The antenna gain is 3.1 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	82.604	19.17
6	2437	71.121	18.52
11	2462	83.753	19.23

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	55.335	17.43
6	2437	47.973	16.81
11	2462	55.976	17.48

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	57.28	17.58
6	2437	49.317	16.93
11	2462	53.951	17.32

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	56.754	17.54
6	2437	52.966	17.24
9	2452	20.941	13.21

7.2 Power Spectral Density

Input Power:	220 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Chun Wu
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802.11b

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2412	-2.88	8.00	Pass
6	2437	-3.50	8.00	Pass
11	2462	-2.61	8.00	Pass

Note: The antenna gain is 3.1 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	-7.66	8.00	Pass
6	2437	-8.07	8.00	Pass
11	2462	-7.45	8.00	Pass

Note: The antenna gain is 3.1 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	-7.11	8.00	Pass
6	2437	-7.85	8.00	Pass
11	2462	-7.61	8.00	Pass

Note: The antenna gain is 3.1 dBi < 6 dBi, so the power density limit shall not be reduced.

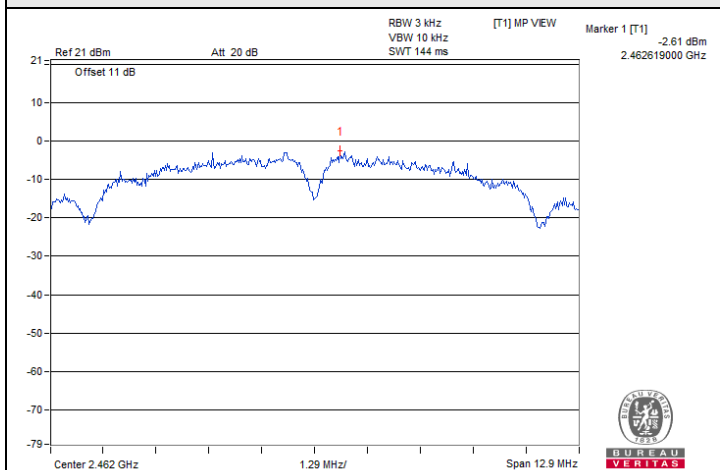
802.11n (HT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
3	2422	-10.39	8.00	Pass
6	2437	-10.66	8.00	Pass
9	2452	-14.43	8.00	Pass

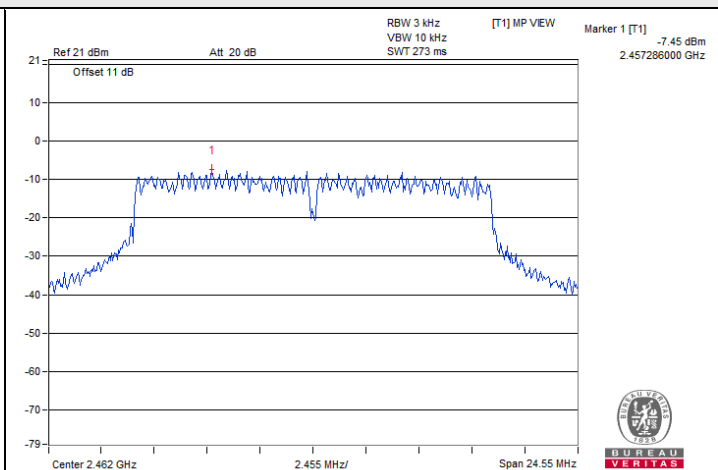
Note: The antenna gain is 3.1 dBi < 6 dBi, so the power density limit shall not be reduced.



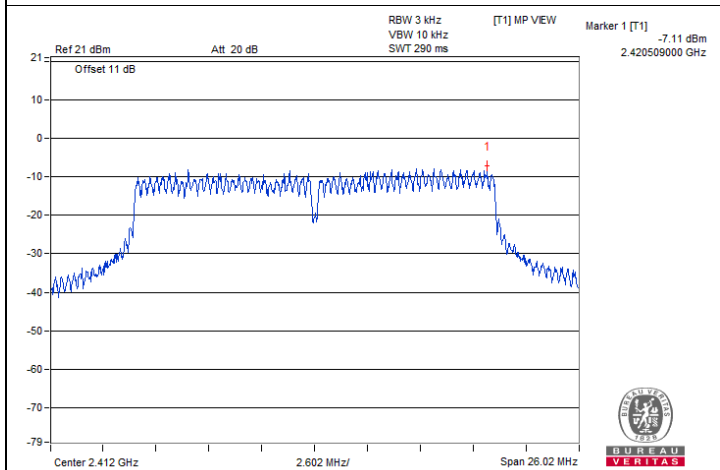
Spectrum Plot of Maximum Value



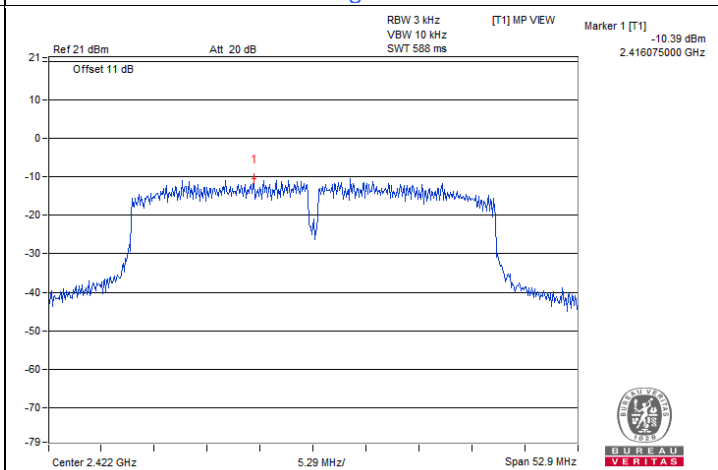
802.11b : CH 11



802.11g : CH 11



802.11n (HT20) : CH 1



802.11n (HT40) : CH 3

7.3 6 dB Bandwidth

Input Power:	220 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Chun Wu
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802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	8.6	0.5	Pass
6	2437	8.62	0.5	Pass
11	2462	8.6	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	16.36	0.5	Pass
6	2437	16.42	0.5	Pass
11	2462	16.37	0.5	Pass

802.11n (HT20)

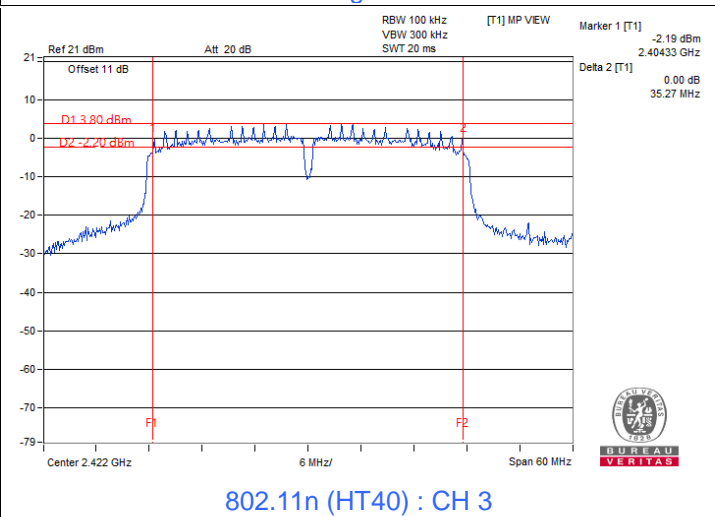
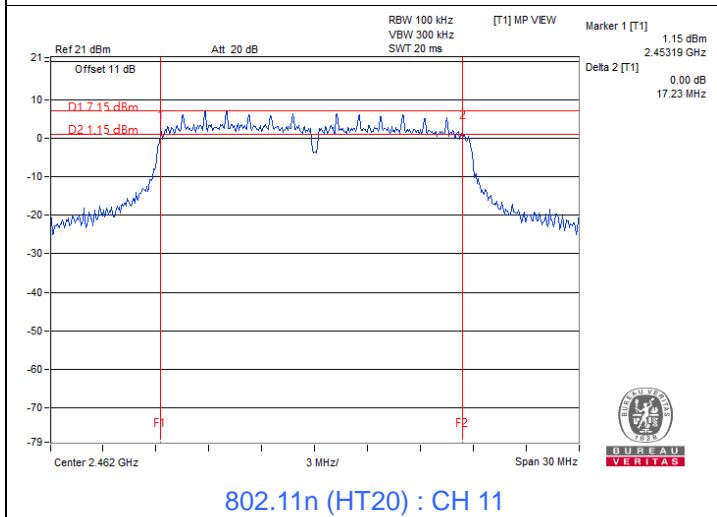
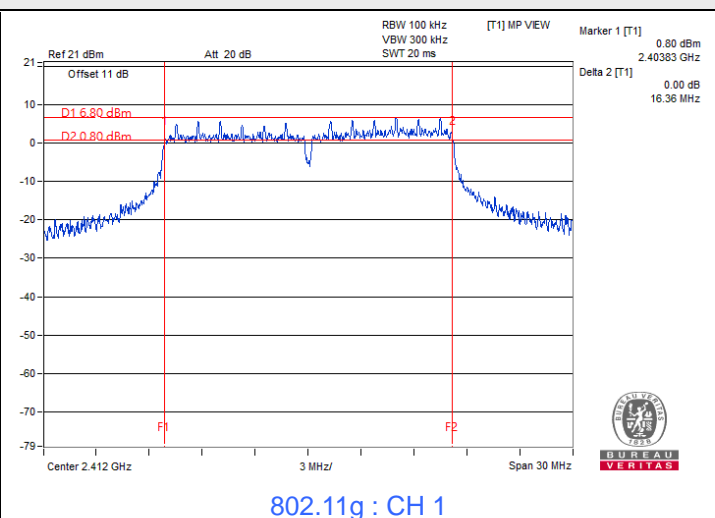
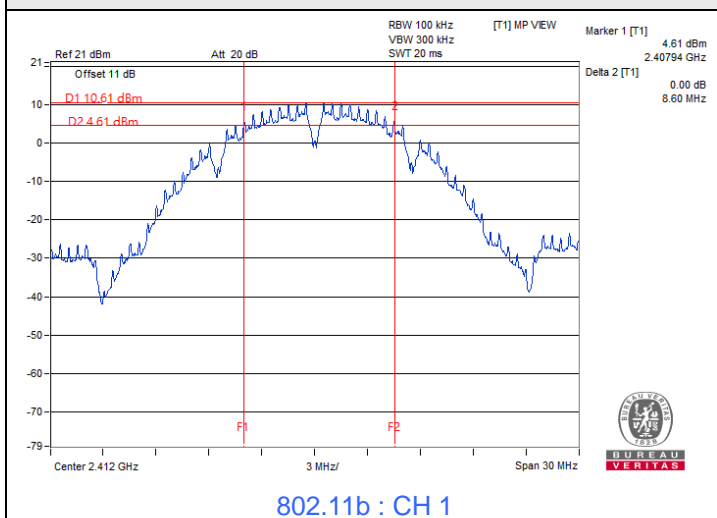
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	17.35	0.5	Pass
6	2437	17.39	0.5	Pass
11	2462	17.23	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
3	2422	35.27	0.5	Pass
6	2437	35.67	0.5	Pass
9	2452	35.6	0.5	Pass



Spectrum Plot of Minimum Value





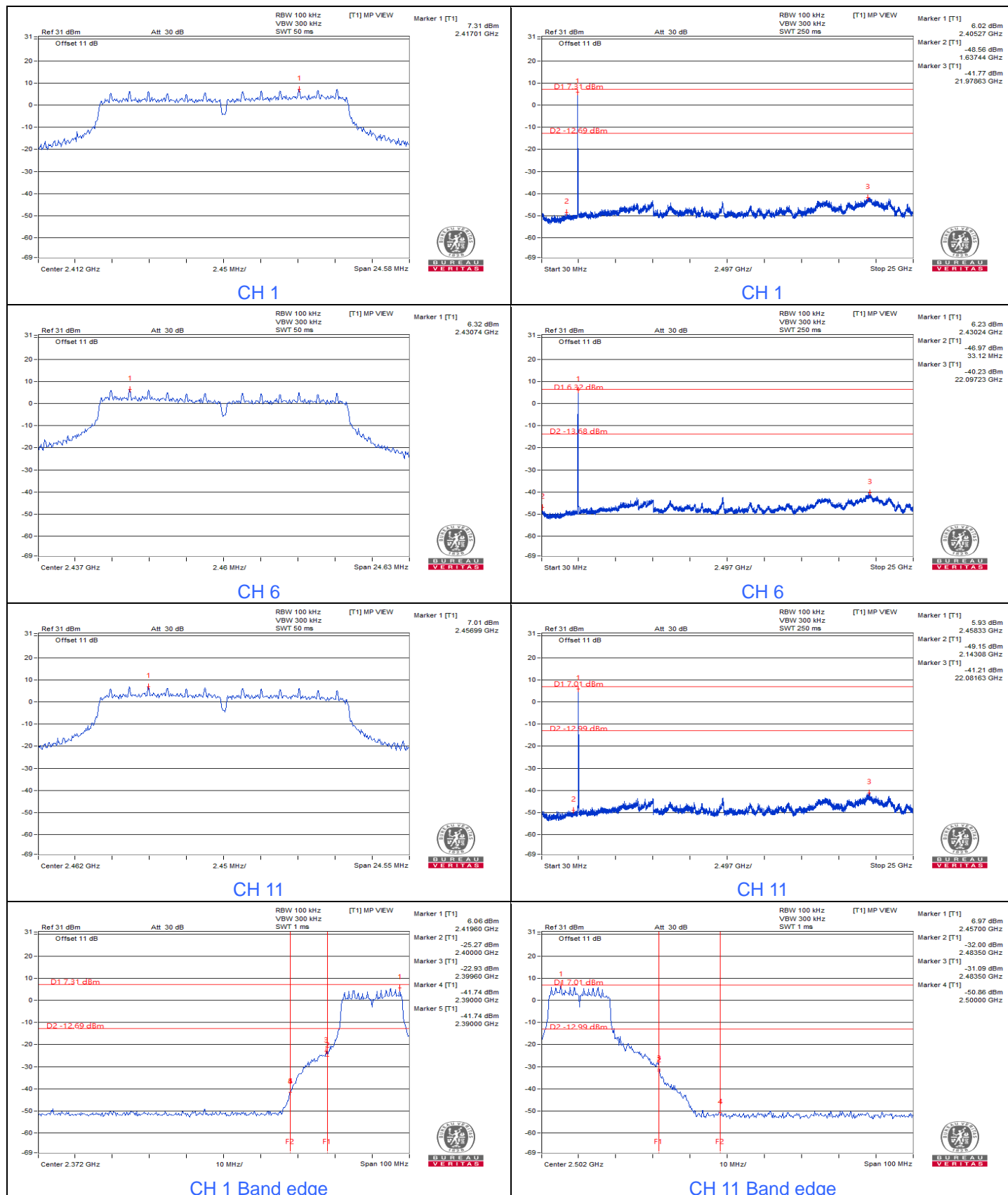
7.4 Conducted Out of Band Emissions

Input Power:	220 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Chun Wu
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802.11b

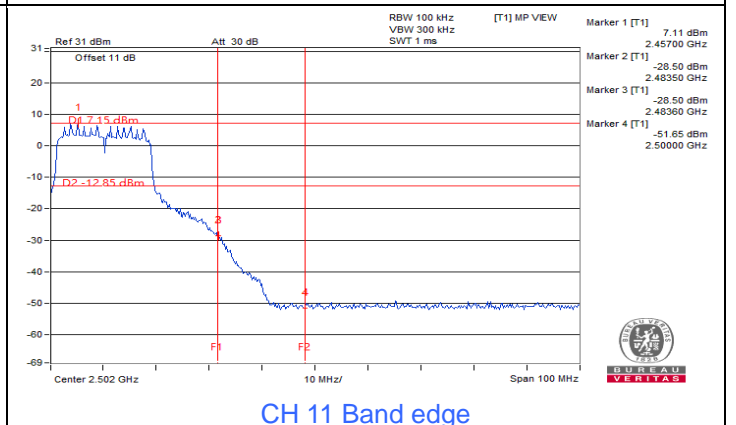
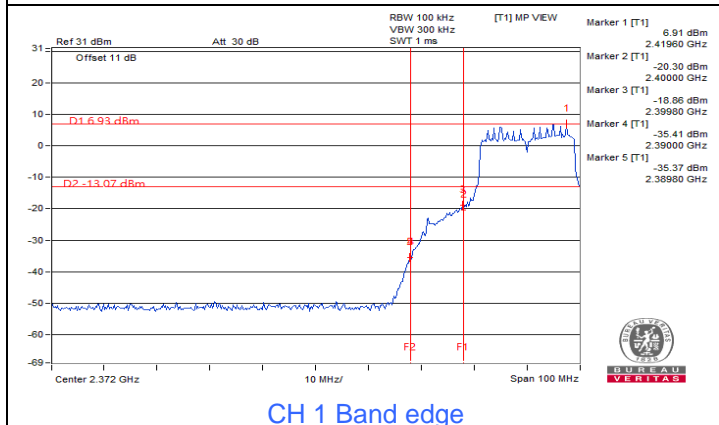
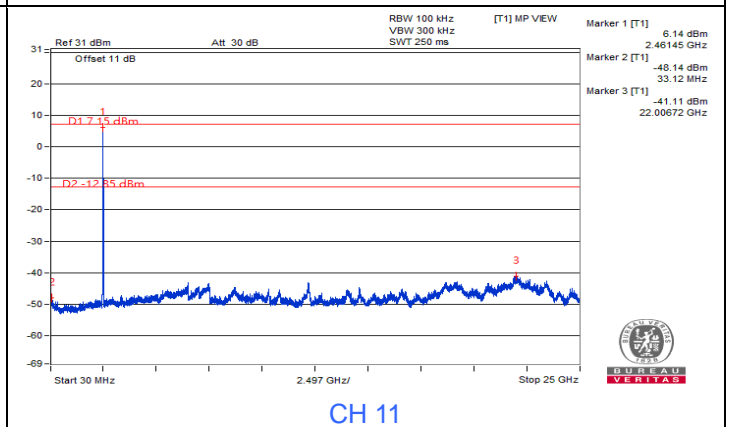
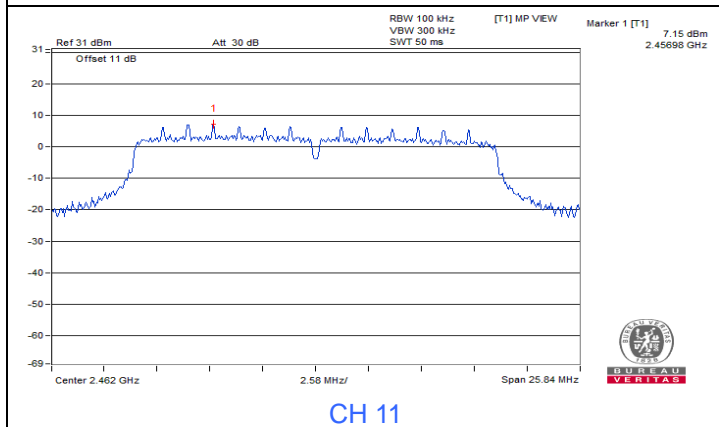
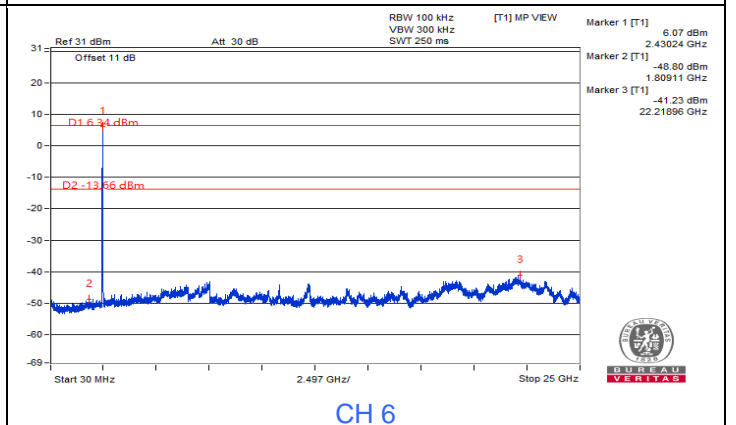
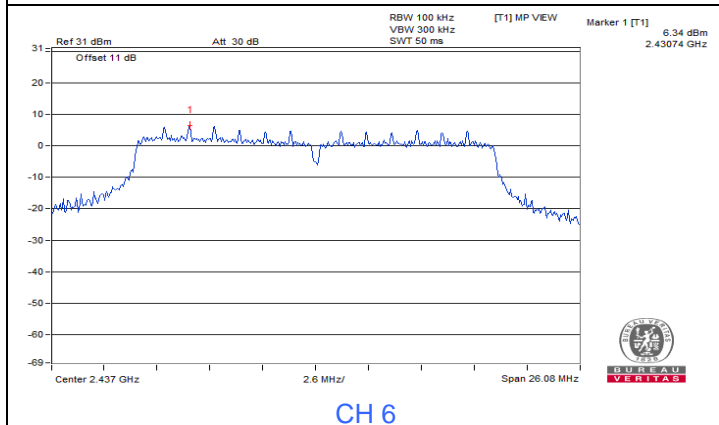
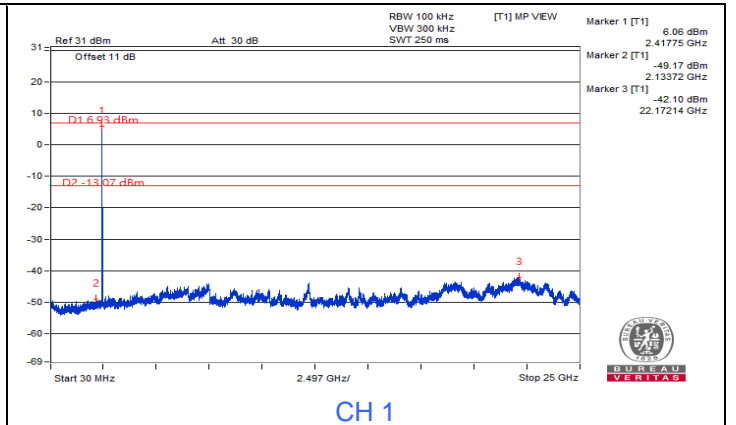
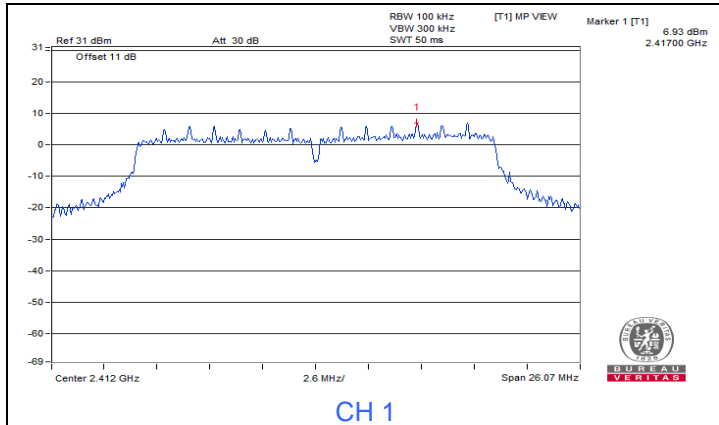


802.11g





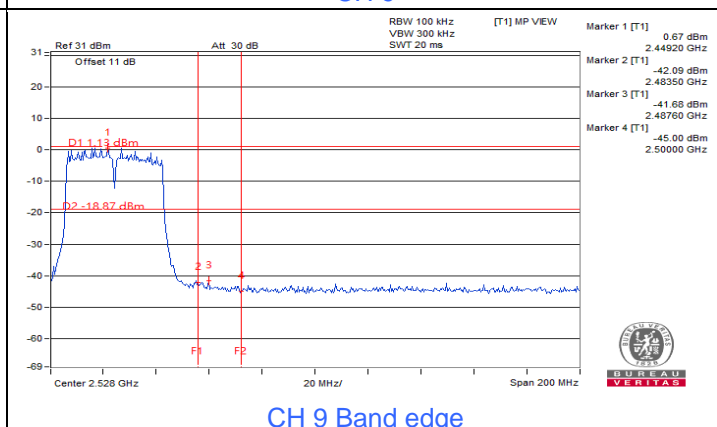
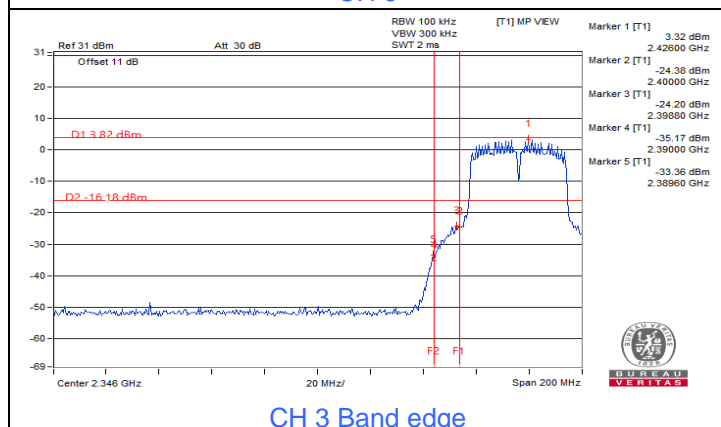
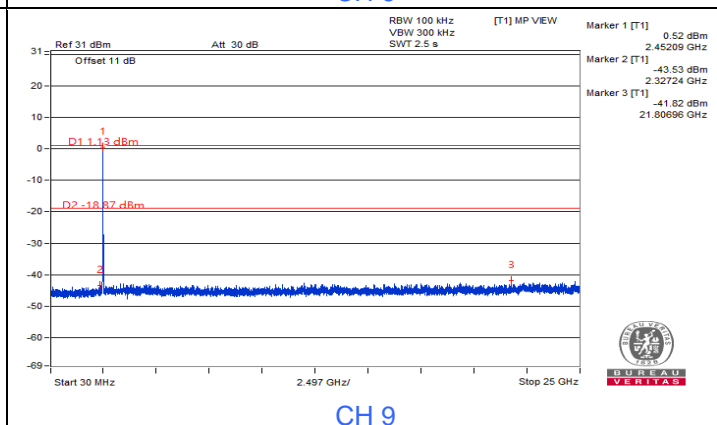
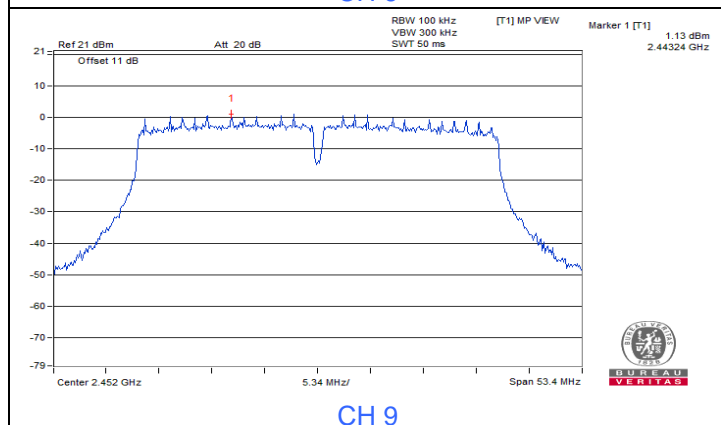
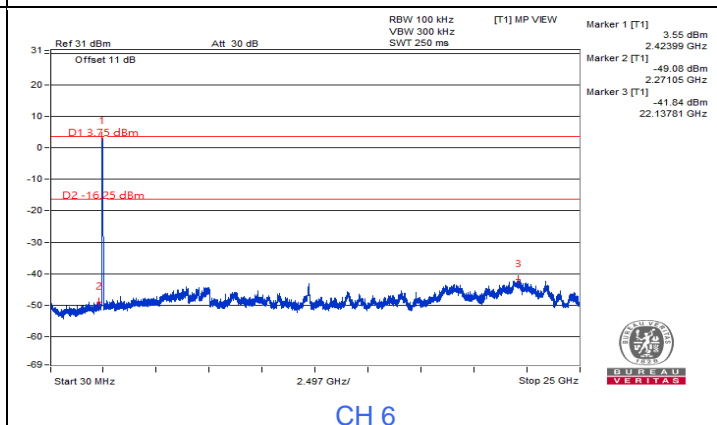
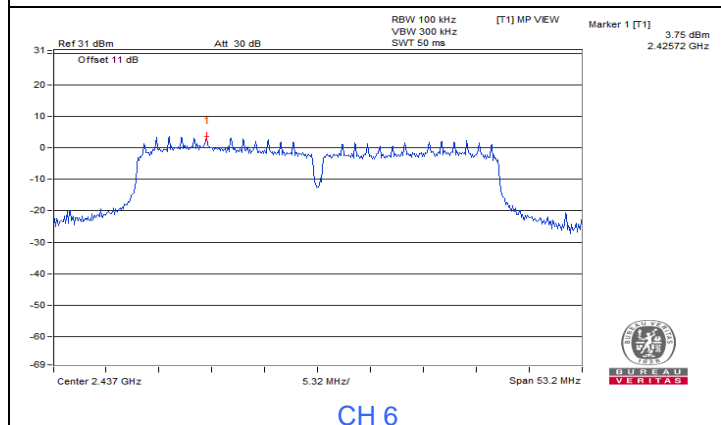
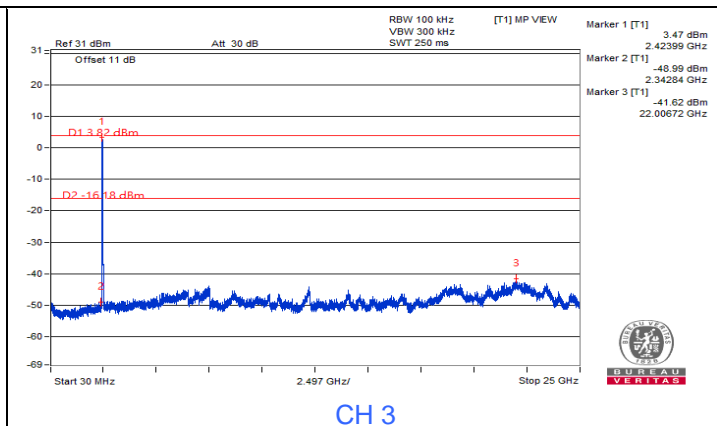
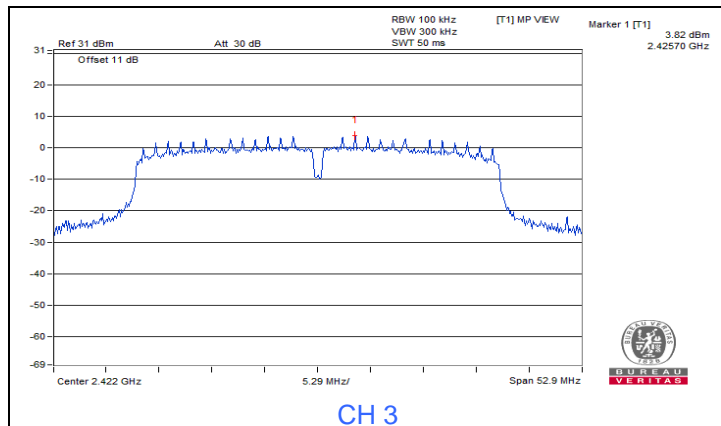
802.11n (HT20)





BUREAU VERITAS

802.11n (HT40)



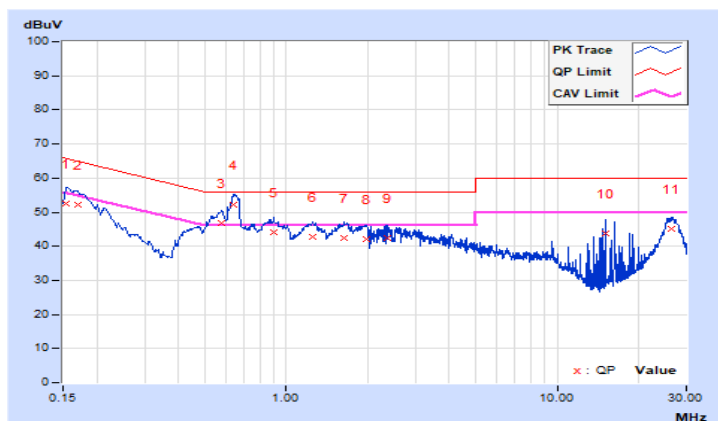
7.5 AC Power Conducted Emissions

RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	220 Vac, 60 Hz	Environmental Conditions	25°C, 75% RH
Tested By	James Chang		

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	0.15391	9.61	42.98	30.61	52.59	40.22	65.79	55.79	-13.20	-15.57
2	0.16956	9.61	42.64	30.29	52.25	39.90	64.98	54.98	-12.73	-15.08
3	0.57772	9.63	37.33	25.61	46.96	35.24	56.00	46.00	-9.04	-10.76
4	0.64001	9.64	42.57	33.96	52.21	43.60	56.00	46.00	-3.79	-2.40
5	0.89892	9.65	34.33	25.36	43.98	35.01	56.00	46.00	-12.02	-10.99
6	1.25873	9.67	32.94	24.78	42.61	34.45	56.00	46.00	-13.39	-11.55
7	1.63419	9.68	32.86	25.73	42.54	35.41	56.00	46.00	-13.46	-10.59
8	1.96710	9.69	32.31	24.88	42.00	34.57	56.00	46.00	-14.00	-11.43
9	2.35199	9.70	32.78	24.00	42.48	33.70	56.00	46.00	-13.52	-12.30
10	15.02172	9.89	33.88	12.47	43.77	22.36	60.00	50.00	-16.23	-27.64
11	26.43647	9.91	35.05	29.36	44.96	39.27	60.00	50.00	-15.04	-10.73

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

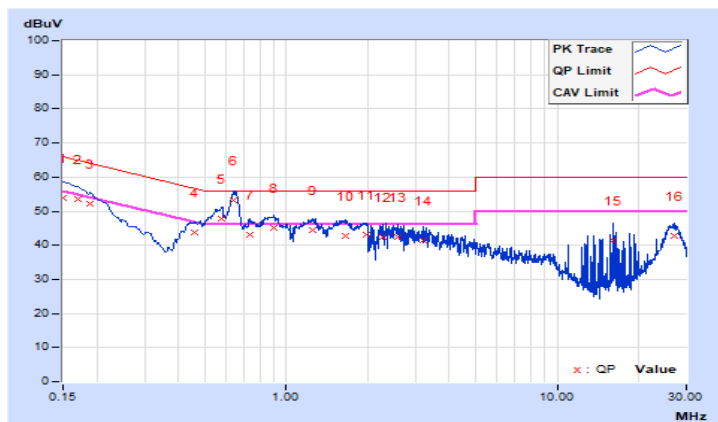


RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	220 Vac, 60 Hz	Environmental Conditions	25°C, 75% RH
Tested By	James Chang		

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	0.15000	9.63	44.26	31.44	53.89	41.07	66.00	56.00	-12.11	-14.93
2	0.16956	9.63	44.04	32.39	53.67	42.02	64.98	54.98	-11.31	-12.96
3	0.18903	9.63	42.44	32.59	52.07	42.22	64.08	54.08	-12.01	-11.86
4	0.45816	9.64	34.29	25.61	43.93	35.25	56.73	46.73	-12.80	-11.48
5	0.57431	9.65	38.31	26.98	47.96	36.63	56.00	46.00	-8.04	-9.37
6	0.64059	9.66	43.47	35.00	53.13	44.66	56.00	46.00	-2.87	-1.34
7	0.73040	9.66	33.45	24.73	43.11	34.39	56.00	46.00	-12.89	-11.61
8	0.90180	9.67	35.43	26.27	45.10	35.94	56.00	46.00	-10.90	-10.06
9	1.25091	9.69	34.64	25.85	44.33	35.54	56.00	46.00	-11.67	-10.46
10	1.64592	9.70	33.12	24.43	42.82	34.13	56.00	46.00	-13.18	-11.87
11	1.97054	9.71	33.45	25.20	43.16	34.91	56.00	46.00	-12.84	-11.09
12	2.26595	9.72	32.85	25.88	42.57	35.60	56.00	46.00	-13.43	-10.40
13	2.59838	9.72	32.82	26.06	42.54	35.78	56.00	46.00	-13.46	-10.22
14	3.19677	9.73	31.57	23.32	41.30	33.05	56.00	46.00	-14.70	-12.95
15	15.99773	9.95	31.62	10.36	41.57	20.31	60.00	50.00	-18.43	-29.69
16	26.95635	10.01	32.60	26.84	42.61	36.85	60.00	50.00	-17.39	-13.15

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



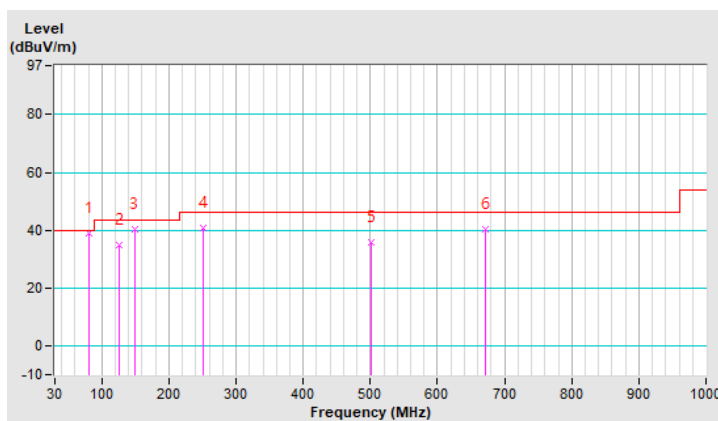
7.6 Unwanted Emissions below 1 GHz

RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	220 Vac, 60 Hz	Environmental Conditions	28°C, 76% RH
Tested By	Randy 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	80.40	38.9 QP	40.0	-1.1	1.99 H	236	57.0	-18.1
2	125.10	35.1 QP	43.5	-8.4	1.49 H	232	49.9	-14.8
3	148.30	40.5 QP	43.5	-3.0	1.99 H	47	53.7	-13.2
4	250.20	40.9 QP	46.0	-5.1	1.49 H	18	55.1	-14.2
5	500.40	35.8 QP	46.0	-10.2	1.49 H	26	43.7	-7.9
6	672.10	40.2 QP	46.0	-5.8	1.49 H	18	44.7	-4.5

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.

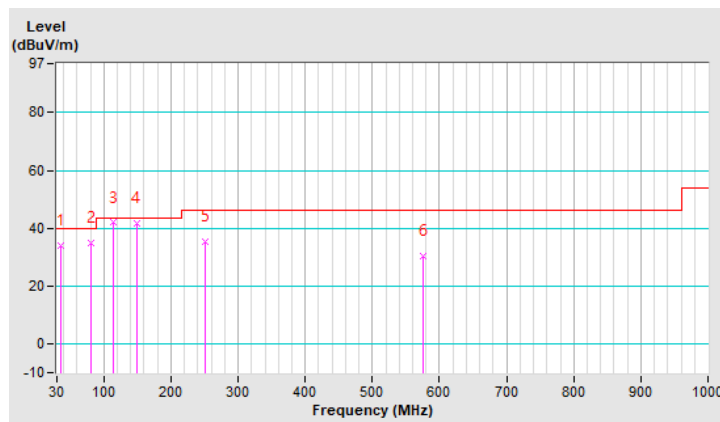


RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	220 Vac, 60 Hz	Environmental Conditions	28°C, 76% RH
Tested By	Randy Wu		

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	35.80	33.8 QP	40.0	-6.2	1.01 V	131	48.0	-14.2
2	80.40	34.7 QP	40.0	-5.3	1.50 V	103	52.8	-18.1
3	113.40	41.9 QP	43.5	-1.6	1.01 V	197	57.9	-16.0
4	148.30	41.5 QP	43.5	-2.0	1.50 V	74	54.7	-13.2
5	250.20	35.2 QP	46.0	-10.8	1.01 V	151	49.4	-14.2
6	576.10	30.2 QP	46.0	-15.8	1.01 V	78	36.4	-6.2

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

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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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	57.7 PK	74.0	-16.3	1.44 H	53	25.7	32.0
2	2390.00	44.4 AV	54.0	-9.6	1.44 H	53	12.4	32.0
3	*2412.00	106.6 PK			1.44 H	53	74.5	32.1
4	*2412.00	104.1 AV			1.44 H	53	72.0	32.1
5	4824.00	53.9 PK	74.0	-20.1	3.43 H	328	50.8	3.1
6	4824.00	49.5 AV	54.0	-4.5	3.43 H	328	46.4	3.1
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	57.4 PK	74.0	-16.6	1.67 V	353	25.4	32.0
2	2390.00	44.3 AV	54.0	-9.7	1.67 V	353	12.3	32.0
3	*2412.00	98.8 PK			1.67 V	353	66.7	32.1
4	*2412.00	96.2 AV			1.67 V	353	64.1	32.1
5	4824.00	50.4 PK	74.0	-23.6	1.50 V	91	47.3	3.1
6	4824.00	41.5 AV	54.0	-12.5	1.50 V	91	38.4	3.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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	105.1 PK			2.96 H	353	73.1	32.0
2	*2437.00	102.7 AV			2.96 H	353	70.7	32.0
3	4874.00	55.8 PK	74.0	-18.2	1.35 H	333	52.6	3.2
4	4874.00	52.2 AV	54.0	-1.8	1.35 H	333	49.0	3.2
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	98.5 PK			3.34 V	105	66.5	32.0
2	*2437.00	96.0 AV			3.34 V	105	64.0	32.0
3	4874.00	52.3 PK	74.0	-21.7	1.57 V	93	49.1	3.2
4	4874.00	45.9 AV	54.0	-8.1	1.57 V	93	42.7	3.2

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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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	105.0 PK			1.72 H	54	73.0	32.0
2	*2462.00	102.7 AV			1.72 H	54	70.7	32.0
3	2483.50	59.5 PK	74.0	-14.5	1.72 H	54	27.5	32.0
4	2483.50	48.6 AV	54.0	-5.4	1.72 H	54	16.6	32.0
5	4924.00	53.6 PK	74.0	-20.4	1.42 H	333	50.3	3.3
6	4924.00	48.3 AV	54.0	-5.7	1.42 H	333	45.0	3.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	99.4 PK			3.62 V	106	67.4	32.0
2	*2462.00	96.9 AV			3.62 V	106	64.9	32.0
3	2483.50	57.8 PK	74.0	-16.2	3.62 V	106	25.8	32.0
4	2483.50	45.6 AV	54.0	-8.4	3.62 V	106	13.6	32.0
5	4924.00	50.7 PK	74.0	-23.3	1.50 V	39	47.4	3.3
6	4924.00	43.0 AV	54.0	-11.0	1.50 V	39	39.7	3.3

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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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	61.2 PK	74.0	-12.8	1.77 H	57	29.2	32.0
2	2390.00	45.4 AV	54.0	-8.6	1.77 H	57	13.4	32.0
3	*2412.00	107.1 PK			1.77 H	57	75.0	32.1
4	*2412.00	97.0 AV			1.77 H	57	64.9	32.1
5	4824.00	49.8 PK	74.0	-24.2	1.35 H	348	46.7	3.1
6	4824.00	38.1 AV	54.0	-15.9	1.35 H	348	35.0	3.1

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	57.5 PK	74.0	-16.5	2.88 V	79	25.5	32.0
2	2390.00	44.6 AV	54.0	-9.4	2.88 V	79	12.6	32.0
3	*2412.00	102.7 PK			2.88 V	79	70.6	32.1
4	*2412.00	91.8 AV			2.88 V	79	59.7	32.1
5	4824.00	48.5 PK	74.0	-25.5	1.53 V	311	45.4	3.1
6	4824.00	36.0 AV	54.0	-18.0	1.53 V	311	32.9	3.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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	107.1 PK			2.98 H	360	75.1	32.0
2	*2437.00	96.9 AV			2.98 H	360	64.9	32.0
3	4874.00	48.1 PK	74.0	-25.9	1.72 H	30	44.9	3.2
4	4874.00	37.4 AV	54.0	-16.6	1.72 H	30	34.2	3.2

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	101.8 PK			3.95 V	87	69.8	32.0
2	*2437.00	91.8 AV			3.95 V	87	59.8	32.0
3	4874.00	47.7 PK	74.0	-26.3	1.54 V	52	44.5	3.2
4	4874.00	36.3 AV	54.0	-17.7	1.54 V	52	33.1	3.2

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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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			2.06 H	19	74.5	32.0
2	*2462.00	96.5 AV			2.06 H	19	64.5	32.0
3	2483.50	71.3 PK	74.0	-2.7	2.06 H	19	39.3	32.0
4	2483.50	53.1 AV	54.0	-0.9	2.06 H	19	21.1	32.0
5	4924.00	48.5 PK	74.0	-25.5	1.44 H	31	45.2	3.3
6	4924.00	36.8 AV	54.0	-17.2	1.44 H	31	33.5	3.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	101.6 PK			3.16 V	97	69.6	32.0
2	*2462.00	91.1 AV			3.16 V	97	59.1	32.0
3	2483.50	66.9 PK	74.0	-7.1	3.16 V	97	34.9	32.0
4	2483.50	48.2 AV	54.0	-5.8	3.16 V	97	16.2	32.0
5	4924.00	48.9 PK	74.0	-25.1	1.66 V	314	45.6	3.3
6	4924.00	36.6 AV	54.0	-17.4	1.66 V	314	33.3	3.3

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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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	60.6 PK	74.0	-13.4	1.49 H	67	28.6	32.0
2	2390.00	45.3 AV	54.0	-8.7	1.49 H	67	13.3	32.0
3	*2412.00	107.9 PK			1.49 H	67	75.8	32.1
4	*2412.00	97.0 AV			1.49 H	67	64.9	32.1
5	4824.00	48.7 PK	74.0	-25.3	1.52 H	81	45.6	3.1
6	4824.00	36.4 AV	54.0	-17.6	1.52 H	81	33.3	3.1

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	57.3 PK	74.0	-16.7	3.49 V	79	25.3	32.0
2	2390.00	44.5 AV	54.0	-9.5	3.49 V	79	12.5	32.0
3	*2412.00	102.6 PK			3.49 V	79	70.5	32.1
4	*2412.00	92.1 AV			3.49 V	79	60.0	32.1
5	4824.00	48.3 PK	74.0	-25.7	1.64 V	313	45.2	3.1
6	4824.00	35.6 AV	54.0	-18.4	1.64 V	313	32.5	3.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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	106.4 PK			1.73 H	2	74.4	32.0
2	*2437.00	96.6 AV			1.73 H	2	64.6	32.0
3	4874.00	50.5 PK	74.0	-23.5	1.56 H	341	47.3	3.2
4	4874.00	37.6 AV	54.0	-16.4	1.56 H	341	34.4	3.2
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	101.0 PK			3.33 V	81	69.0	32.0
2	*2437.00	91.5 AV			3.33 V	81	59.5	32.0
3	4874.00	48.6 PK	74.0	-25.4	3.14 V	84	45.4	3.2
4	4874.00	35.5 AV	54.0	-18.5	3.14 V	84	32.3	3.2

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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	26°C, 79% RH
Tested By	Randy 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	107.5 PK			3.01 H	358	75.5	32.0
2	*2462.00	97.3 AV			3.01 H	358	65.3	32.0
3	2483.50	73.6 PK	74.0	-0.4	3.01 H	358	41.6	32.0
4	2483.50	53.7 AV	54.0	-0.3	3.01 H	358	21.7	32.0
5	4924.00	50.5 PK	74.0	-23.5	1.54 H	81	47.2	3.3
6	4924.00	37.6 AV	54.0	-16.4	1.54 H	81	34.3	3.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	101.7 PK			3.19 V	101	69.7	32.0
2	*2462.00	91.0 AV			3.19 V	101	59.0	32.0
3	2483.50	66.1 PK	74.0	-7.9	3.19 V	101	34.1	32.0
4	2483.50	48.2 AV	54.0	-5.8	3.19 V	101	16.2	32.0
5	4924.00	48.6 PK	74.0	-25.4	1.54 V	314	45.3	3.3
6	4924.00	35.6 AV	54.0	-18.4	1.54 V	314	32.3	3.3

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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	25°C, 72% RH
Tested By	Randy 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	71.4 PK	74.0	-2.6	1.87 H	57	39.4	32.0
2	2390.00	53.8 AV	54.0	-0.2	1.87 H	57	21.8	32.0
3	*2422.00	103.4 PK			1.87 H	57	71.4	32.0
4	*2422.00	93.8 AV			1.87 H	57	61.8	32.0
5	4844.00	50.6 PK	74.0	-23.4	1.52 H	314	47.5	3.1
6	4844.00	37.3 AV	54.0	-16.7	1.52 H	314	34.2	3.1

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	65.4 PK	74.0	-8.6	3.39 V	80	33.4	32.0
2	2390.00	50.3 AV	54.0	-3.7	3.39 V	80	18.3	32.0
3	*2422.00	99.5 PK			3.39 V	80	67.5	32.0
4	*2422.00	88.8 AV			3.39 V	80	56.8	32.0
5	4844.00	48.4 PK	74.0	-25.6	3.14 V	21	45.3	3.1
6	4844.00	36.4 AV	54.0	-17.6	3.14 V	21	33.3	3.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	25°C, 72% RH
Tested By	Randy 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	103.7 PK			1.94 H	46	71.7	32.0
2	*2437.00	93.1 AV			1.94 H	46	61.1	32.0
3	4874.00	50.7 PK	74.0	-23.3	1.64 H	314	47.5	3.2
4	4874.00	37.5 AV	54.0	-16.5	1.64 H	314	34.3	3.2
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	98.7 PK			3.35 V	86	66.7	32.0
2	*2437.00	88.7 AV			3.35 V	86	56.7	32.0
3	4874.00	48.6 PK	74.0	-25.4	3.14 V	85	45.4	3.2
4	4874.00	36.4 AV	54.0	-17.6	3.14 V	85	33.2	3.2

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 = 10 Hz
Input Power	220 Vac, 60 Hz	Environmental Conditions	25°C, 72% RH
Tested By	Randy 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	*2452.00	99.6 PK			2.94 H	359	67.7	31.9
2	*2452.00	89.1 AV			2.94 H	359	57.2	31.9
3	2483.50	73.8 PK	74.0	-0.2	2.94 H	359	41.8	32.0
4	2483.50	53.7 AV	54.0	-0.3	2.94 H	359	21.7	32.0
5	4904.00	50.9 PK	74.0	-23.1	3.11 H	28	47.7	3.2
6	4904.00	37.8 AV	54.0	-16.2	3.11 H	28	34.6	3.2

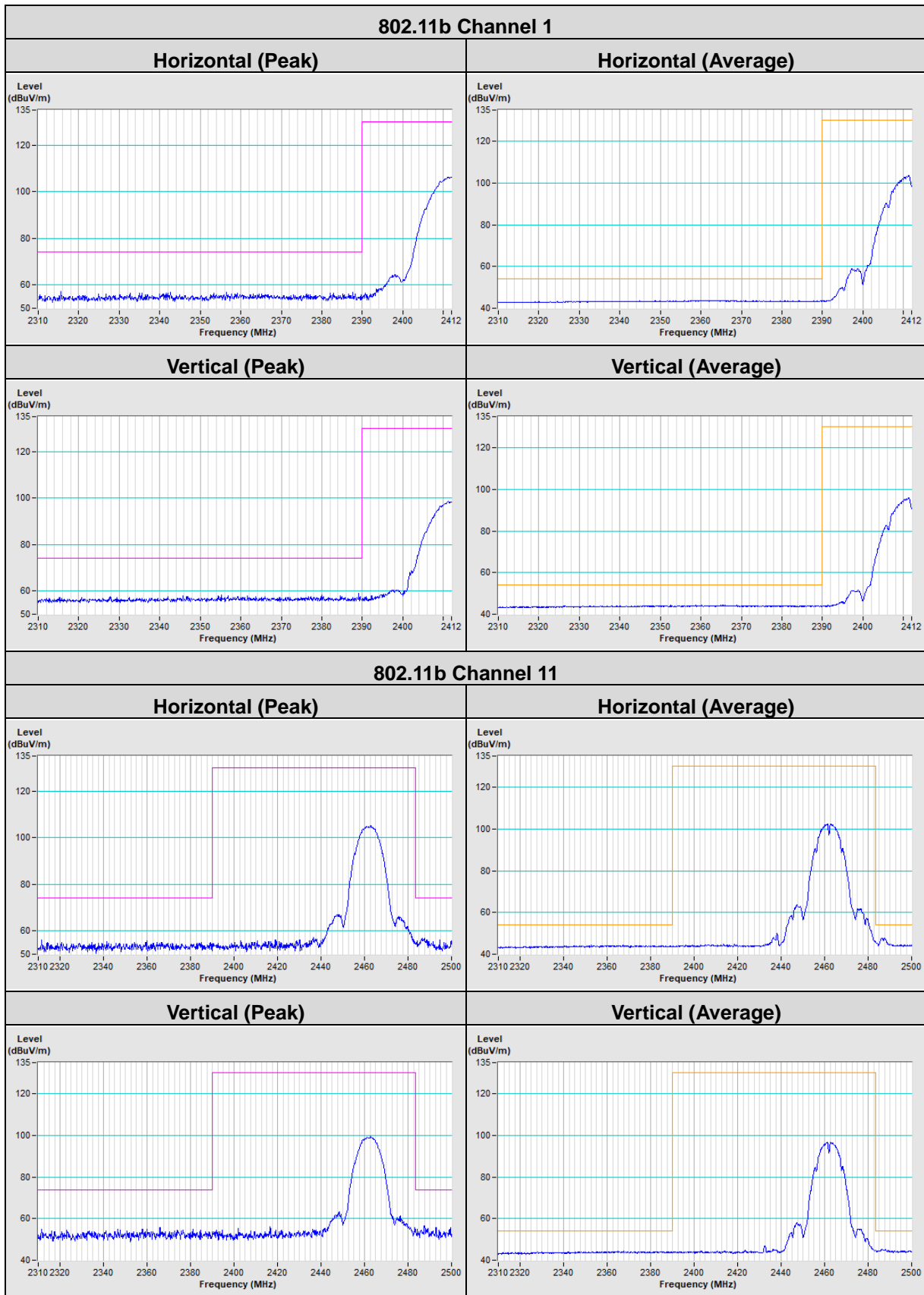
Antenna Polarity & Test Distance : Vertical at 3 m

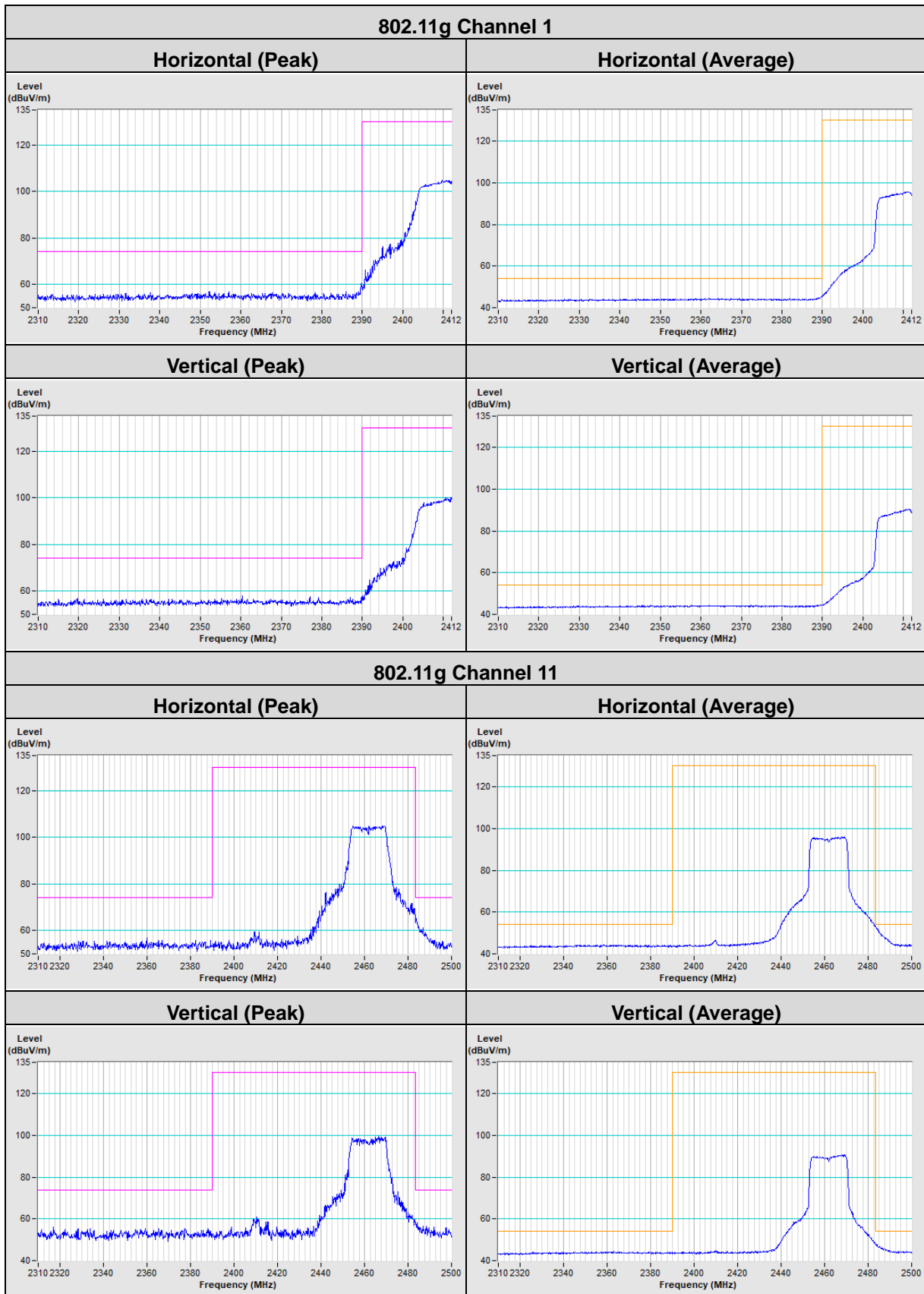
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	92.9 PK			3.09 V	93	61.0	31.9
2	*2452.00	82.8 AV			3.09 V	93	50.9	31.9
3	2483.50	68.0 PK	74.0	-6.0	3.09 V	93	36.0	32.0
4	2483.50	49.8 AV	54.0	-4.2	3.09 V	93	17.8	32.0
5	4904.00	48.6 PK	74.0	-25.4	1.64 V	314	45.4	3.2
6	4904.00	36.5 AV	54.0	-17.5	1.64 V	314	33.3	3.2

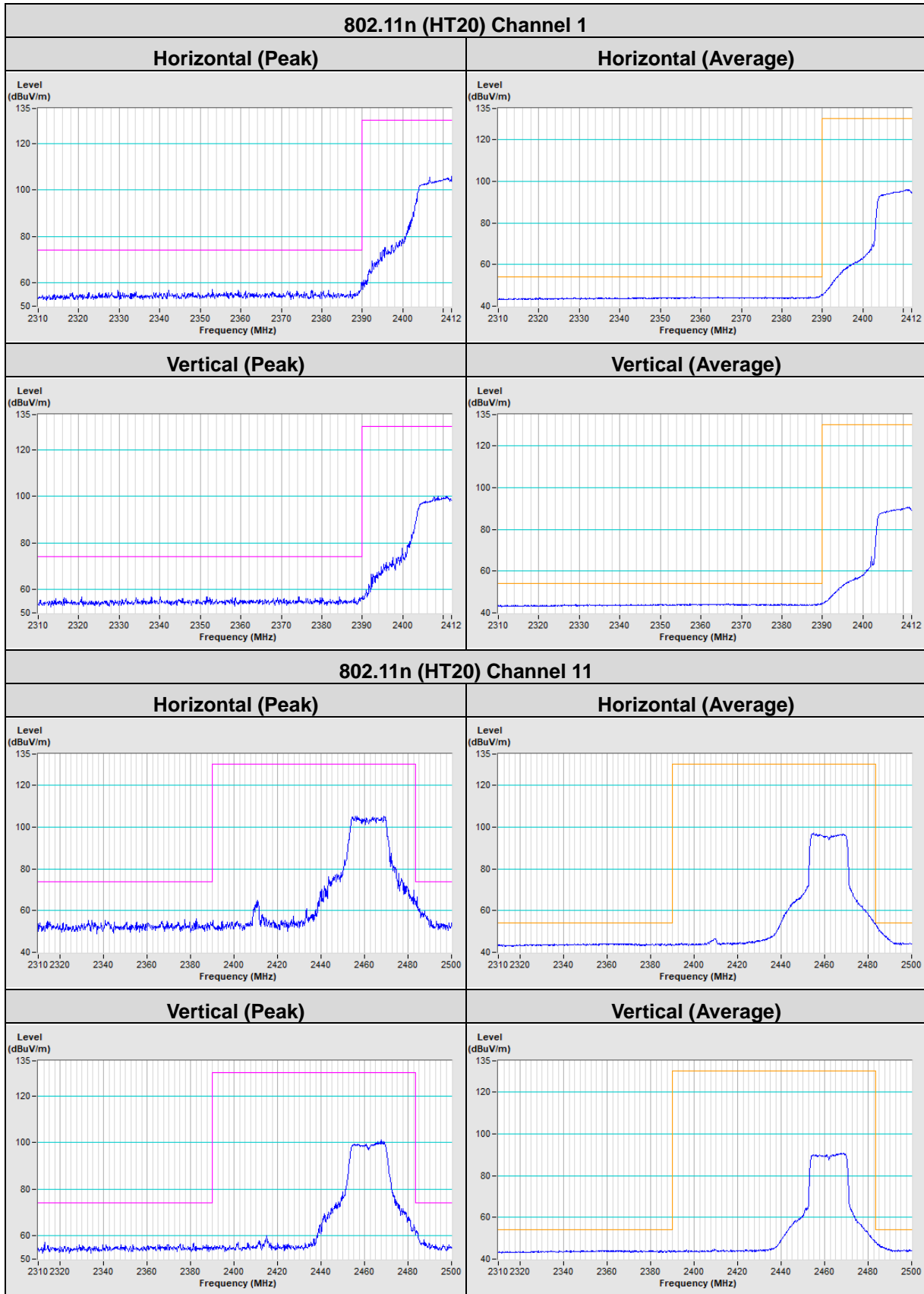
Remarks:

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

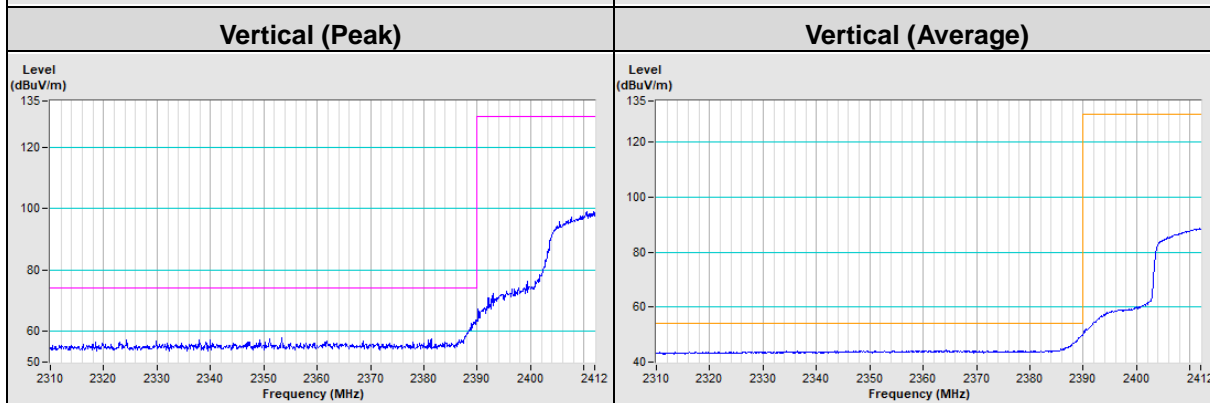
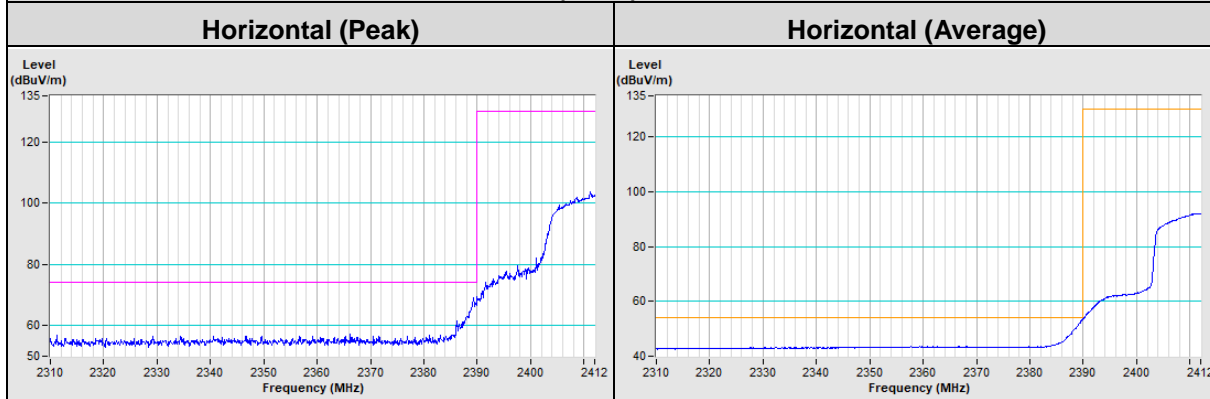
Plot of Band Edge



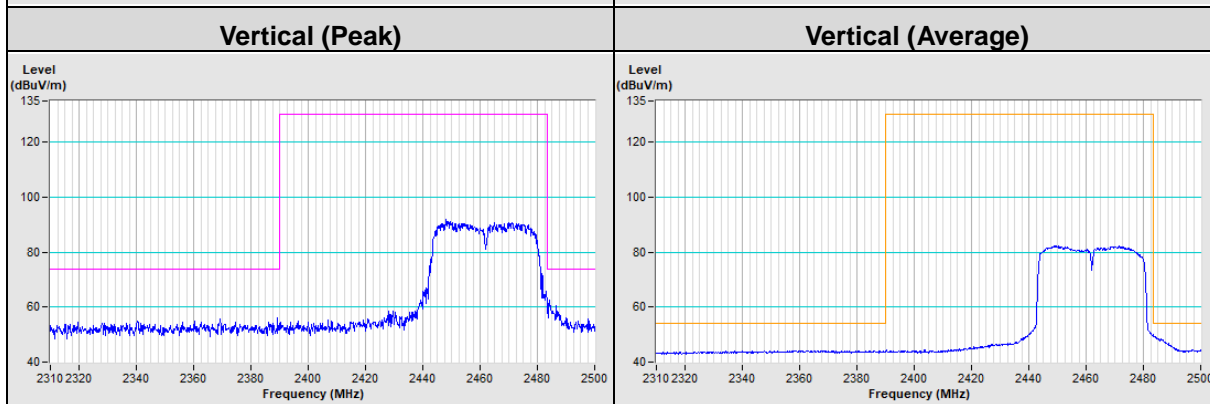
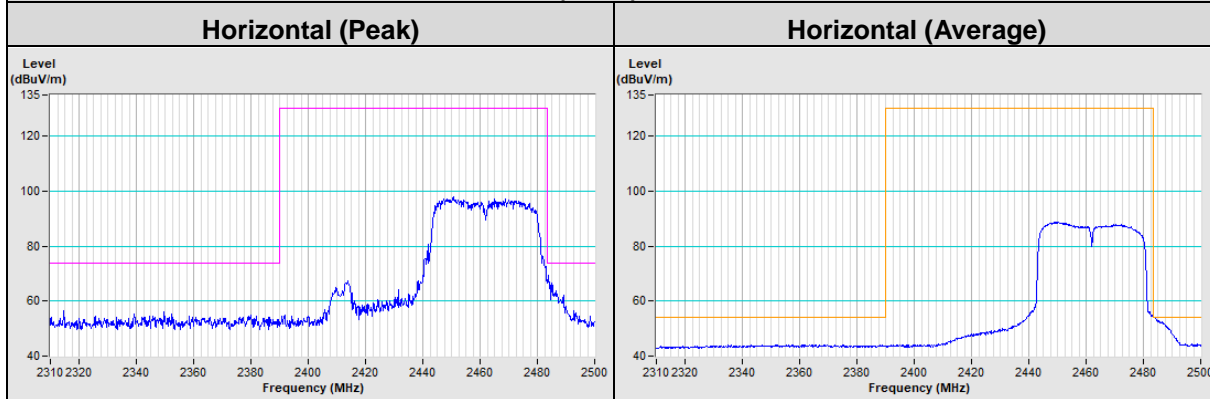




802.11n (HT40) Channel 3



802.11n (HT40) Channel 9



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:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

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

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