

Partial FCC Test Report

Report No.: RF181222C02D

FCC ID: PPD-QCNFA344AH

Test Model: QCNFA344A

Received Date: Oct. 25, 2018

Test Date: Oct. 25, 2018 ~ Jan. 29, 2019

Issued Date: Feb. 01, 2019

Applicant: Qualcomm Atheros, Inc.

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

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(R.O.C)

Test Location: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan
Hsien 333, Taiwan, R.O.C.

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF181222C02D	Original Release	Feb. 01, 2019

1 Certificate of Conformity

Product: 802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card

Brand: Qualcomm Atheros

Test Model: QCNFA344A

Sample Status: Engineering Sample

Applicant: Qualcomm Atheros, Inc.

Test Date: Oct. 25, 2018 ~ Jan. 29, 2019

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Gina Liu, **Date:** Feb. 01, 2019
Gina Liu / Specialist

Approved by : Dylan Chiou, **Date:** Feb. 01, 2019
Dylan Chiou / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -11.47 dB at 0.54645 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.56 dB at 2483.84 MHz.
15.247(d)	Antenna Port Emission	N/A	Refer to Note 1
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to Note 1
---	Occupied Bandwidth Measurement	Pass	Reference only
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	N/A	Refer to Note 1
15.203	Antenna Requirement	N/A	Refer to Note 1

Note:

1. This report is a partial report, only test item of Conducted Emissions, Radiated Emissions and Conducted power were performed for this report. Other testing data please refer to BV CPS report no.: RF150107E06B for module (Brand: Qualcomm Atheros, Model: QCNFA344A).
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand	Qualcomm Atheros
Test Model	QCNFA344A
Status of EUT	Engineering Sample
Power Supply Rating	3.3 Vdc (host equipment)
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 300.0 Mbps
Operating Frequency	2412 ~ 2472 MHz
Number of Channel	13 for 802.11b, 802.11g, 802.11n (HT20) 9 for 802.11n (HT40)
Output Power	337.40 mW
Antenna Type	Refer to Note as below
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT was installed in a specific End-product.

Equipment Name	Brand Name	Model Name	Difference
Notebook Computer	Lenovo	Lenovo 14w*****, 81MQ*****, Lenovo 14e Chromebook*****, 81MH***** (*=0~9, A~Z, a~z, "-" or blank, for marketing use only, with no impact on RF compliance of the product)	All models are electrically identical, different model names are for marketing purpose.

2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx Function
802.11b	2TX
802.11g	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX
802.11ac (HT20)	2TX
802.11ac (HT40)	2TX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for HT20 / HT40, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

3. The antenna information is listed as below.

Antenna Type	Manufacturer	Parts Number	Antenna Gain			
			BT/WLAN 2.4 GHz	WLAN 5.15~5.35 GHz	WLAN 5.47~5.725 GHz	WLAN 5.725~5.85 GHz
PIFA	High-Tek Electronics Co., Ltd.	Main Ant.: 0ACCN018024N Aux Ant.: 0ACCN018025N	Main: -0.56 Aux.: -2.41	Main: -0.05 Aux.: -1.14	Main: -0.73 Aux.: -1.79	Main: -1.98 Aux.: -3.33
PIFA	Yageo Corporation	Main Ant.: ANTA0LC13081WLAN1 (DC330029600) Aux Ant.: ANTA0LC13081WLAN2 (DC330029610)	Main: -0.59 Aux.: -0.69	Main: -0.34 Aux.: -0.08	Main: -2.43 Aux.: -0.76	Main: -2.01 Aux.: -4.32

4. The End-product contains following accessory devices.

Product	Brand	Model	Description
Adapter	Lenovo	ADLX45YLC3D	I/P: 100-240 Vac, 50-60 Hz, 1300 mA O/P: 20 Vdc, 2.25 A / 15 Vdc, 3.0A / 9Vdc, 2.0 A / 5 Vdc, 2.0 A
Battery	Lenovo	L18D3PG2	11.52 Vdc, 4955 mAh

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

3.2 Description of Test Modes

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442		

9 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	8	2447
4	2427	9	2452
5	2432	10	2457
6	2437	11	2462
7	2442		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	-	-

Where **RE $\geq$ 1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of Laptop mode and Tablet mode. The worst case was found when positioned on **Laptop mode**.

NOTE: "-" means no effect.

Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 13	1, 6, 11, 12, 13	DSSS	DBPSK	1.0
-	802.11g	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 11	3, 6, 9, 10, 11	OFDM	BPSK	13.5

Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	1 to 13	12	OFDM	BPSK	6.0

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	1 to 13	12	OFDM	BPSK	6.0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang

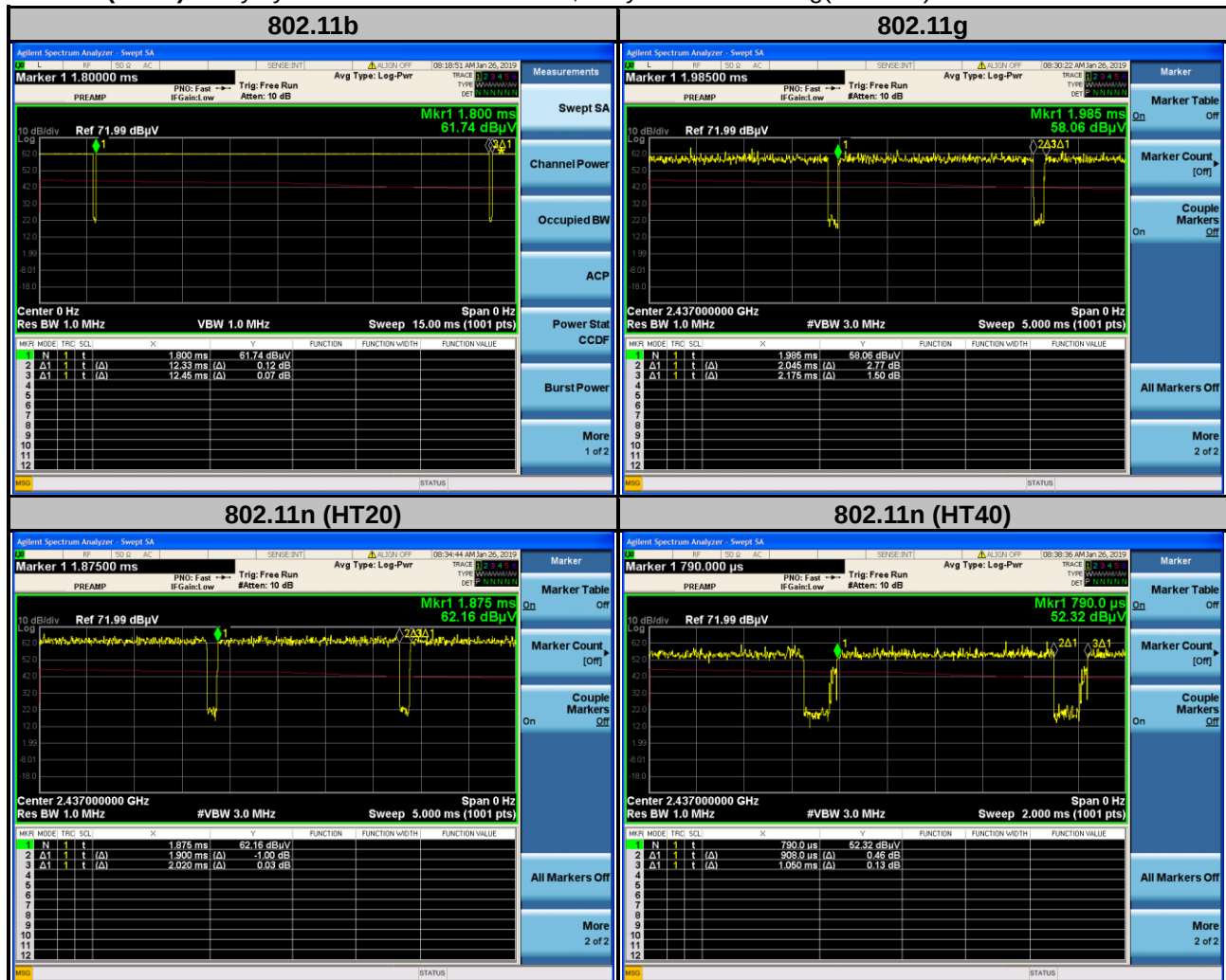
3.3 Duty Cycle of Test Signal

802.11b: Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11g: Duty cycle = $2.045/2.175 = 0.94$, Duty factor = $10 * \log(1/0.94) = 0.27$

802.11n (HT20): Duty cycle = $1.90/2.02 = 0.941$, Duty factor = $10 * \log(1/0.941) = 0.26$

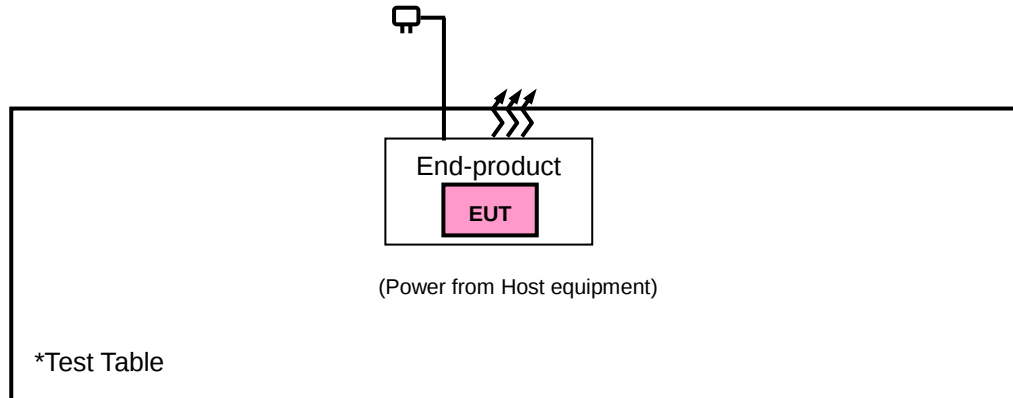
802.11n (HT40): Duty cycle = $0.908/1.050 = 0.865$, Duty factor = $10 * \log(1/0.865) = 6.30$



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

KDB 558074 D01 15.247 Meas Guidance v05

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions 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

NOTE:

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.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 16, 2018	Mar. 15, 2019
Spectrum Analyzer Agilent	N9010A	MY52220314	Nov. 22, 2017	Nov. 21, 2018
			Dec. 13, 2018	Dec. 12, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
Broadband Horn Antenna SCHWARZBECK	BBHA 9170	148	Dec. 13, 2017	Dec. 12, 2018
			Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Dec. 12, 2017	Dec. 11, 2018
			Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Dec. 06, 2017	Dec. 05, 2018
			Nov. 23, 2018	Nov. 22, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
Loop Antenna	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier EMCI	EMC001340	980201	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 012645	980115	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 330H	980112	Oct. 12, 2018	Oct. 11, 2019
Power Meter Anritsu	ML2495A	1012010	Sep. 05, 2018	Sep. 04, 2019
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2018	Sep. 03, 2019
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-800 0&3000	140811+170717	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-100 0(140807)	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 12, 2018	Oct. 11, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019
DC Power Supply Topward	33010D	807748	NA	NA
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The IC Site Registration No. is 7450F-10.

4.1.3 Test Procedures

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 a 3 meter chamber room. 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.

Note:

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

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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.
- f. The test-receiver system was set to peak and average detected 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.

Note:

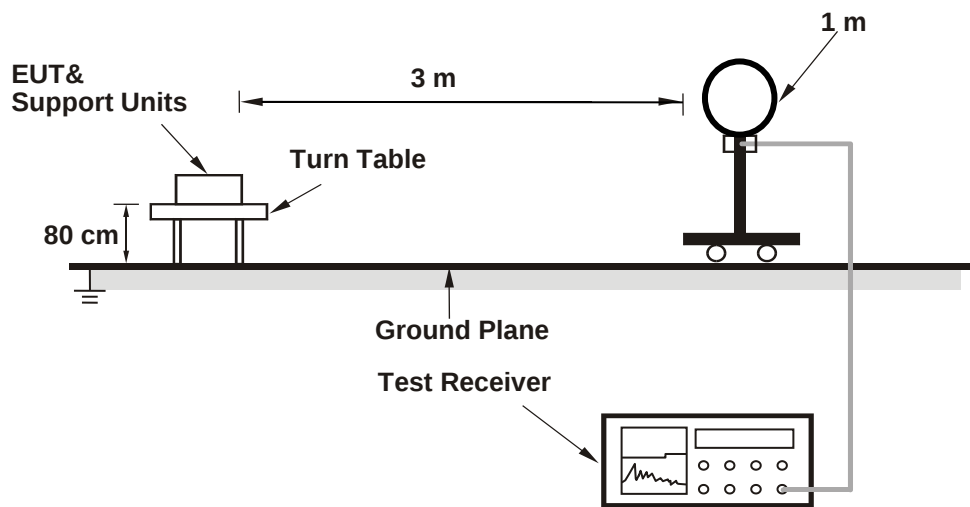
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. 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.
(11b: RBW = 1 MHz, VBW = 100 Hz ; 11g: RBW = 1 MHz, VBW = 1 kHz ;
11n (HT20): RBW = 1 MHz, VBW = 1 kHz ; 11n (HT40): RBW = 1 MHz, VBW = 3 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

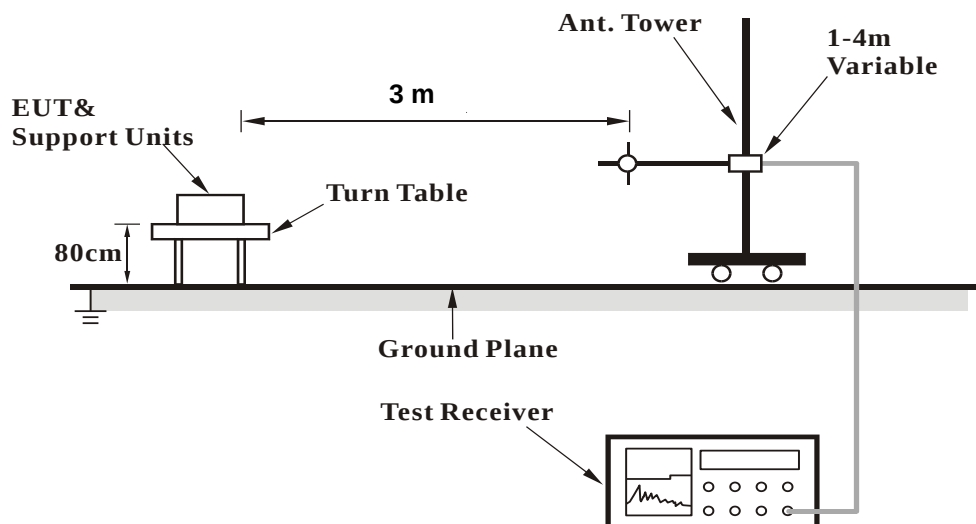
No deviation.

4.1.5 Test Set Up

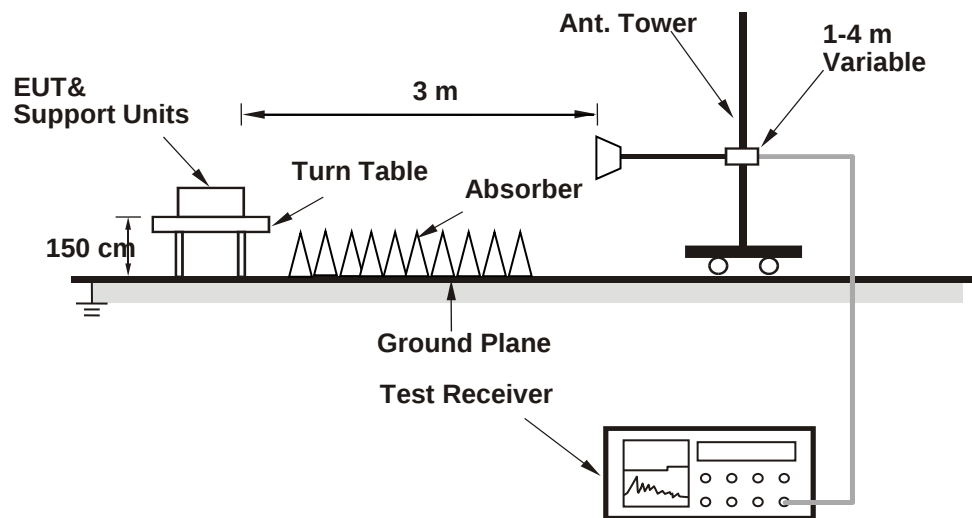
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

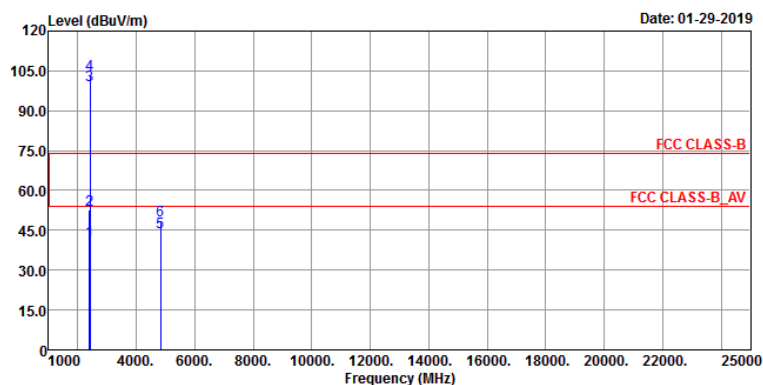
- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

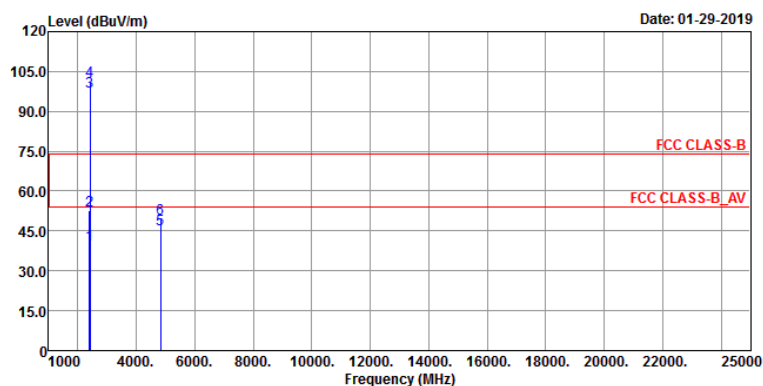
Above 1 GHz Data :
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



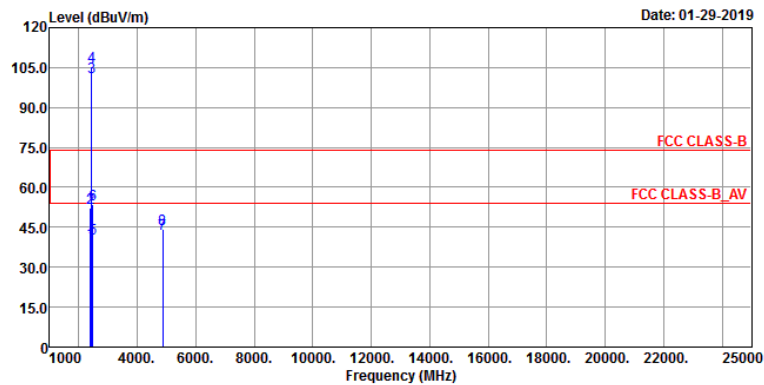
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.37	47.37	54	-12.63	27.16	4.36	37.52	158	75	Average
2390	52.73	58.73	74	-21.27	27.16	4.36	37.52	158	75	Peak
2412	99.79	105.7			27.23	4.38	37.52	158	75	Average
2412	103.49	109.4			27.23	4.38	37.52	158	75	Peak
4824	44.15	59.06	54	-9.85	31.17	6.81	52.89	152	111	Average
4824	48.52	63.43	74	-25.48	31.17	6.81	52.89	152	111	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	39.75	45.75	54	-14.25	27.16	4.36	37.52	187	95	Average
2390	52.5	58.5	74	-21.5	27.16	4.36	37.52	187	95	Peak
2412	97.63	103.54			27.23	4.38	37.52	187	95	Average
2412	101.41	107.32			27.23	4.38	37.52	187	95	Peak
4824	45.52	60.43	54	-8.48	31.17	6.81	52.89	165	231	Average
4824	49.63	64.54	74	-24.37	31.17	6.81	52.89	165	231	Peak

Remarks:

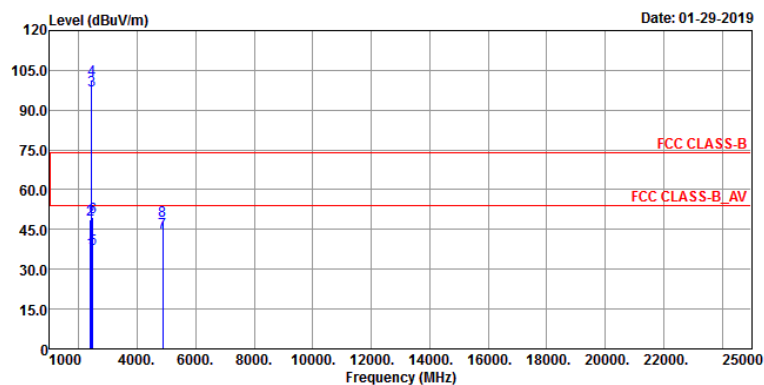
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



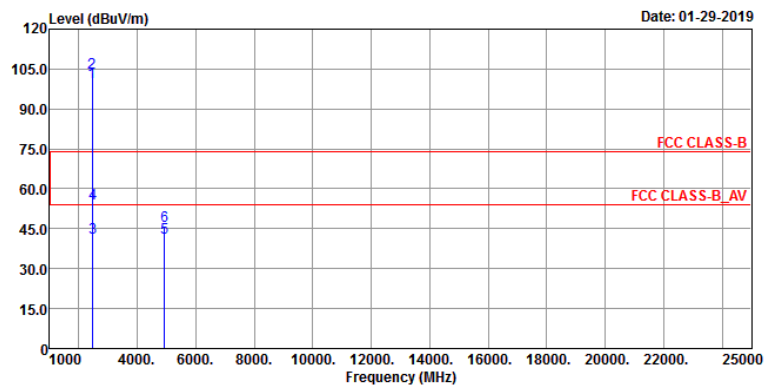
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	39.63	45.63	54	-14.37	27.16	4.36	37.52	137	70	Average
2390	52.34	58.34	74	-21.66	27.16	4.36	37.52	137	70	Peak
2437	101.26	106.94			27.38	4.4	37.46	137	70	Average
2437	105.34	111.02			27.38	4.4	37.46	137	70	Peak
2483.5	40.79	46.15	54	-13.21	27.53	4.43	37.32	137	70	Average
2483.5	53.44	58.8	74	-20.56	27.53	4.43	37.32	137	70	Peak
4874	42.5	57.25	54	-11.5	31.25	6.86	52.86	132	251	Average
4874	44.4	59.15	74	-29.6	31.25	6.86	52.86	132	251	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.81	42.81	54	-17.19	27.16	4.36	37.52	100	184	Average
2390	48.76	54.76	74	-25.24	27.16	4.36	37.52	100	184	Peak
2437	97.35	103.03			27.38	4.4	37.46	100	184	Average
2437	101.34	107.02			27.38	4.4	37.46	100	184	Peak
2483.5	37.82	43.18	54	-16.18	27.53	4.43	37.32	100	184	Average
2483.5	49.59	54.95	74	-24.41	27.53	4.43	37.32	100	184	Peak
4874	44	58.75	54	-10	31.25	6.86	52.86	154	352	Average
4874	48.38	63.13	74	-25.62	31.25	6.86	52.86	154	352	Peak

Remarks:

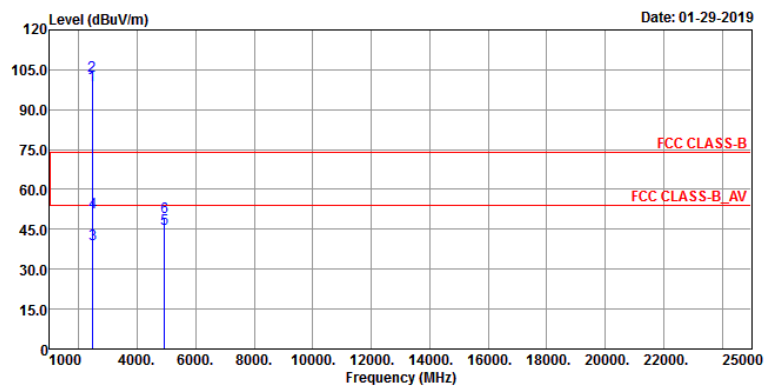
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



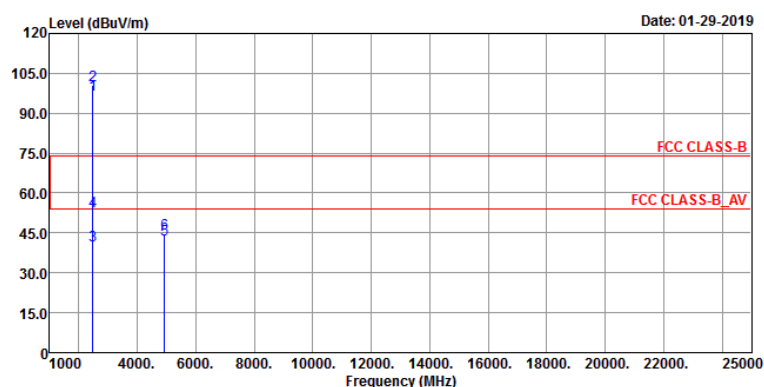
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	99.99	105.51			27.46	4.41	37.39	153	70	Average
2462	103.74	109.26			27.46	4.41	37.39	153	70	Peak
2483.5	41.68	47.04	54	-12.32	27.53	4.43	37.32	153	70	Average
2483.5	54.42	59.78	74	-19.58	27.53	4.43	37.32	153	70	Peak
4924	41.52	56.18	54	-12.48	31.34	6.89	52.89	165	231	Average
4924	46	60.66	74	-28	31.34	6.89	52.89	165	231	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	99.24	104.76			27.46	4.41	37.39	200	90	Average
2462	102.89	108.41			27.46	4.41	37.39	200	90	Peak
2483.5	39.2	44.56	54	-14.8	27.53	4.43	37.32	200	90	Average
2483.5	51.51	56.87	74	-22.49	27.53	4.43	37.32	200	90	Peak
4924	45.12	59.78	54	-8.88	31.34	6.89	52.89	185	214	Average
4924	49.78	64.44	74	-24.22	31.34	6.89	52.89	185	214	Peak

Remarks:

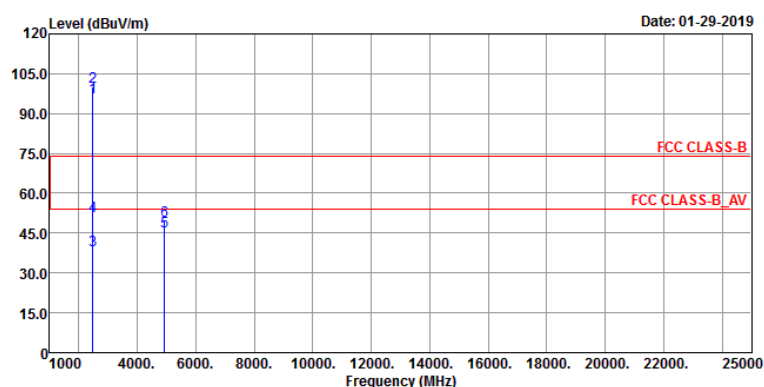
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



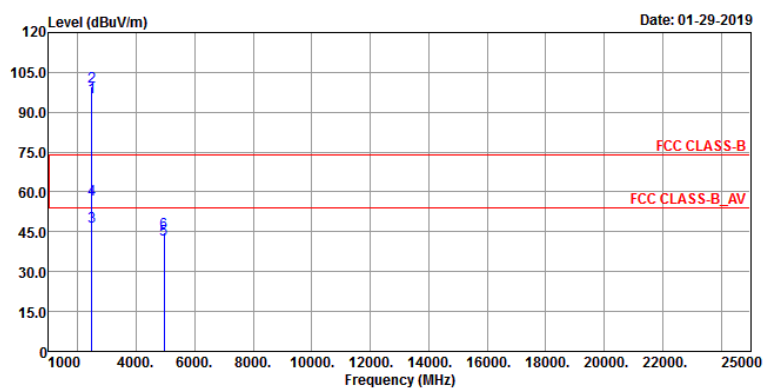
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	96.91	102.35			27.46	4.42	37.32	157	70	Average
2467	100.51	105.95			27.46	4.42	37.32	157	70	Peak
2483.5	40.19	45.55	54	-13.81	27.53	4.43	37.32	157	70	Average
2483.5	53.26	58.62	74	-20.74	27.53	4.43	37.32	157	70	Peak
4934	42.51	57.17	54	-11.49	31.34	6.89	52.89	111	165	Average
4934	44.86	59.52	74	-29.14	31.34	6.89	52.89	111	165	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	96.14	101.58			27.46	4.42	37.32	200	89	Average
2467	99.86	105.3			27.46	4.42	37.32	200	89	Peak
2483.5	38.47	43.83	54	-15.53	27.53	4.43	37.32	200	89	Average
2483.5	51.24	56.6	74	-22.76	27.53	4.43	37.32	200	89	Peak
4934	45.52	60.18	54	-8.48	31.34	6.89	52.89	165	285	Average
4934	49.58	64.24	74	-24.42	31.34	6.89	52.89	165	285	Peak

Remarks:

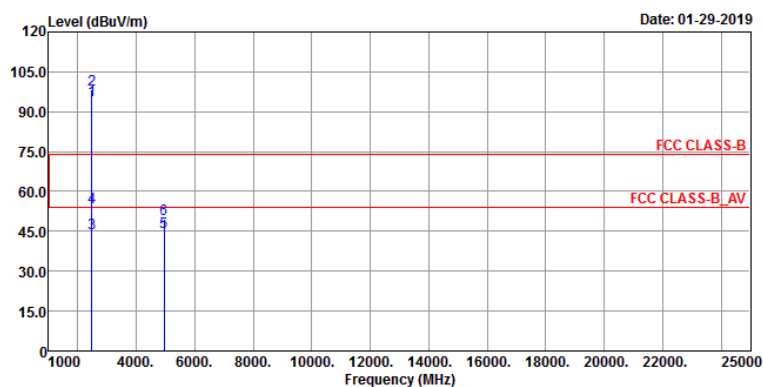
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	95.63	101			27.53	4.42	37.32	155	70	Average
2472	99.61	104.98			27.53	4.42	37.32	155	70	Peak
2483.5	47	52.36	54	-7.00	27.53	4.43	37.32	155	70	Average
2483.5	57.19	62.55	74	-16.81	27.53	4.43	37.32	155	70	Peak
4944	42.15	56.81	54	-11.85	31.37	6.89	52.92	147	152	Average
4944	44.52	59.18	74	-29.48	31.37	6.89	52.92	147	152	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	94.16	99.53			27.53	4.42	37.32	200	92	Average
2472	98.3	103.67			27.53	4.42	37.32	200	92	Peak
2483.5	44.35	49.71	54	-9.65	27.53	4.43	37.32	200	92	Average
2483.5	54.05	59.41	74	-19.95	27.53	4.43	37.32	200	92	Peak
4944	44.85	59.51	54	-9.15	31.37	6.89	52.92	152	231	Average
4944	49.52	64.18	74	-24.48	31.37	6.89	52.92	152	231	Peak

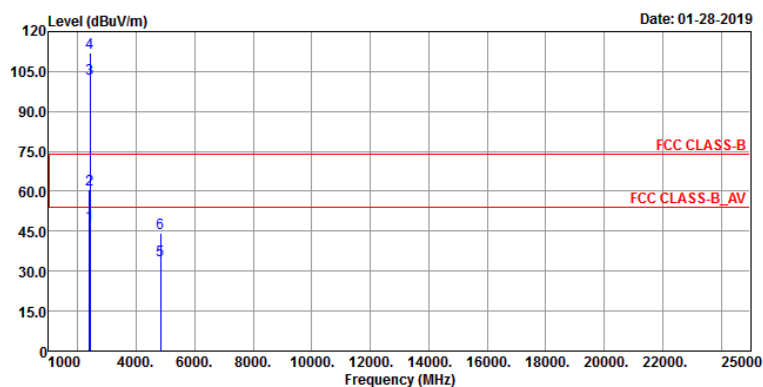
Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2472 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

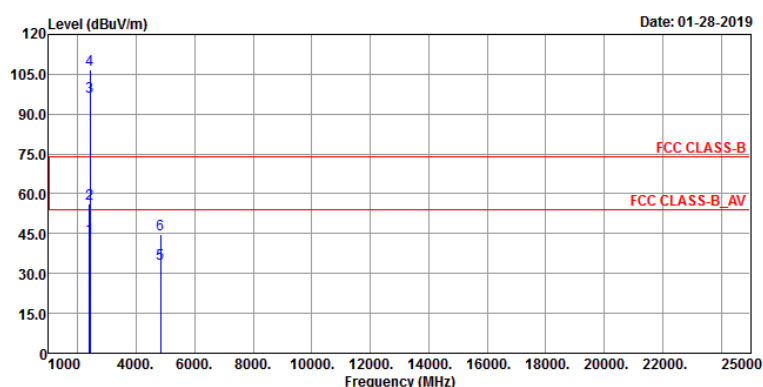
802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



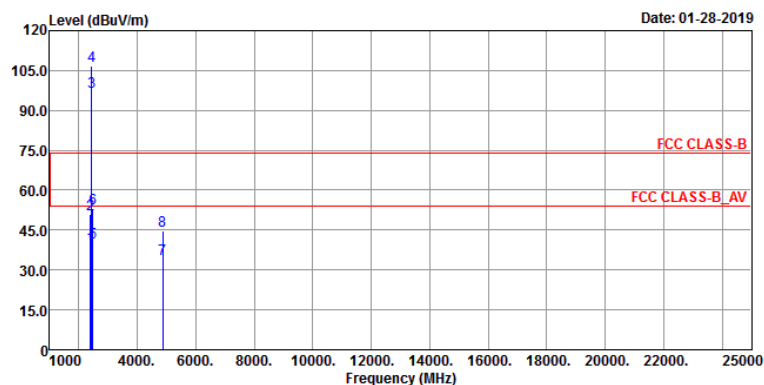
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	47.57	53.57	54	-6.43	27.16	4.36	37.52	147	68	Average
2389.94	60.48	66.48	74	-13.52	27.16	4.36	37.52	147	68	Peak
2412	102.24	108.15			27.23	4.38	37.52	147	68	Average
2412	112.24	118.15			27.23	4.38	37.52	147	68	Peak
4824	34.16	49.07	54	-19.84	31.17	6.81	52.89	182	134	Average
4824	44.14	59.05	74	-29.86	31.17	6.81	52.89	182	134	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	43.43	49.43	54	-10.57	27.16	4.36	37.52	110	276	Average
2389.94	56.43	62.43	74	-17.57	27.16	4.36	37.52	110	276	Peak
2412	96.69	102.6			27.23	4.38	37.52	110	276	Average
2412	106.69	112.6			27.23	4.38	37.52	110	276	Peak
4824	33.62	48.53	54	-20.38	31.17	6.81	52.89	118	219	Average
4824	44.53	59.44	74	-29.47	31.17	6.81	52.89	118	219	Peak

Remarks:

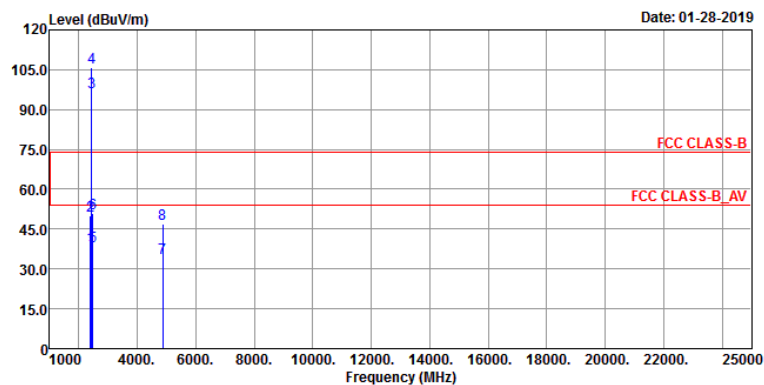
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



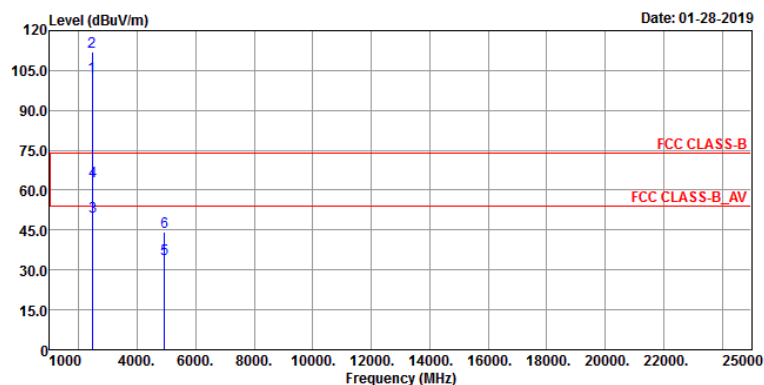
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	38.77	44.77	54	-15.23	27.16	4.36	37.52	155	70	Average
2390	50.97	56.97	74	-23.03	27.16	4.36	37.52	155	70	Peak
2437	97.01	102.69			27.38	4.4	37.46	155	70	Average
2437	106.58	112.26			27.38	4.4	37.46	155	70	Peak
2483.5	40.43	45.79	54	-13.57	27.53	4.43	37.32	155	70	Average
2483.5	52.99	58.35	74	-21.01	27.53	4.43	37.32	155	70	Peak
4874	34.14	48.89	54	-19.86	31.25	6.86	52.86	193	167	Average
4874	44.72	59.47	74	-29.28	31.25	6.86	52.86	193	167	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	38.44	44.44	54	-15.56	27.16	4.36	37.52	200	92	Average
2390	50.14	56.14	74	-23.86	27.16	4.36	37.52	200	92	Peak
2437	96.52	102.2			27.38	4.4	37.46	200	92	Average
2437	105.95	111.63			27.38	4.4	37.46	200	92	Peak
2483.5	38.74	44.1	54	-15.26	27.53	4.43	37.32	200	92	Average
2483.5	50.72	56.08	74	-23.28	27.53	4.43	37.32	200	92	Peak
4874	34.01	48.76	54	-19.99	31.25	6.86	52.86	111	123	Average
4874	46.87	61.62	74	-27.13	31.25	6.86	52.86	111	123	Peak

Remarks:

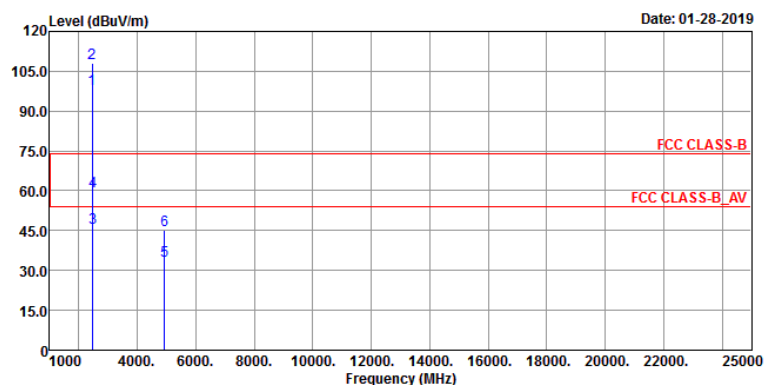
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



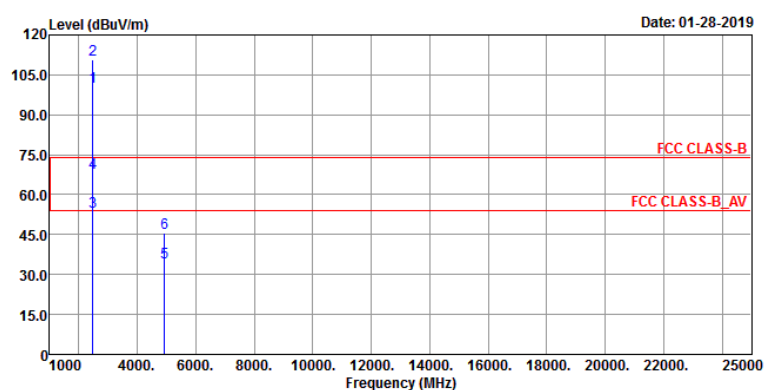
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	102.72	108.24			27.46	4.41	37.39	135	69	Average
2462	112.16	117.68			27.46	4.41	37.39	135	69	Peak
2483.52	50.22	55.58	54	-3.78	27.53	4.43	37.32	135	69	Average
2483.52	63.42	68.78	74	-10.58	27.53	4.43	37.32	135	69	Peak
4924	34.23	48.89	54	-19.77	31.34	6.89	52.89	200	315	Average
4924	44.15	58.81	74	-29.85	31.34	6.89	52.89	200	315	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	98.14	103.66			27.46	4.41	37.39	109	276	Average
2462	108.15	113.67			27.46	4.41	37.39	109	276	Peak
2483.52	46.03	51.39	54	-7.97	27.53	4.43	37.32	109	276	Average
2483.52	59.69	65.05	74	-14.31	27.53	4.43	37.32	109	276	Peak
4924	33.68	48.34	54	-20.32	31.34	6.89	52.89	105	316	Average
4924	44.94	59.6	74	-29.06	31.34	6.89	52.89	105	316	Peak

Remarks:

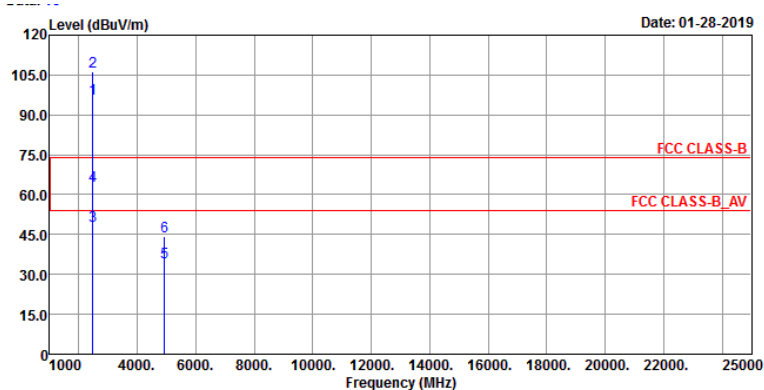
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



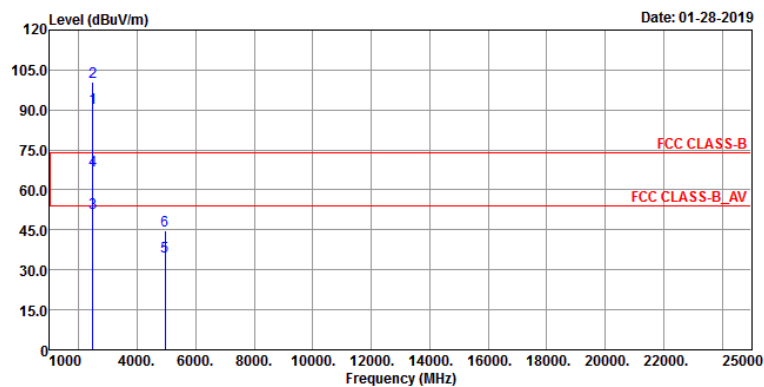
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	100.58	106.02			27.46	4.42	37.32	100	75	Average
2467	110.65	116.09			27.46	4.42	37.32	100	75	Peak
2483.84	53.44	58.8	54	-0.56	27.53	4.43	37.32	100	75	Average
2483.84	68.27	73.63	74	-5.73	27.53	4.43	37.32	100	75	Peak
4934	34.72	49.38	54	-19.28	31.34	6.89	52.89	175	179	Average
4934	45.58	60.24	74	-28.42	31.34	6.89	52.89	175	179	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	96.13	101.57			27.46	4.42	37.32	109	273	Average
2467	106.13	111.57			27.46	4.42	37.32	109	273	Peak
2483.56	48.17	53.53	54	-5.83	27.53	4.43	37.32	109	273	Average
2483.56	63.47	68.83	74	-10.53	27.53	4.43	37.32	109	273	Peak
4934	34.42	49.08	54	-19.58	31.34	6.89	52.89	104	101	Average
4934	44.48	59.14	74	-29.52	31.34	6.89	52.89	104	101	Peak

Remarks:

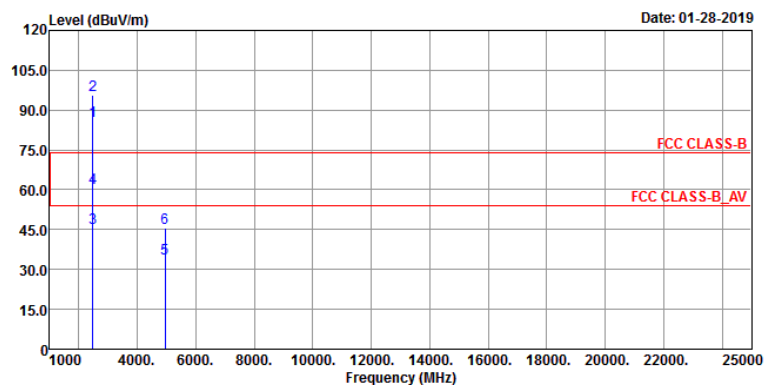
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	90.6	95.97			27.53	4.42	37.32	101	69	Average
2472	100.61	105.98			27.53	4.42	37.32	101	69	Peak
2483.52	51.3	56.66	54	-2.7	27.53	4.43	37.32	101	69	Average
2483.52	67.46	72.82	74	-6.54	27.53	4.43	37.32	101	69	Peak
4944	34.97	49.63	54	-19.03	31.37	6.89	52.92	168	203	Average
4944	44.63	59.29	74	-29.37	31.37	6.89	52.92	168	203	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	85.74	91.11			27.53	4.42	37.32	110	266	Average
2472	95.68	101.05			27.53	4.42	37.32	110	266	Peak
2483.52	45.65	51.01	54	-8.35	27.53	4.43	37.32	110	266	Average
2483.52	60.55	65.91	74	-13.45	27.53	4.43	37.32	110	266	Peak
4944	34.31	48.97	54	-19.69	31.37	6.89	52.92	101	106	Average
4944	45.72	60.38	74	-28.28	31.37	6.89	52.92	101	106	Peak

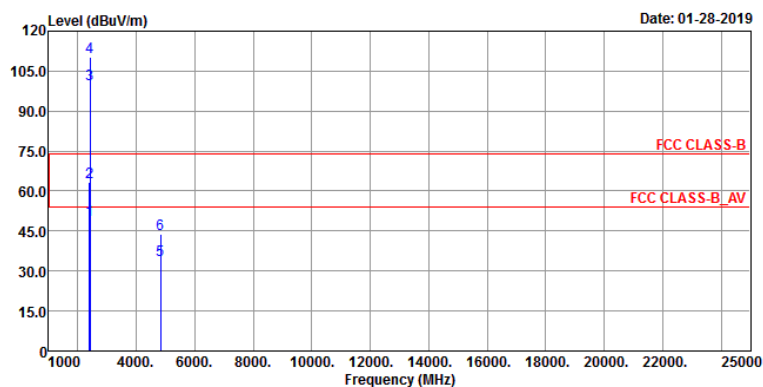
Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2472 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

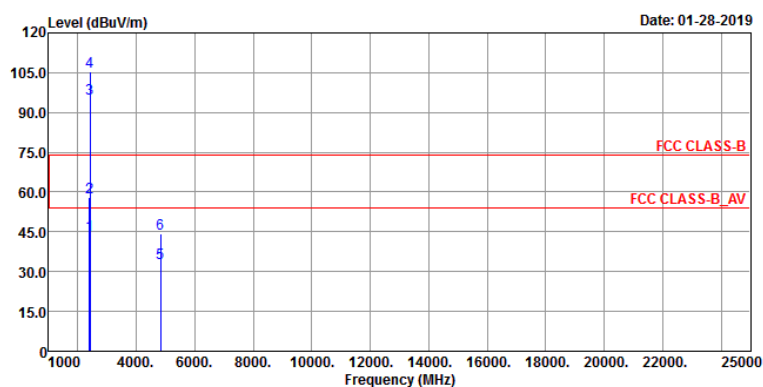
802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



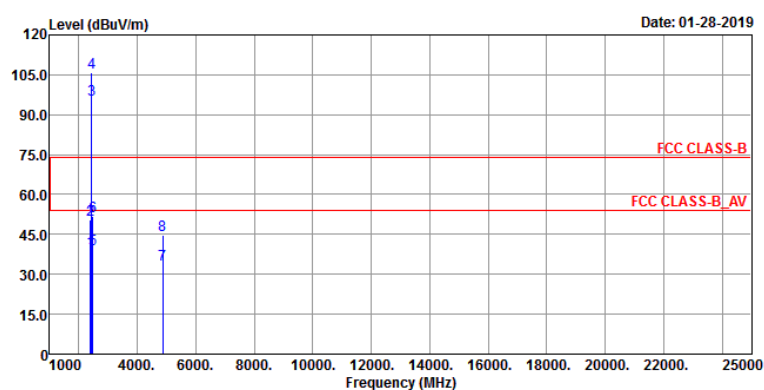
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	49.07	55.07	54	-4.93	27.16	4.36	37.52	138	79	Average
2389.94	63.45	69.45	74	-10.55	27.16	4.36	37.52	138	79	Peak
2412	100.28	106.19			27.23	4.38	37.52	138	79	Average
2412	110.28	116.19			27.23	4.38	37.52	138	79	Peak
4824	34.01	48.92	54	-19.99	31.17	6.81	52.89	184	223	Average
4824	44.03	58.94	74	-29.97	31.17	6.81	52.89	184	223	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	43.78	49.78	54	-10.22	27.16	4.36	37.52	113	275	Average
2389.94	58.14	64.14	74	-15.86	27.16	4.36	37.52	113	275	Peak
2412	95.31	101.22			27.23	4.38	37.52	113	275	Average
2412	105.32	111.23			27.23	4.38	37.52	113	275	Peak
4824	33.22	48.13	54	-20.78	31.17	6.81	52.89	116	307	Average
4824	44.46	59.37	74	-29.54	31.17	6.81	52.89	116	307	Peak

Remarks:

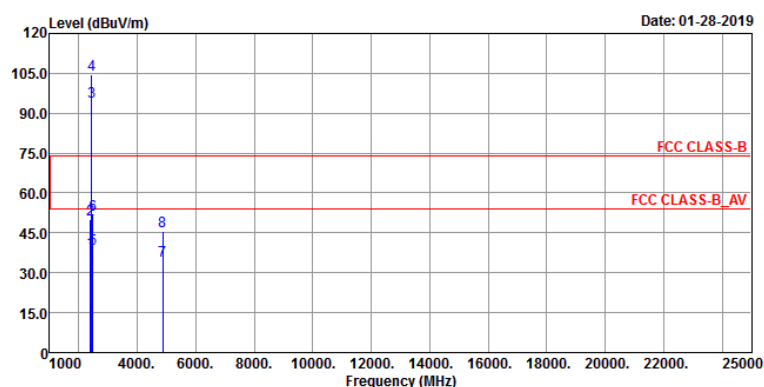
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



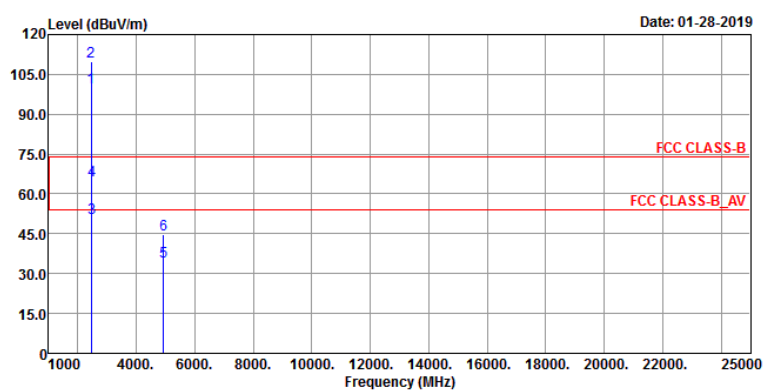
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	39.18	45.18	54	-14.82	27.16	4.36	37.52	158	75	Average
2390	50.61	56.61	74	-23.39	27.16	4.36	37.52	158	75	Peak
2437	95.46	101.14			27.38	4.4	37.46	158	75	Average
2437	105.88	111.56			27.38	4.4	37.46	158	75	Peak
2483.5	39.5	44.86	54	-14.5	27.53	4.43	37.32	158	75	Average
2483.5	51.63	56.99	74	-22.37	27.53	4.43	37.32	158	75	Peak
4874	33.59	48.34	54	-20.41	31.25	6.86	52.86	194	53	Average
4874	44.64	59.39	74	-29.36	31.25	6.86	52.86	194	53	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	38.02	44.02	54	-15.98	27.16	4.36	37.52	200	94	Average
2390	50.2	56.2	74	-23.8	27.16	4.36	37.52	200	94	Peak
2437	94.47	100.15			27.38	4.4	37.46	200	94	Average
2437	104.4	110.08			27.38	4.4	37.46	200	94	Peak
2483.5	38.9	44.26	54	-15.1	27.53	4.43	37.32	200	94	Average
2483.5	51.72	57.08	74	-22.28	27.53	4.43	37.32	200	94	Peak
4874	34.58	49.33	54	-19.42	31.25	6.86	52.86	104	153	Average
4874	45.76	60.51	74	-28.24	31.25	6.86	52.86	104	153	Peak

Remarks:

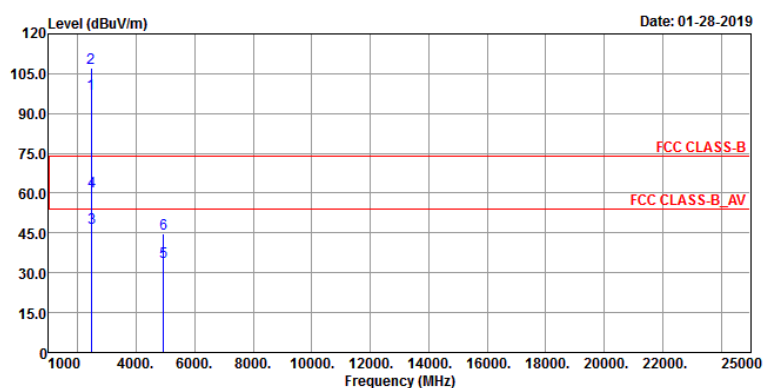
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



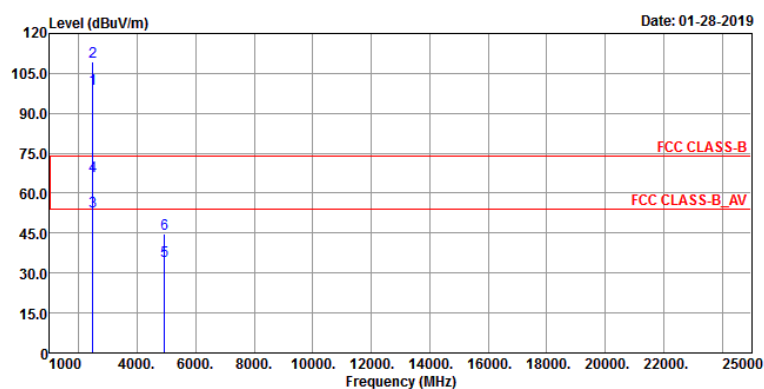
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	99.93	105.45			27.46	4.41	37.39	131	78	Average
2462	109.93	115.45			27.46	4.41	37.39	131	78	Peak
2483.52	51.03	56.39	54	-2.97	27.53	4.43	37.32	131	78	Average
2483.52	65.27	70.63	74	-8.73	27.53	4.43	37.32	131	78	Peak
4924	34.55	49.21	54	-19.45	31.34	6.89	52.89	173	213	Average
4924	44.88	59.54	74	-29.12	31.34	6.89	52.89	173	213	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	97.31	102.83			27.46	4.41	37.39	108	279	Average
2462	107.32	112.84			27.46	4.41	37.39	108	279	Peak
2483.52	46.93	52.29	54	-7.07	27.53	4.43	37.32	108	279	Average
2483.52	60.68	66.04	74	-13.32	27.53	4.43	37.32	108	279	Peak
4924	34.22	48.88	54	-19.78	31.34	6.89	52.89	107	103	Average
4924	44.55	59.21	74	-29.45	31.34	6.89	52.89	107	103	Peak

Remarks:

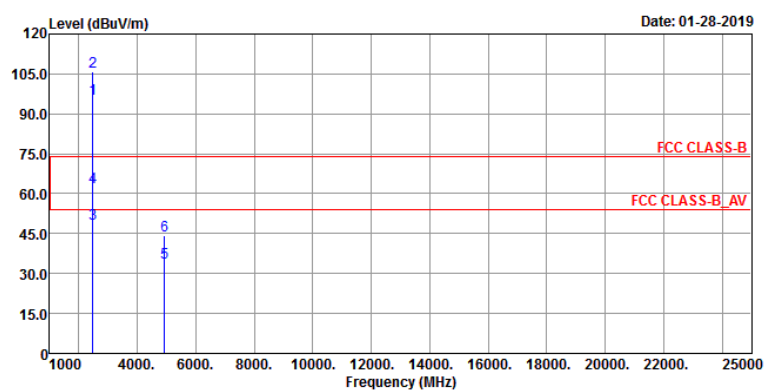
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



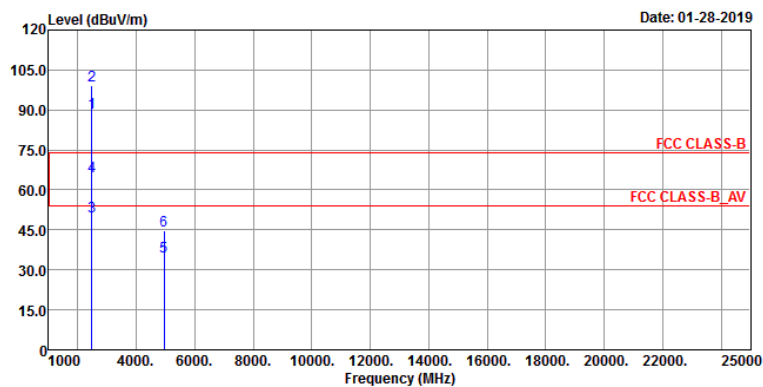
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	99.28	104.72			27.46	4.42	37.32	138	73	Average
2467	109.28	114.72			27.46	4.42	37.32	138	73	Peak
2483.52	52.98	58.34	54	-1.02	27.53	4.43	37.32	138	73	Average
2483.52	66.54	71.9	74	-7.46	27.53	4.43	37.32	138	73	Peak
4934	34.48	49.14	54	-19.52	31.34	6.89	52.89	171	192	Average
4934	44.88	59.54	74	-29.12	31.34	6.89	52.89	171	192	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	95.81	101.25			27.46	4.42	37.32	107	268	Average
2467	105.81	111.25			27.46	4.42	37.32	107	268	Peak
2483.52	48.64	54	54	-5.36	27.53	4.43	37.32	107	268	Average
2483.52	62.36	67.72	74	-11.64	27.53	4.43	37.32	107	268	Peak
4934	33.91	48.57	54	-20.09	31.34	6.89	52.89	133	217	Average
4934	44.2	58.86	74	-29.8	31.34	6.89	52.89	133	217	Peak

Remarks:

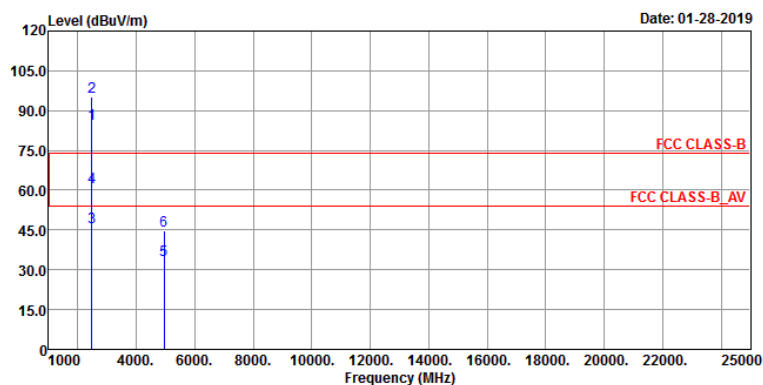
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	89.07	94.44			27.53	4.42	37.32	137	72	Average
2472	99.08	104.45			27.53	4.42	37.32	137	72	Peak
2483.52	50.25	55.61	54	-3.75	27.53	4.43	37.32	137	72	Average
2483.52	65.05	70.41	74	-8.95	27.53	4.43	37.32	137	72	Peak
4944	34.77	49.43	54	-19.23	31.37	6.89	52.92	169	214	Average
4944	44.88	59.54	74	-29.12	31.37	6.89	52.92	169	214	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	84.99	90.36			27.53	4.42	37.32	106	268	Average
2472	94.99	100.36			27.53	4.42	37.32	106	268	Peak
2483.52	45.87	51.23	54	-8.13	27.53	4.43	37.32	106	268	Average
2483.52	61.08	66.44	74	-12.92	27.53	4.43	37.32	106	268	Peak
4944	33.78	48.44	54	-20.22	31.37	6.89	52.92	108	168	Average
4944	44.72	59.38	74	-29.28	31.37	6.89	52.92	108	168	Peak

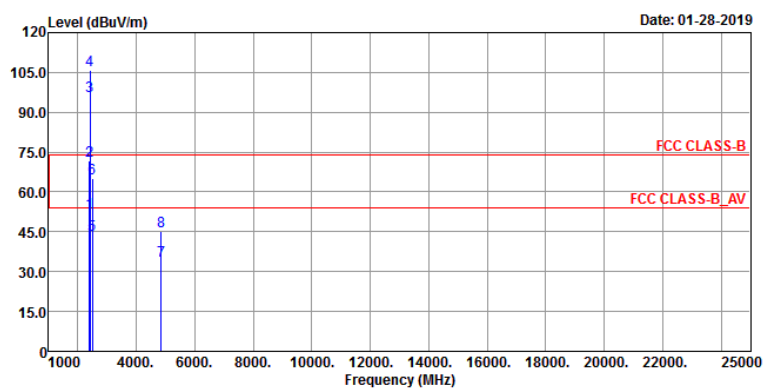
Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2472 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

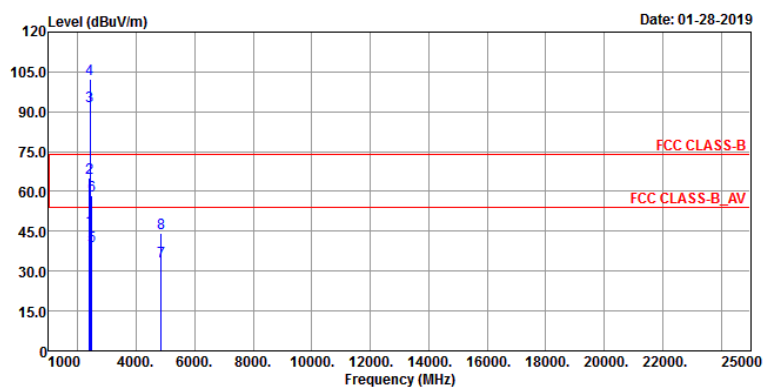
802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



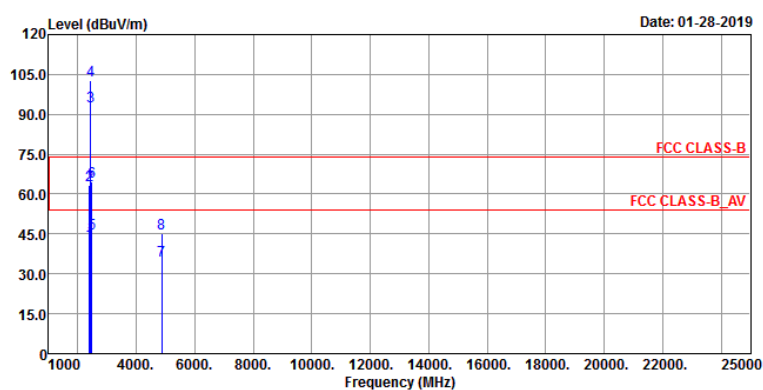
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.8	52.37	58.37	54	-1.63	27.16	4.36	37.52	134	69	Average
2389.8	71.92	77.92	74	-2.08	27.16	4.36	37.52	134	69	Peak
2422	95.98	101.74			27.31	4.39	37.46	134	69	Average
2422	105.99	111.75			27.31	4.39	37.46	134	69	Peak
2484.28	43.72	49.08	54	-10.28	27.53	4.43	37.32	134	69	Average
2484.28	65.09	70.45	74	-8.91	27.53	4.43	37.32	134	69	Peak
4844	34.22	49.07	54	-19.78	31.2	6.83	52.88	186	157	Average
4844	45.03	59.88	74	-28.97	31.2	6.83	52.88	186	157	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	45.71	51.71	54	-8.29	27.16	4.36	37.52	108	273	Average
2389.94	65.05	71.05	74	-8.95	27.16	4.36	37.52	108	273	Peak
2422	92.09	97.85			27.31	4.39	37.46	108	273	Average
2422	102.11	107.87			27.31	4.39	37.46	108	273	Peak
2483.68	39.37	44.73	54	-14.63	27.53	4.43	37.32	108	273	Average
2483.68	58.62	63.98	74	-15.38	27.53	4.43	37.32	108	273	Peak
4844	33.51	48.36	54	-20.49	31.2	6.83	52.88	124	226	Average
4844	44.49	59.34	74	-29.51	31.2	6.83	52.88	124	226	Peak

Remarks:

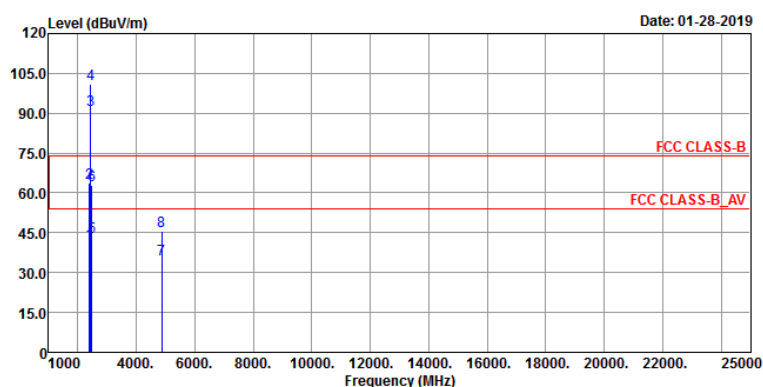
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2422 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



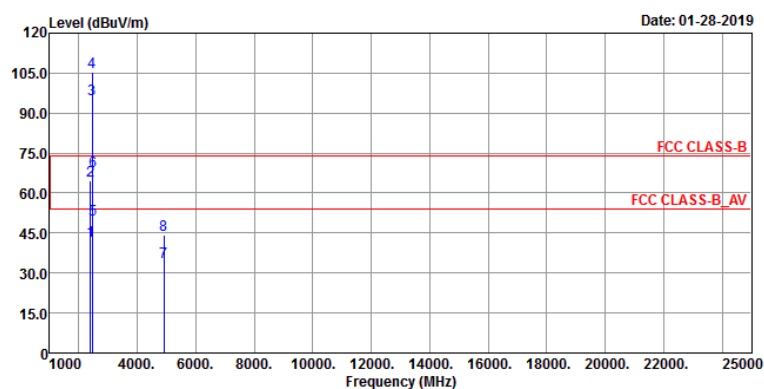
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.76	47.76	54	-12.24	27.16	4.36	37.52	155	69	Average
2390	63.44	69.44	74	-10.56	27.16	4.36	37.52	155	69	Peak
2437	92.99	98.67			27.38	4.4	37.46	155	69	Average
2437	102.72	108.4			27.38	4.4	37.46	155	69	Peak
2483.5	45.37	50.73	54	-8.63	27.53	4.43	37.32	155	69	Average
2483.5	64.58	69.94	74	-9.42	27.53	4.43	37.32	155	69	Peak
4874	34.9	49.65	54	-19.1	31.25	6.86	52.86	185	142	Average
4874	45.34	60.09	74	-28.66	31.25	6.86	52.86	185	142	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.4	47.4	54	-12.6	27.16	4.36	37.52	200	98	Average
2390	63.55	69.55	74	-10.45	27.16	4.36	37.52	200	98	Peak
2437	91.22	96.9			27.38	4.4	37.46	200	98	Average
2437	101.07	106.75			27.38	4.4	37.46	200	98	Peak
2483.5	43.48	48.84	54	-10.52	27.53	4.43	37.32	200	98	Average
2483.5	62.89	68.25	74	-11.11	27.53	4.43	37.32	200	98	Peak
4874	35.02	49.77	54	-18.98	31.25	6.86	52.86	111	303	Average
4874	45.52	60.27	74	-28.48	31.25	6.86	52.86	111	303	Peak

Remarks:

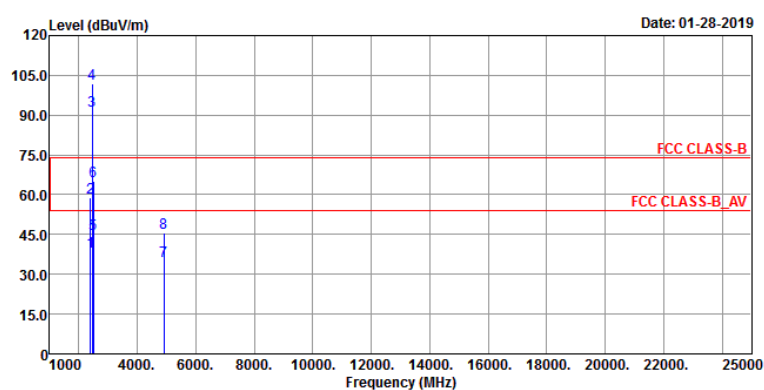
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



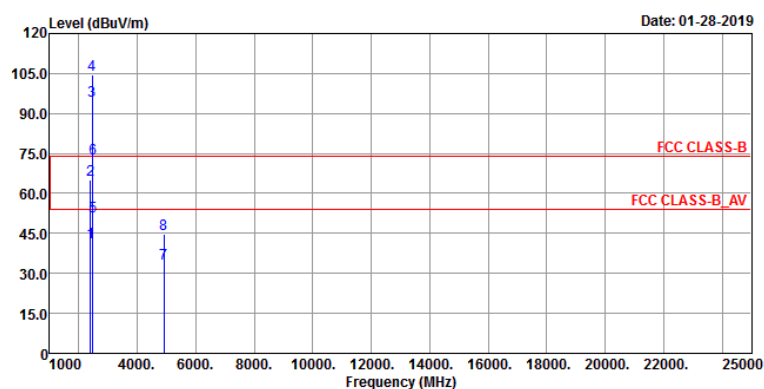
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.8	42.2	48.2	54	-11.8	27.16	4.36	37.52	143	70	Average
2389.8	64.45	70.45	74	-9.55	27.16	4.36	37.52	143	70	Peak
2452	95.29	100.89			27.38	4.41	37.39	143	70	Average
2452	105.32	110.92			27.38	4.41	37.39	143	70	Peak
2483.76	50.09	55.45	54	-3.91	27.53	4.43	37.32	143	70	Average
2483.76	68.28	73.64	74	-5.72	27.53	4.43	37.32	143	70	Peak
4904	33.97	48.63	54	-20.03	31.31	6.88	52.85	179	103	Average
4904	44.43	59.09	74	-29.57	31.31	6.88	52.85	179	103	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.66	38.34	44.32	54	-15.66	27.16	4.36	37.5	109	277	Average
2389.66	58.79	64.77	74	-15.21	27.16	4.36	37.5	109	277	Peak
2452	91.59	97.19			27.38	4.41	37.39	109	277	Average
2452	101.67	107.27			27.38	4.41	37.39	109	277	Peak
2484.12	45.14	50.5	54	-8.86	27.53	4.43	37.32	109	277	Average
2484.12	64.9	70.26	74	-9.1	27.53	4.43	37.32	109	277	Peak
4904	35.11	49.77	54	-18.89	31.31	6.88	52.85	121	228	Average
4904	45.58	60.24	74	-28.42	31.31	6.88	52.85	121	228	Peak

Remarks:

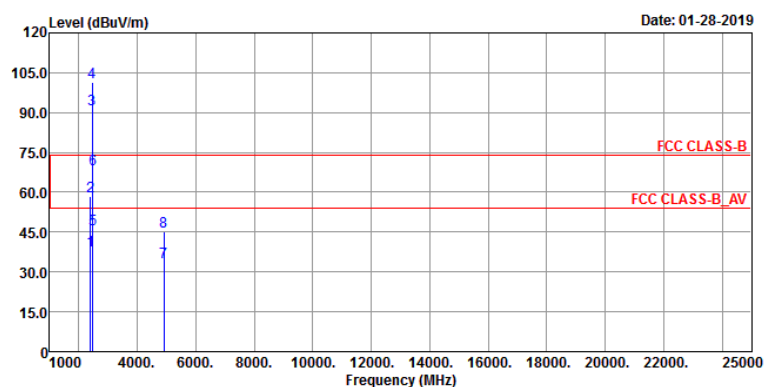
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2452 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 10	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



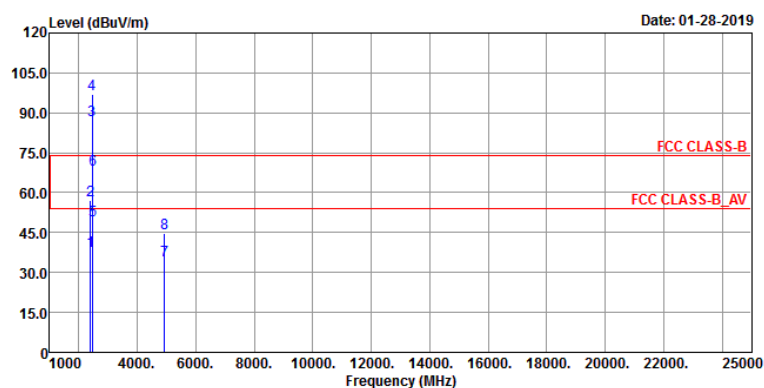
Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2384.06	41.47	47.54	54	-12.53	27.08	4.35	37.5	102	74	Average
2384.06	65.03	71.1	74	-8.97	27.08	4.35	37.5	102	74	Peak
2457	94.57	100.09			27.46	4.41	37.39	102	74	Average
2457	104.58	110.1			27.46	4.41	37.39	102	74	Peak
2483.6	51.29	56.65	54	-2.71	27.53	4.43	37.32	102	74	Average
2483.6	73.11	78.47	74	-0.89	27.53	4.43	37.32	102	74	Peak
4914	33.69	48.35	54	-20.31	31.31	6.88	52.85	188	224	Average
4914	44.57	59.23	74	-29.43	31.31	6.88	52.85	188	224	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.82	37.92	43.9	54	-16.08	27.16	4.36	37.5	108	276	Average
2388.82	58.31	64.29	74	-15.69	27.16	4.36	37.5	108	276	Peak
2457	91.17	96.69			27.46	4.41	37.39	108	276	Average
2457	101.2	106.72			27.46	4.41	37.39	108	276	Peak
2483.68	45.91	51.27	54	-8.09	27.53	4.43	37.32	108	276	Average
2483.68	68.55	73.91	74	-5.45	27.53	4.43	37.32	108	276	Peak
4914	33.47	48.13	54	-20.53	31.31	6.88	52.85	101	99	Average
4914	45.03	59.69	74	-28.97	31.31	6.88	52.85	101	99	Peak

Remarks:

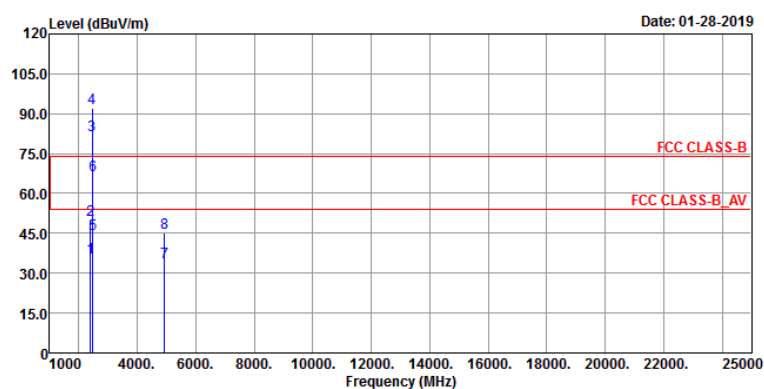
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2457 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	38.05	44.05	54	-15.95	27.16	4.36	37.52	117	67	Average
2389.94	57.11	63.11	74	-16.89	27.16	4.36	37.52	117	67	Peak
2462	87.1	92.62			27.46	4.41	37.39	117	67	Average
2462	97.11	102.63			27.46	4.41	37.39	117	67	Peak
2483.52	49.39	54.75	54	-4.61	27.53	4.43	37.32	117	67	Average
2483.52	68.69	74.05	74	-5.31	27.53	4.43	37.32	117	67	Peak
4924	34.4	49.06	54	-19.6	31.34	6.89	52.89	173	36	Average
4924	44.57	59.23	74	-29.43	31.34	6.89	52.89	173	36	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.96	35.71	41.69	54	-18.29	27.16	4.36	37.5	108	275	Average
2388.96	50.25	56.23	74	-23.75	27.16	4.36	37.5	108	275	Peak
2462	81.97	87.49			27.46	4.41	37.39	108	275	Average
2462	91.97	97.49			27.46	4.41	37.39	108	275	Peak
2483.6	44.57	49.93	54	-9.43	27.53	4.43	37.32	108	275	Average
2483.68	66.9	72.26	74	-7.1	27.53	4.43	37.32	108	275	Peak
4924	34.07	48.73	54	-19.93	31.34	6.89	52.89	116	209	Average
4924	45.03	59.69	74	-28.97	31.34	6.89	52.89	116	209	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

9 kHz ~ 30 MHz Data:

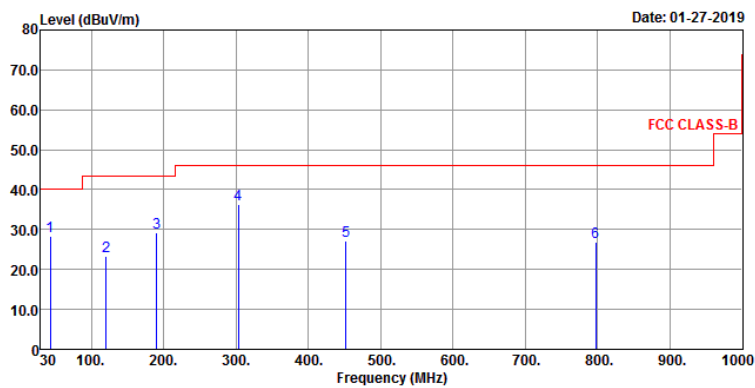
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

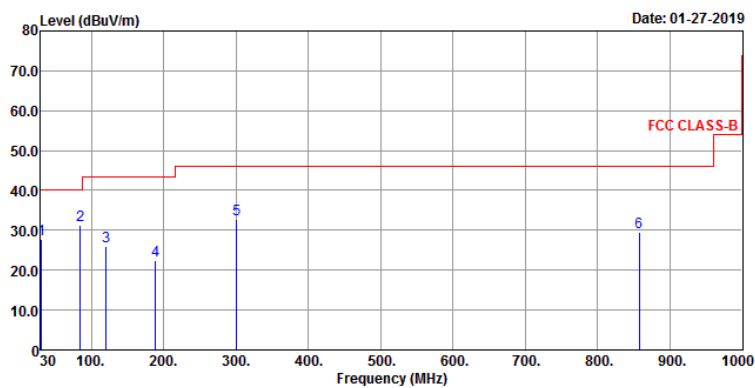
802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
43.58	28.46	45.48	40	-11.54	13.59	0.5	31.11	156	113	Peak
120.21	23.24	43.28	43.5	-20.26	11.02	0.84	31.9	171	156	Peak
190.05	29.19	49.64	43.5	-14.31	10.05	1.17	31.67	198	177	Peak
303.54	36.41	53.59	46	-9.59	13.03	1.67	31.88	246	225	Peak
451.95	27.17	40.49	46	-18.83	16.37	2.29	31.98	268	284	Peak
797.27	26.96	32.53	46	-19.04	22.19	3.66	31.42	316	340	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
30.97	27.86	46.39	40	-12.14	12.14	0.45	31.12	322	324	Peak
84.32	31.43	54.23	40	-8.57	8.2	0.69	31.69	275	294	Peak
120.21	26.02	46.06	43.5	-17.48	11.02	0.84	31.9	253	238	Peak
189.08	22.35	42.75	43.5	-21.15	10.12	1.17	31.69	201	175	Peak
300.63	32.91	50.15	46	-13.09	12.96	1.65	31.85	172	123	Peak
857.41	29.61	34.67	46	-16.39	22.96	3.87	31.89	142	103	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value.
- The emission levels of other frequencies were very low against the limit.

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Feb. 08, 2018	Feb. 07, 2019
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 05, 2018	Sep. 04, 2019
V-LISN/AMN SCHWARZBECK (EUT)	NNBL 8226-2	8226-142	Jul. 23, 2018	Jul. 22, 2019
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 13, 2018	Aug. 12, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 2.
 3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

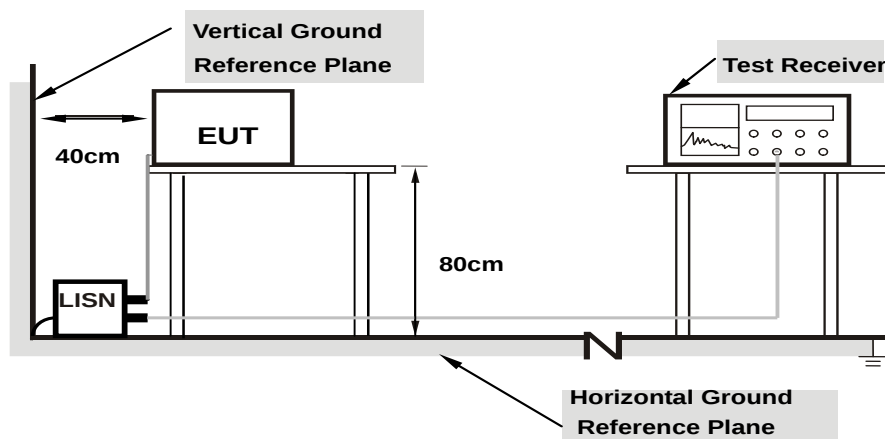
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance 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.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 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).

4.2.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

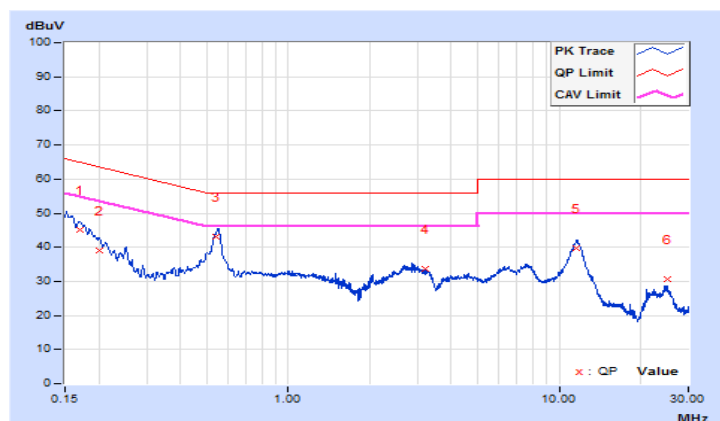
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Jisyong Wang	Test Date	2019/1/27

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	0.16966	10.05	34.98	18.26	45.03	28.31	64.98	54.98	-19.95	-26.67
2	0.19983	10.06	29.14	13.35	39.20	23.41	63.62	53.62	-24.42	-30.21
3	0.54214	10.06	32.97	15.13	43.03	25.19	56.00	46.00	-12.97	-20.81
4	3.18750	10.12	23.53	8.74	33.65	18.86	56.00	46.00	-22.35	-27.14
5	11.62950	10.33	29.31	13.83	39.64	24.16	60.00	50.00	-20.36	-25.84
6	25.08675	10.39	20.33	4.78	30.72	15.17	60.00	50.00	-29.28	-34.83

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

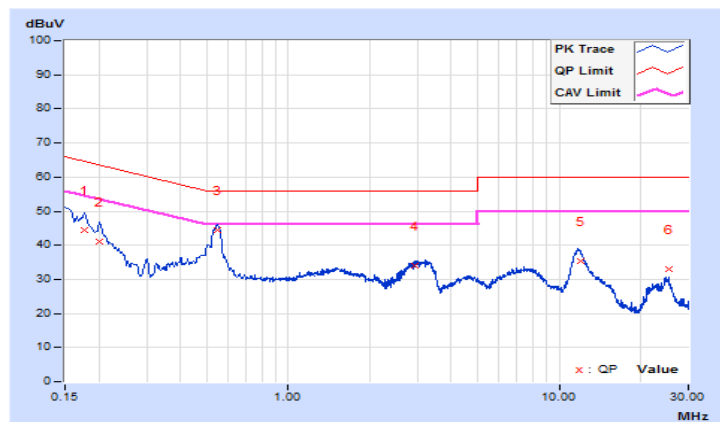


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Jisyong Wang	Test Date	2019/1/27

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	0.17698	10.07	34.39	19.72	44.46	29.79	64.63	54.63	-20.17	-24.84
2	0.20175	10.07	31.14	15.69	41.21	25.76	63.54	53.54	-22.33	-27.78
3	0.54645	10.07	34.46	18.09	44.53	28.16	56.00	46.00	-11.47	-17.84
4	2.94000	10.13	23.90	10.46	34.03	20.59	56.00	46.00	-21.97	-25.41
5	11.95125	10.42	25.06	10.58	35.48	21.00	60.00	50.00	-24.52	-29.00
6	25.29375	10.52	22.53	4.16	33.05	14.68	60.00	50.00	-26.95	-35.32

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



4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

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

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

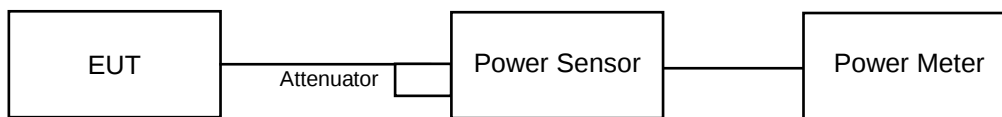
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20 MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ dB.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

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.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

<Peak Power>

Ant-0

Mode	Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)
802.11b	1	2412	63.83	18.05
	6	2437	66.07	18.20
	11	2462	62.81	17.98
	12	2467	32.06	15.06
	13	2472	25.41	14.05
802.11g	1	2412	159.22	22.02
	6	2437	163.31	22.13
	11	2462	155.24	21.91
	12	2467	81.66	19.12
	13	2472	7.50	8.75
802.11n (HT20)	1	2412	164.82	22.17
	6	2437	169.04	22.28
	11	2462	160.69	22.06
	12	2467	81.66	19.12
	13	2472	5.40	7.32
802.11n (HT40)	3	2422	108.14	20.34
	6	2437	181.97	22.60
	9	2452	66.37	18.22
	10	2457	59.16	17.72
	11	2462	8.93	9.51

Ant-1

Mode	Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)
802.11b	1	2412	60.67	17.83
	6	2437	57.41	17.59
	11	2462	61.80	17.91
	12	2467	29.38	14.68
	13	2472	25.29	14.03
802.11g	1	2412	143.22	21.56
	6	2437	136.14	21.34
	11	2462	154.53	21.89
	12	2467	84.14	19.25
	13	2472	7.10	8.51
802.11n (HT20)	1	2412	159.22	22.02
	6	2437	166.34	22.21
	11	2462	156.68	21.95
	12	2467	83.56	19.22
	13	2472	5.32	7.26
802.11n (HT40)	3	2422	105.44	20.23
	6	2437	175.79	22.45
	9	2452	66.07	18.20
	10	2457	57.68	17.61
	11	2462	8.34	9.21

Ant-0 + Ant-1

Mode	Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)
802.11g	1	2412	283.54	24.53
	6	2437	297.88	24.74
	11	2462	307.14	24.87
	12	2467	146.77	21.67
	13	2472	14.93	11.74
802.11n (HT20)	1	2412	337.40	25.28
	6	2437	306.59	24.87
	11	2462	327.64	25.15
	12	2467	170.83	22.33
	13	2472	11.26	10.52
802.11n (HT40)	3	2422	192.13	22.84
	6	2437	330.46	25.19
	9	2452	119.97	20.79
	10	2457	118.18	20.73
	11	2462	17.47	12.42

<Average Power>

Ant-0

Mode	Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
802.11b	1	2412	35.16	15.46
	6	2437	35.24	15.47
	11	2462	34.99	15.44
	12	2467	17.54	12.44
	13	2472	13.80	11.40
802.11g	1	2412	35.32	15.48
	6	2437	35.40	15.49
	11	2462	34.83	15.42
	12	2467	24.04	13.81
	13	2472	1.91	2.82
802.11n (HT20)	1	2412	34.91	15.43
	6	2437	35.08	15.45
	11	2462	34.75	15.41
	12	2467	21.09	13.24
	13	2472	1.35	1.30
802.11n (HT40)	3	2422	19.72	12.95
	6	2437	35.16	15.46
	9	2452	12.27	10.89
	10	2457	11.75	10.70
	11	2462	1.74	2.41

Ant-1

Mode	Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
802.11b	1	2412	33.73	15.28
	6	2437	32.51	15.12
	11	2462	34.59	15.39
	12	2467	16.29	12.12
	13	2472	12.94	11.12
802.11g	1	2412	34.51	15.38
	6	2437	33.27	15.22
	11	2462	34.59	15.39
	12	2467	23.33	13.68
	13	2472	1.83	2.62
802.11n (HT20)	1	2412	33.27	15.22
	6	2437	34.59	15.39
	11	2462	33.04	15.19
	12	2467	20.80	13.18
	13	2472	1.33	1.24
802.11n (HT40)	3	2422	19.01	12.79
	6	2437	33.81	15.29
	9	2452	12.16	10.85
	10	2457	11.61	10.65
	11	2462	1.65	2.18

Ant-0 + Ant-1

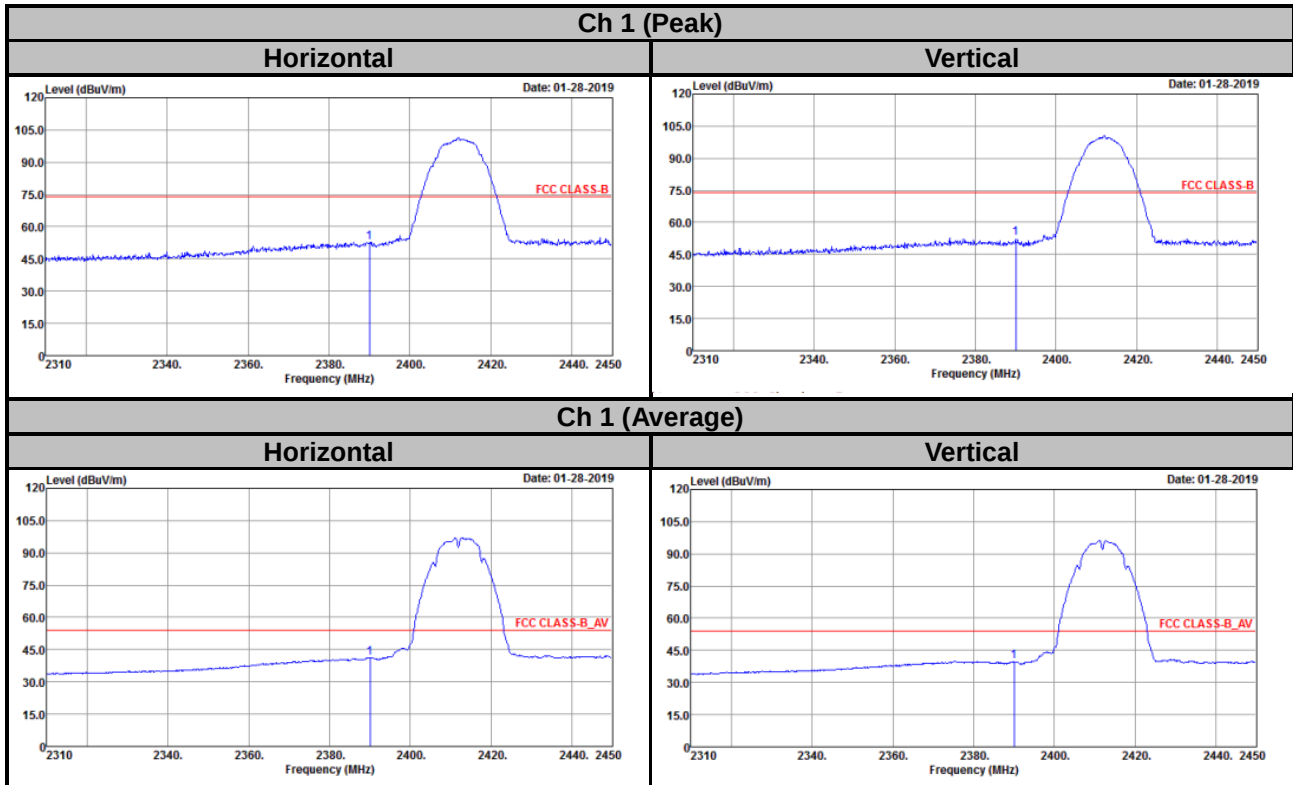
Mode	Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
802.11g	1	2412	316.88	25.01
	6	2437	68.63	18.37
	11	2462	70.43	18.48
	12	2467	38.60	15.87
	13	2472	NA	5.82
802.11n (HT20)	1	2412	70.08	18.46
	6	2437	67.38	18.29
	11	2462	70.08	18.46
	12	2467	42.22	16.26
	13	2472	2.68	4.28
802.11n (HT40)	3	2422	37.41	15.73
	6	2437	67.93	18.32
	9	2452	24.02	13.81
	10	2457	23.44	13.70
	11	2462	3.44	5.36

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

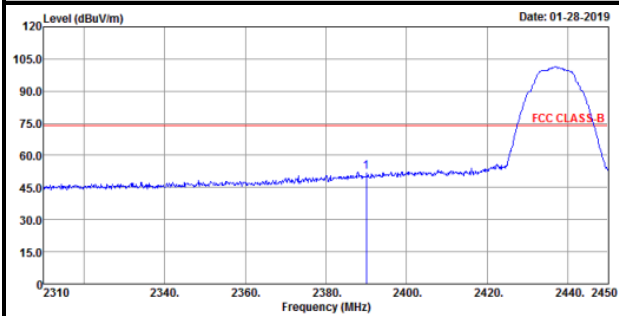
Annex A- Radiated Bandedge Plots

802.11b

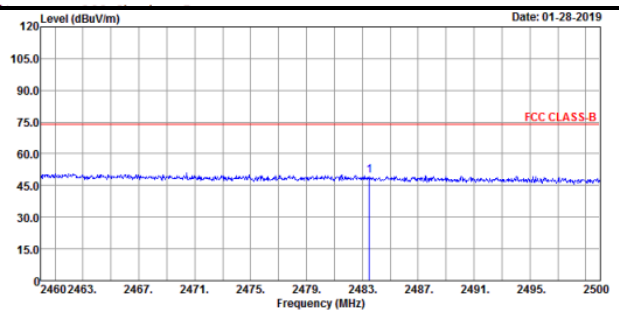
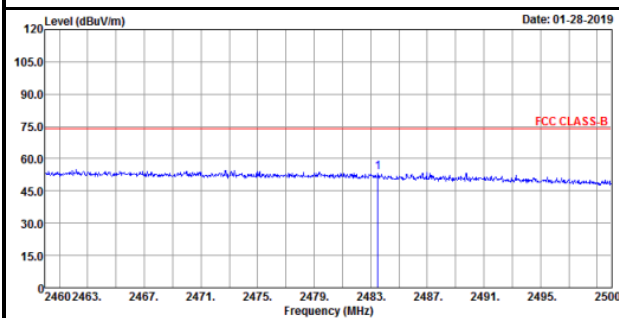
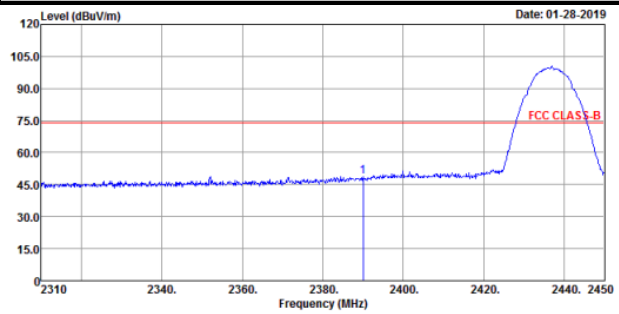


Ch 06 (Peak)

Horizontal

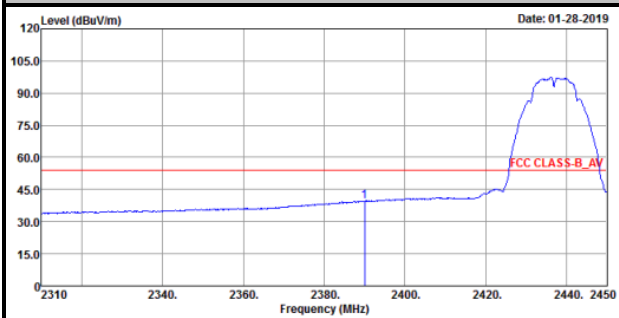


Vertical

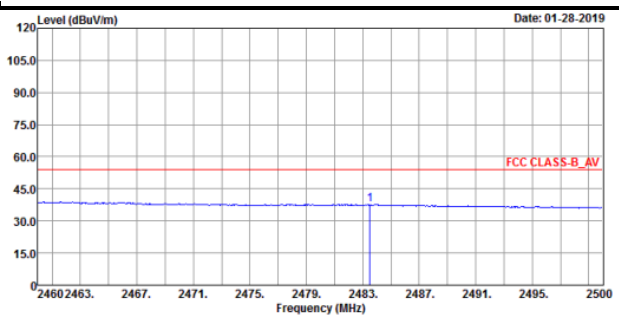
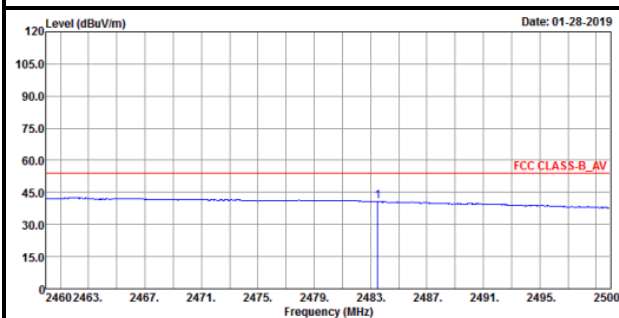
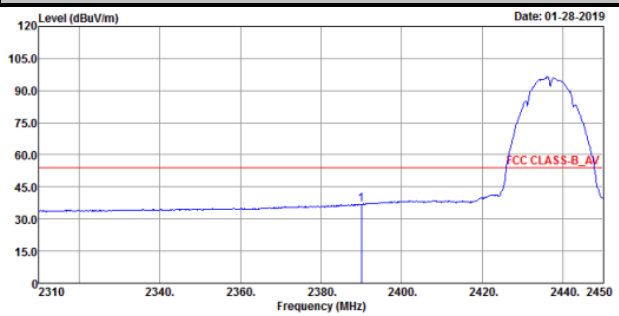


Ch 06 (Average)

Horizontal

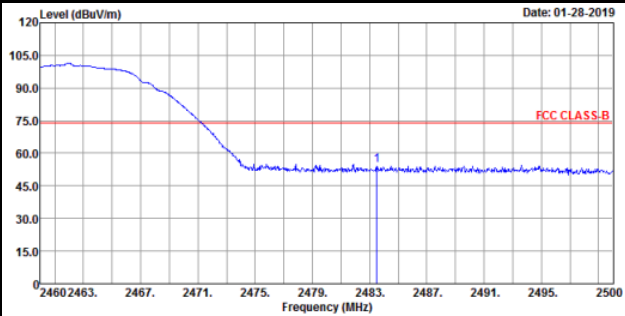


Vertical

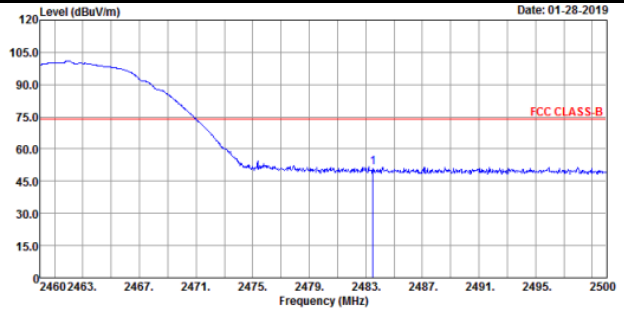


Ch 11 (Peak)

Horizontal

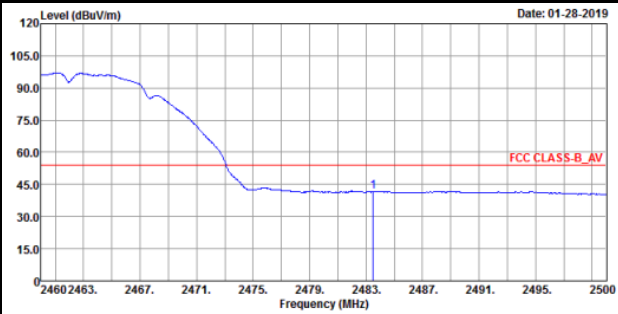


Vertical

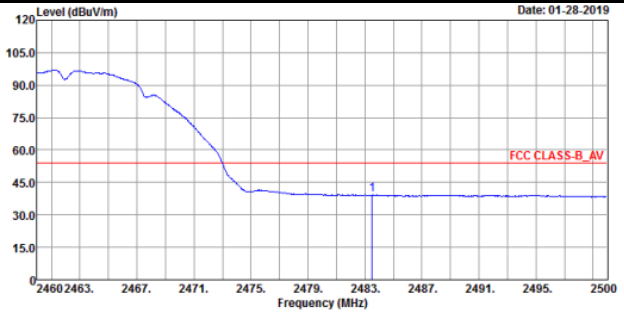


Ch 11 (Average)

Horizontal

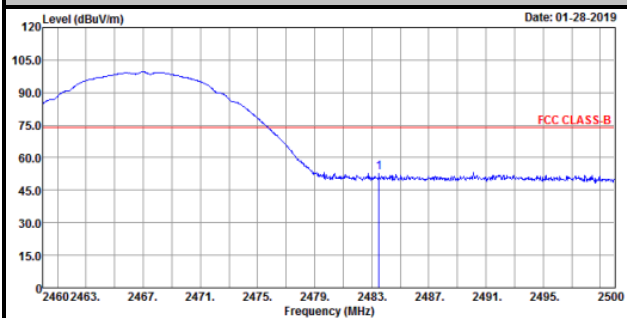


Vertical

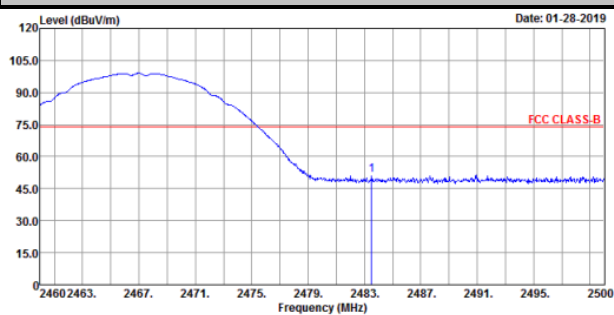


Ch 12 (Peak)

Horizontal

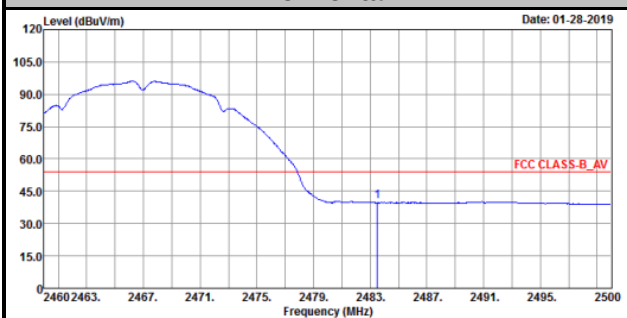


Vertical

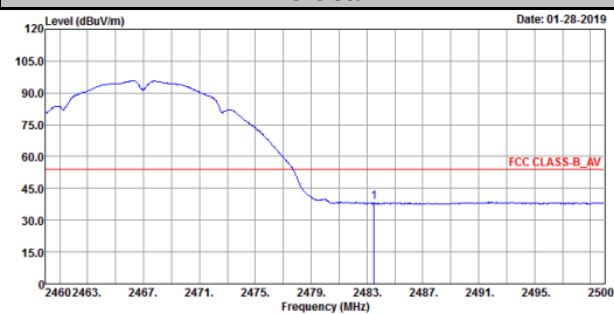


Ch 12 (Average)

Horizontal

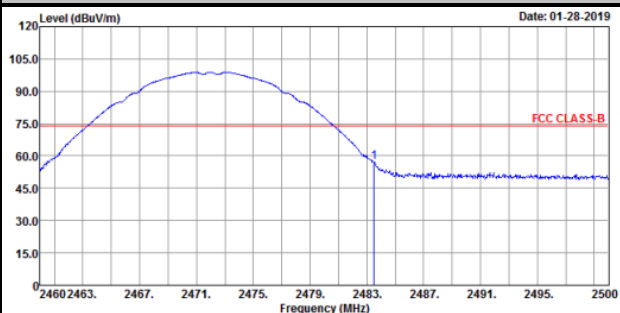


Vertical

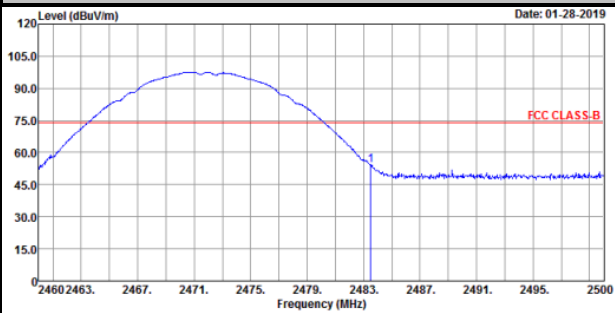


Ch 13 (Peak)

Horizontal

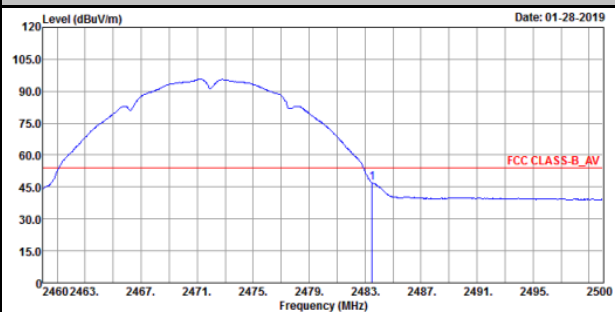


Vertical

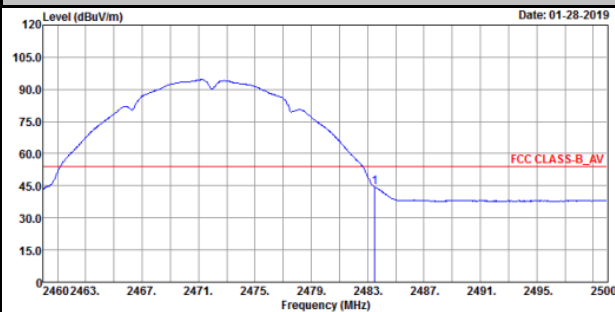


Ch 13 (Average)

Horizontal



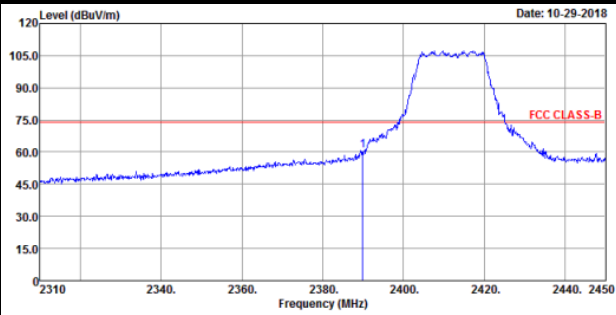
Vertical



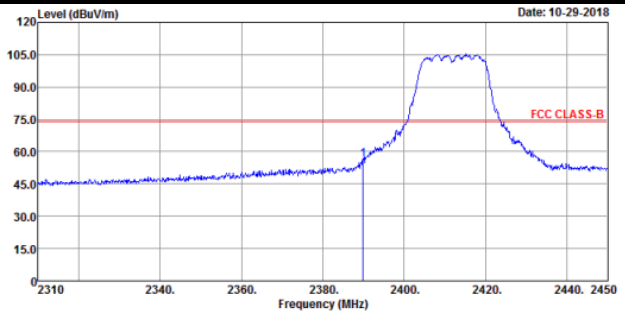
802.11g

Ch 1 (Peak)

Horizontal

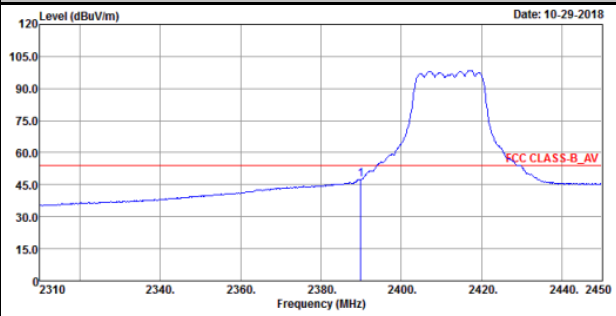


Vertical

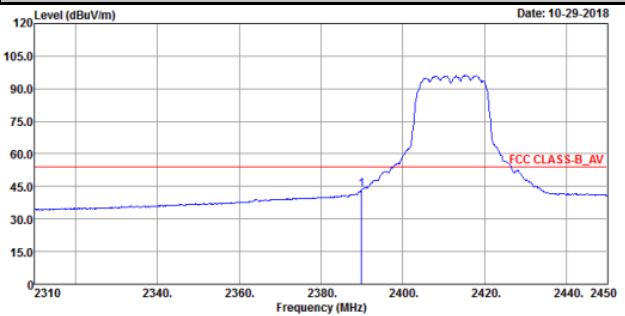


Ch 1 (Average)

Horizontal

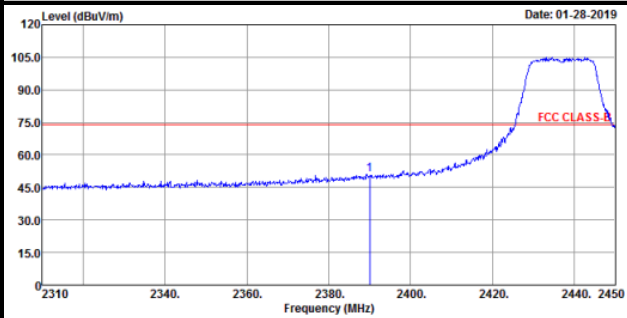


Vertical

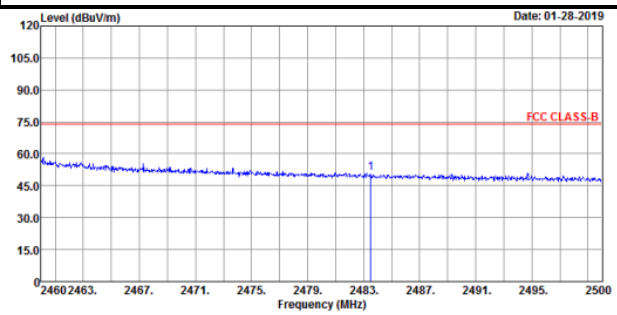
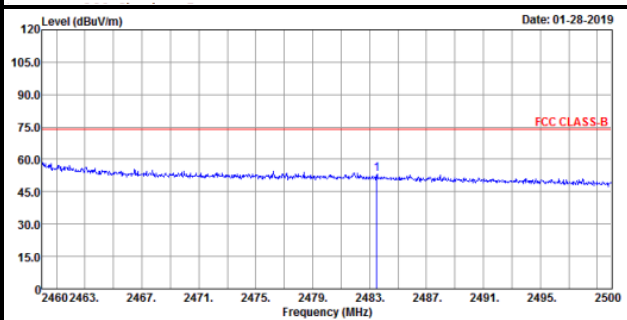
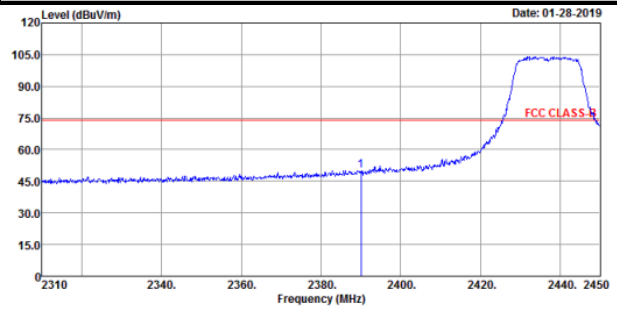


Ch 06 (Peak)

Horizontal

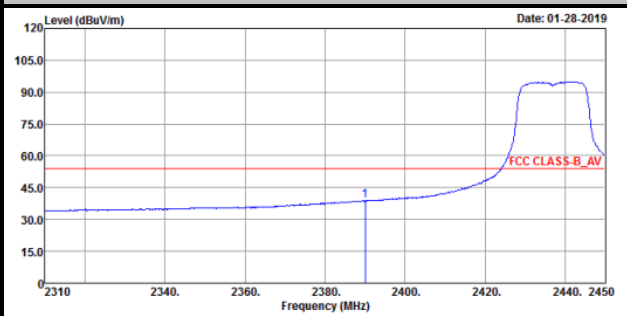


Vertical

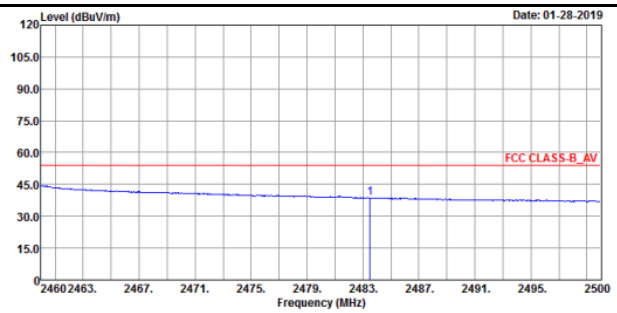
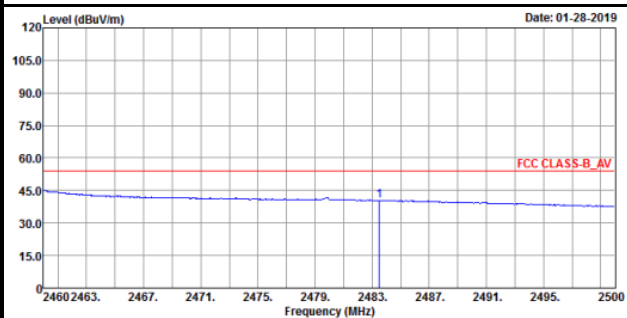
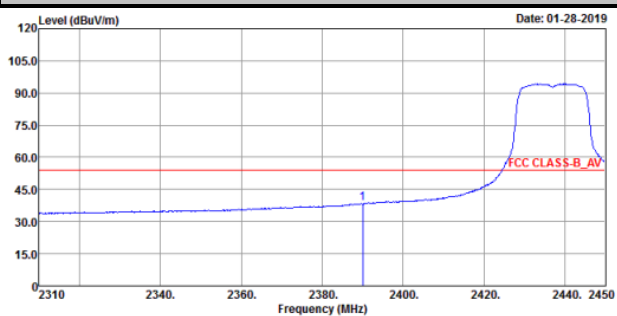


Ch 06 (Average)

Horizontal

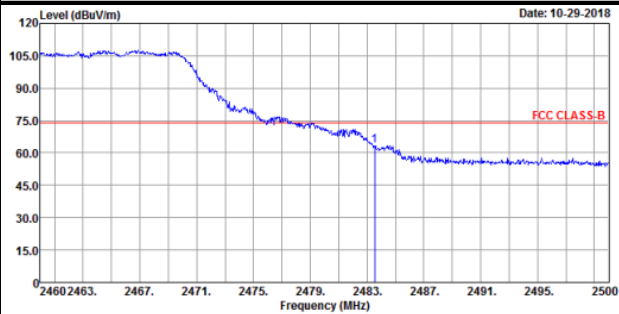


Vertical

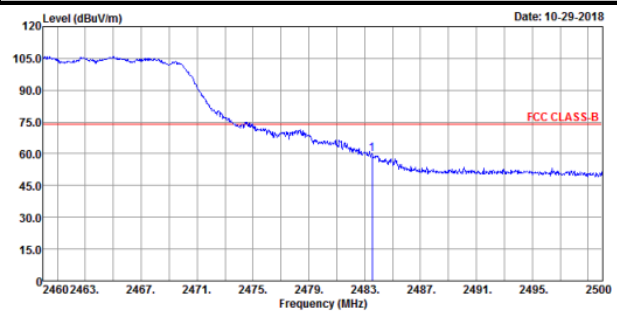


Ch 11 (Peak)

Horizontal

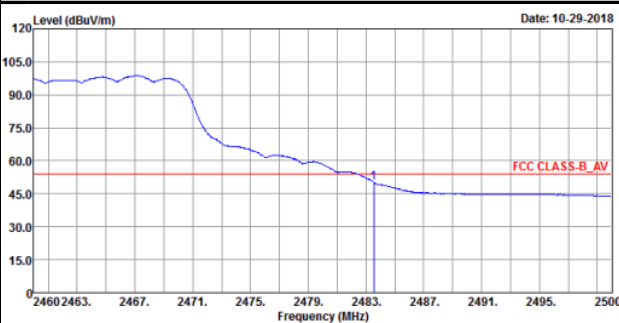


Vertical

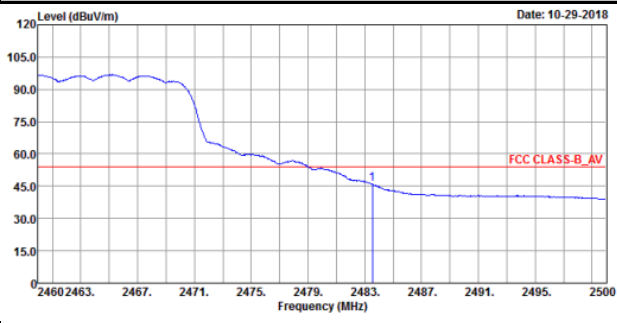


Ch 11 (Average)

Horizontal

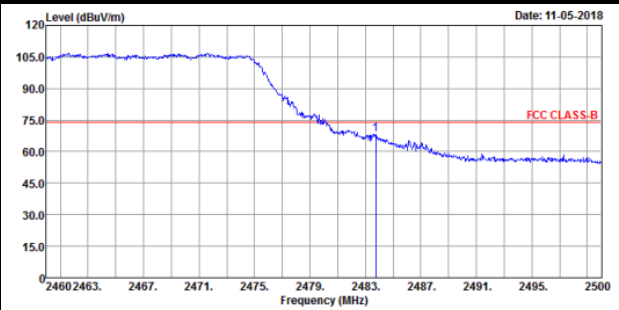


Vertical

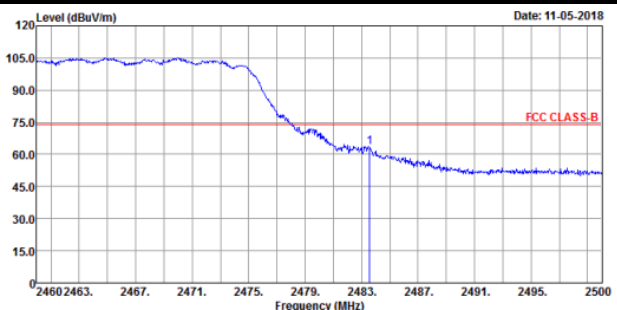


Ch 12 (Peak)

Horizontal

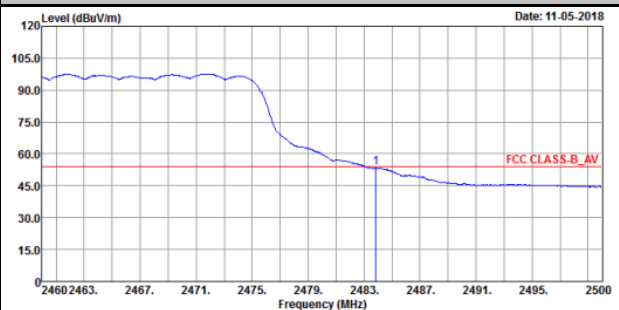


Vertical

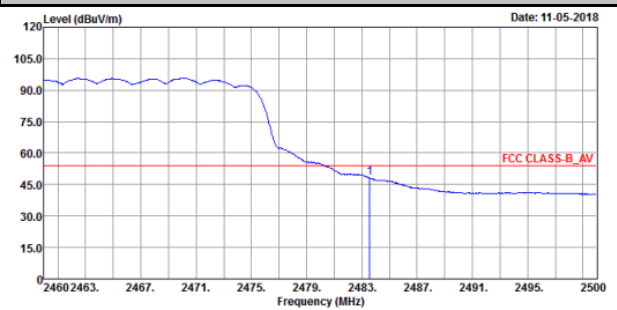


Ch 12 (Average)

Horizontal

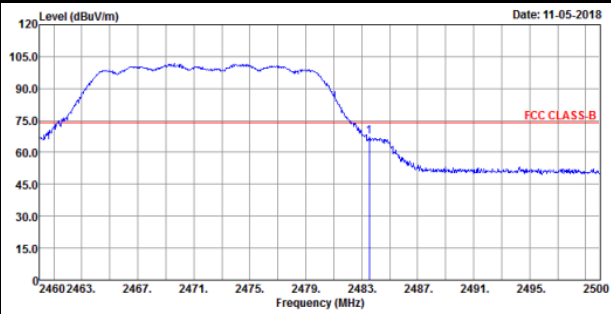


Vertical

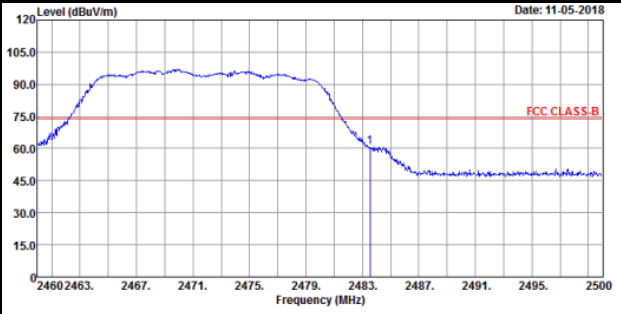


Ch 13 (Peak)

Horizontal

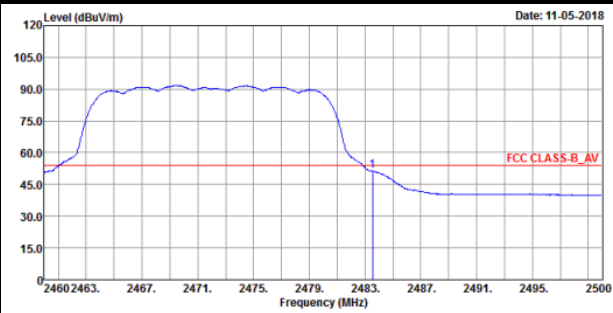


Vertical

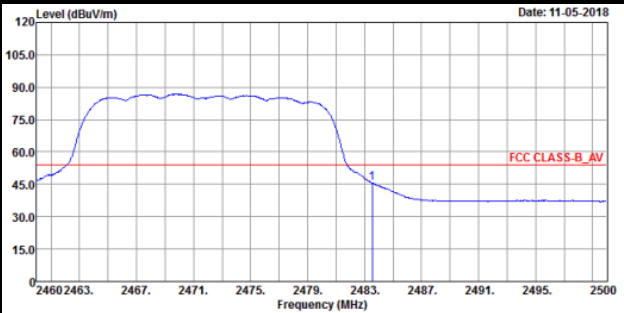


Ch 13 (Average)

Horizontal



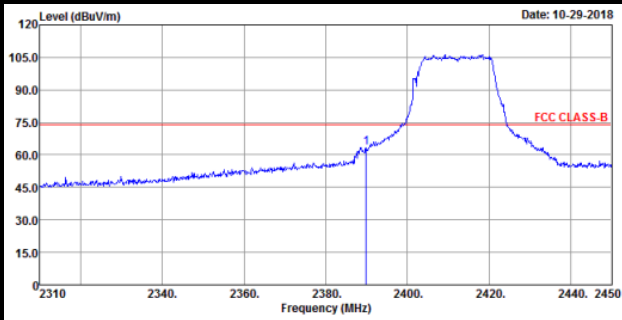
Vertical



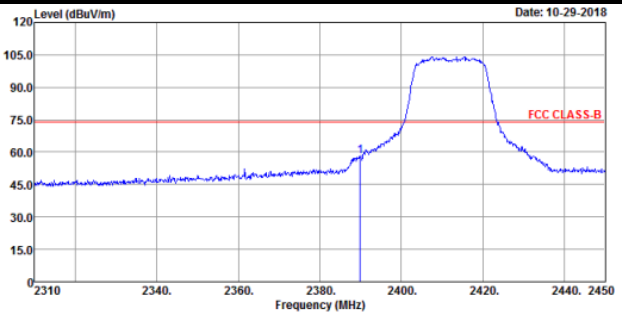
802.11n (HT20)

Ch 1 (Peak)

Horizontal

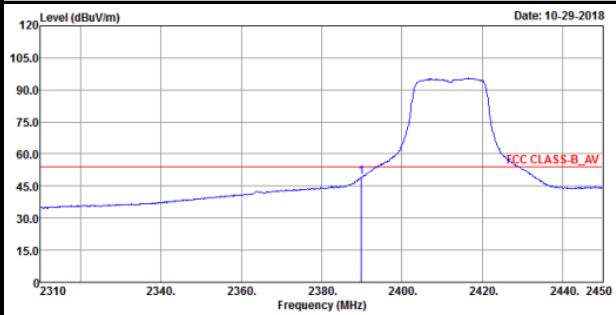


Vertical

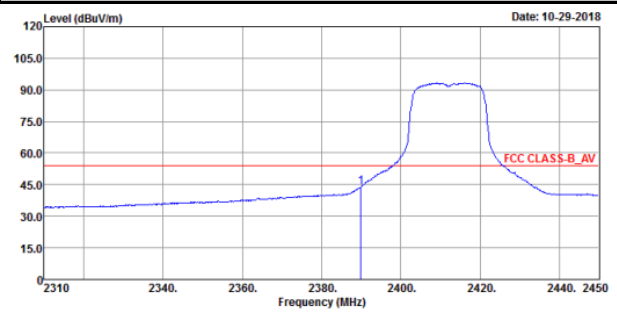


Ch 1 (Average)

Horizontal

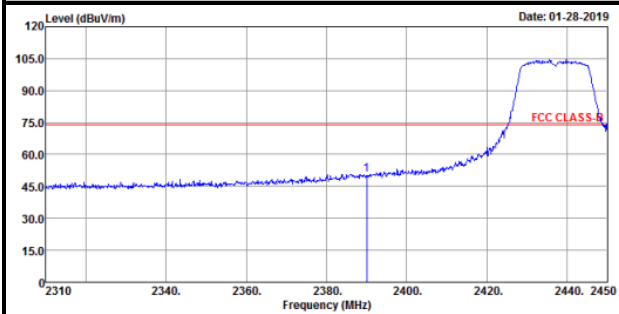


Vertical

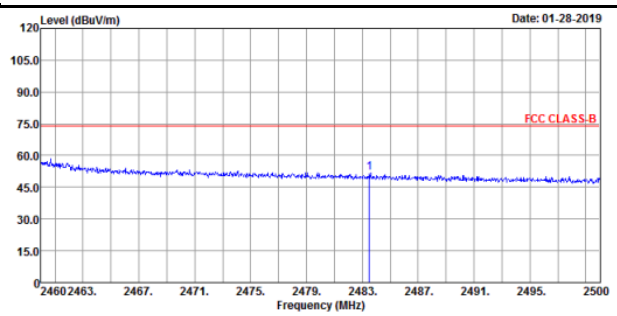
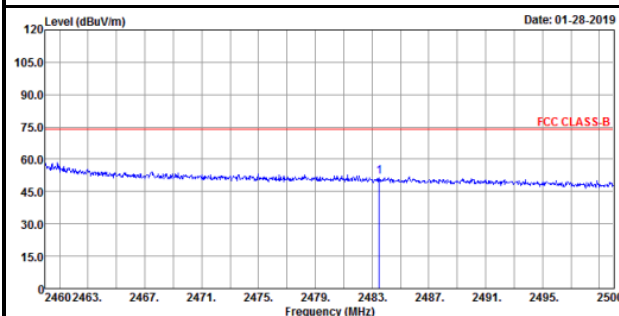
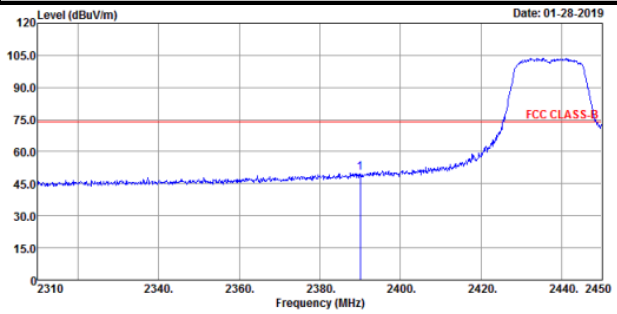


Ch 6 (Peak)

Horizontal

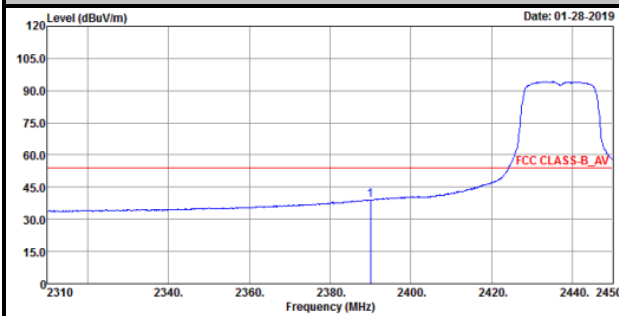


Vertical

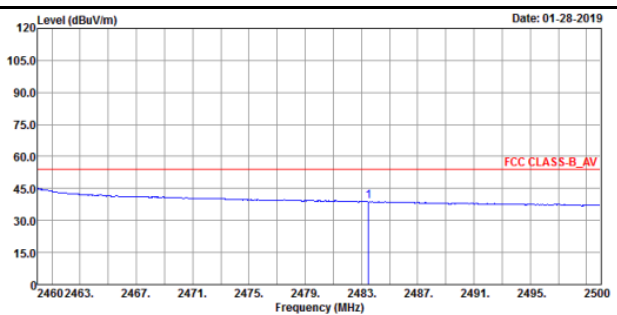
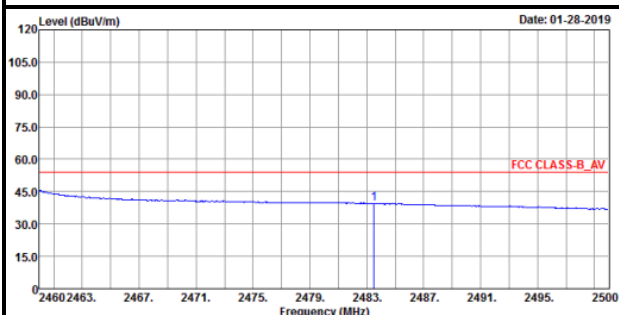
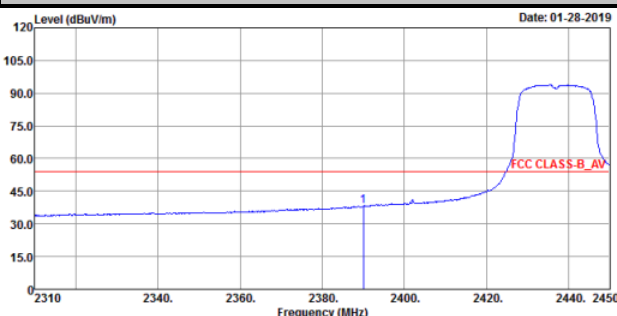


Ch 6 (Average)

Horizontal

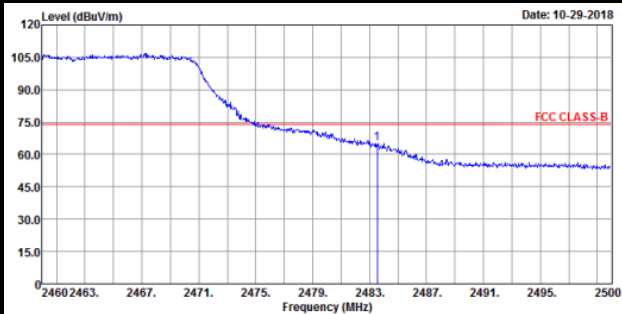


Vertical

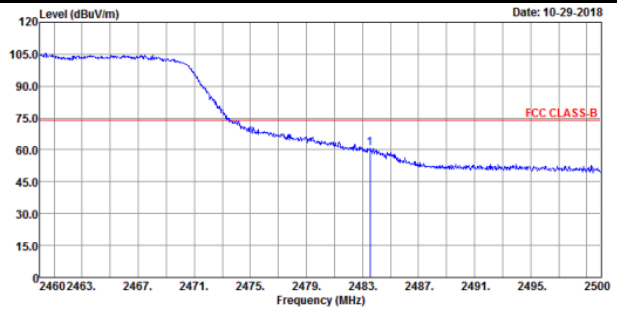


Ch 11 (Peak)

Horizontal

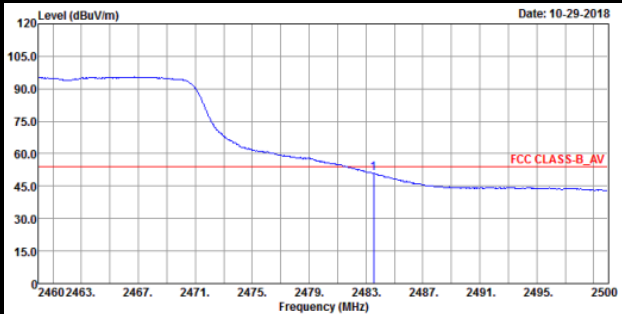


Vertical

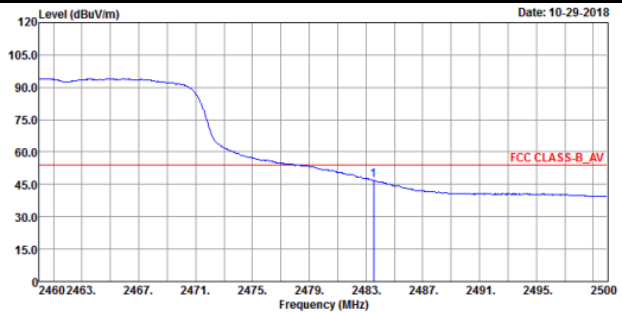


Ch 11 (Average)

Horizontal

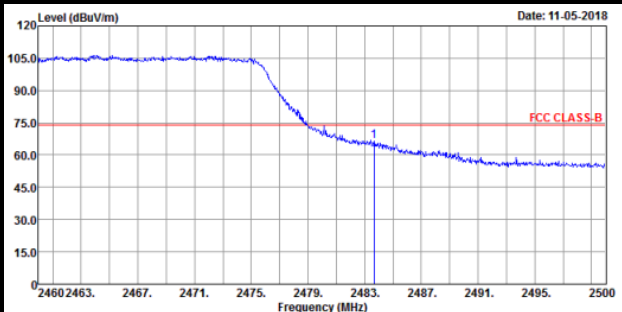


Vertical

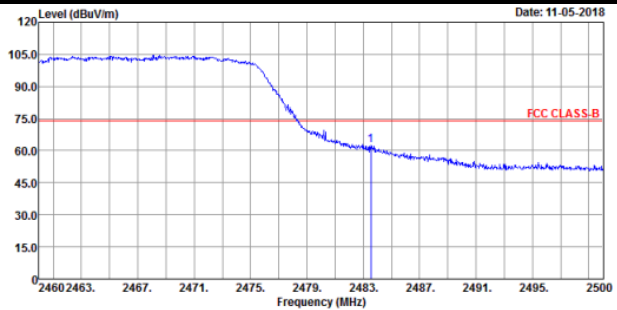


Ch 12 (Peak)

Horizontal

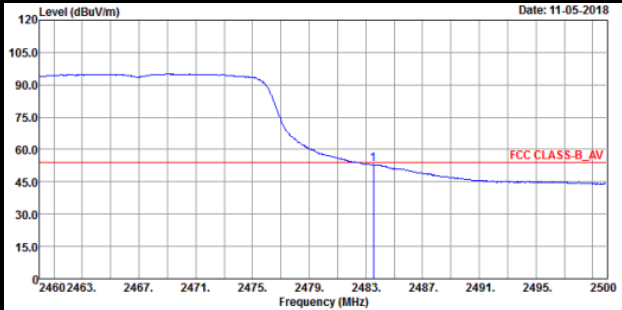


Vertical

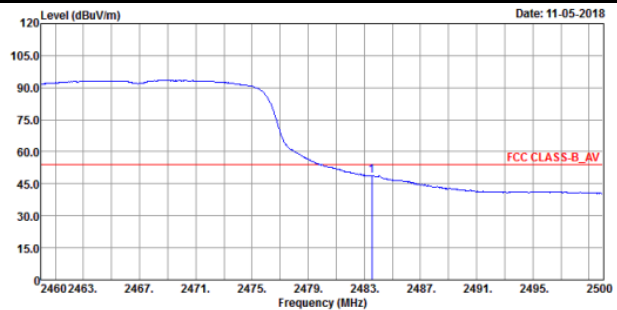


Ch 12 (Average)

Horizontal

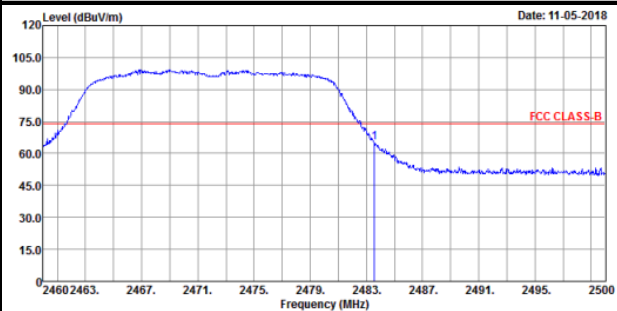


Vertical

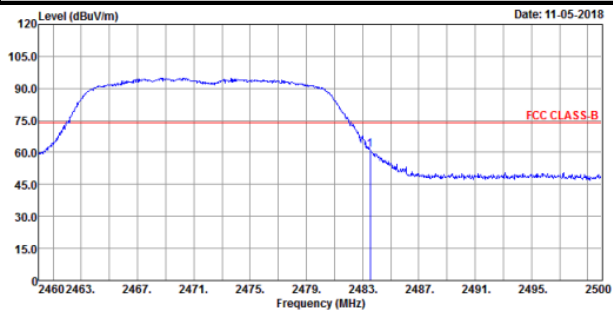


Ch 13 (Peak)

Horizontal

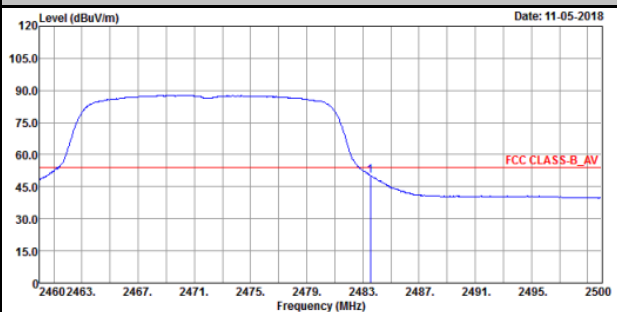


Vertical

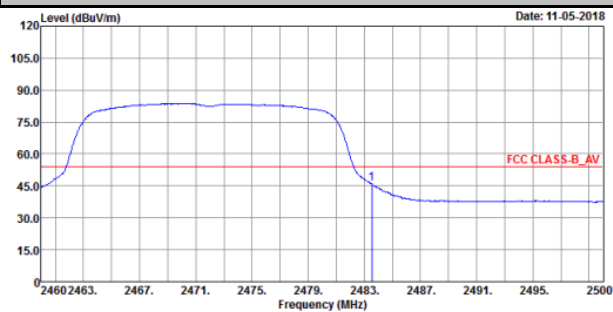


Ch 13 (Average)

Horizontal



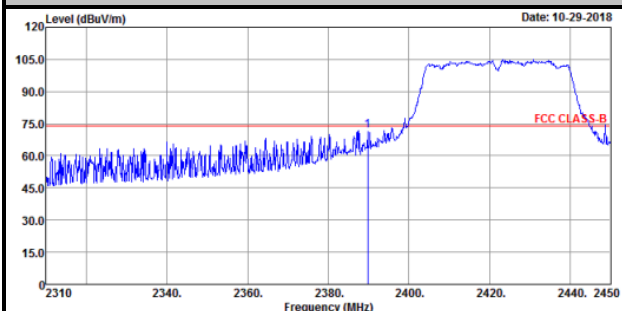
Vertical



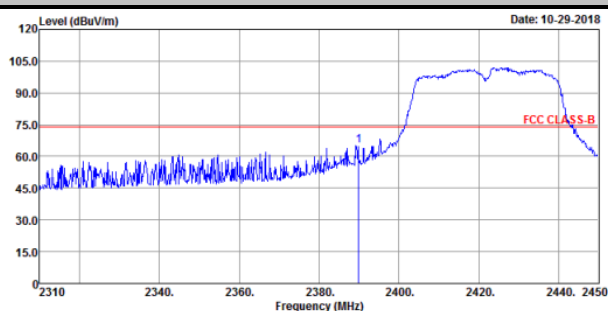
802.11n (HT40)

Ch 3 (Peak)

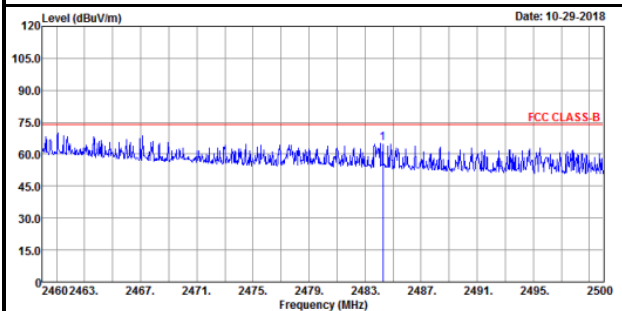
Horizontal



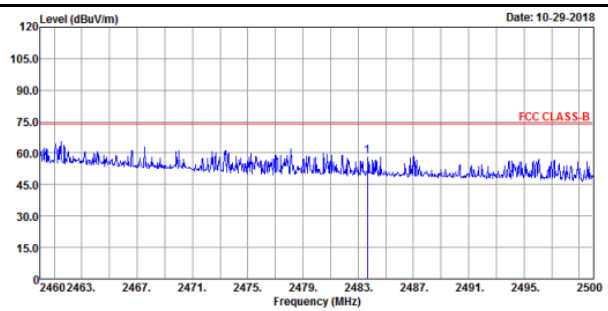
Vertical



Horizontal

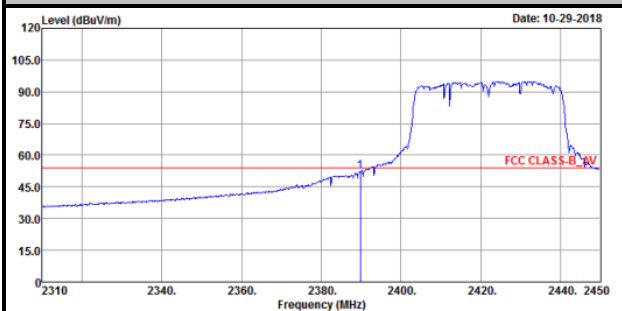


Vertical

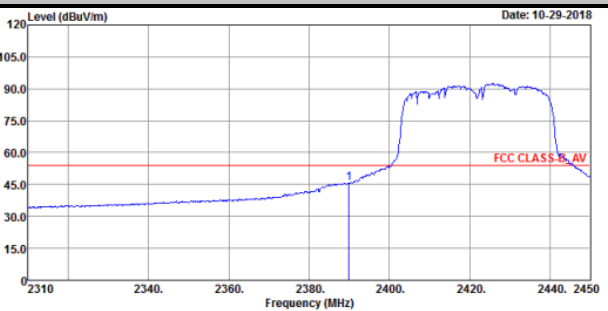


Ch 3 (Average)

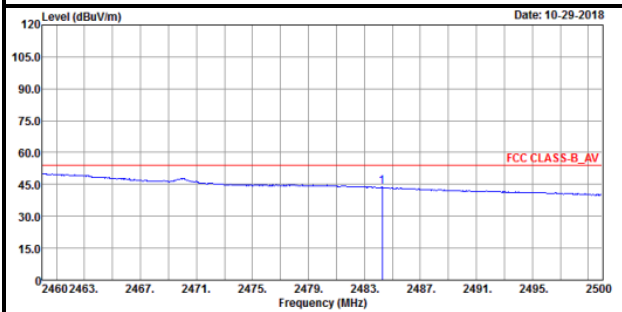
Horizontal



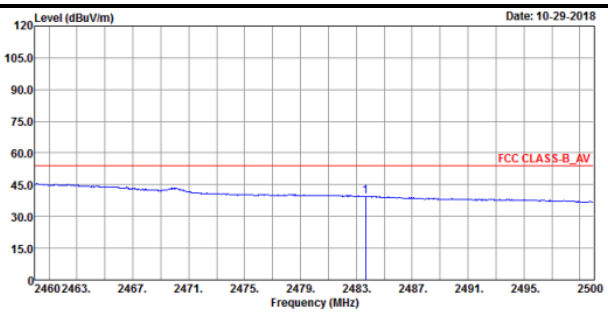
Vertical



Horizontal

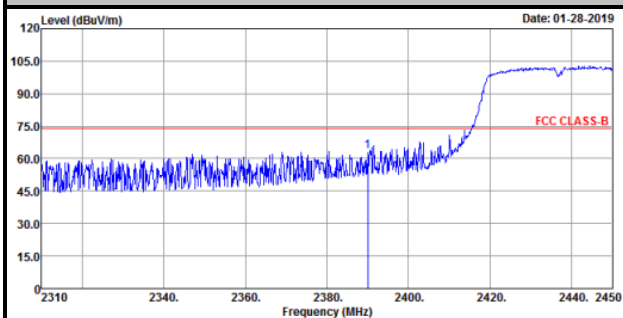


Vertical

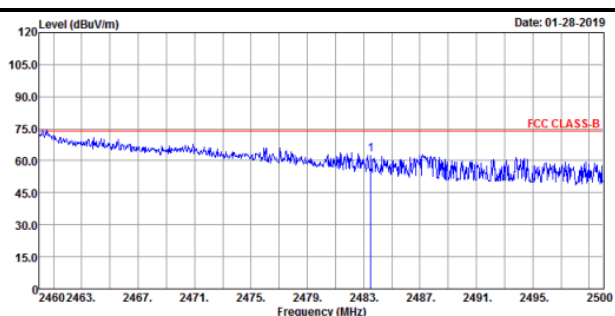
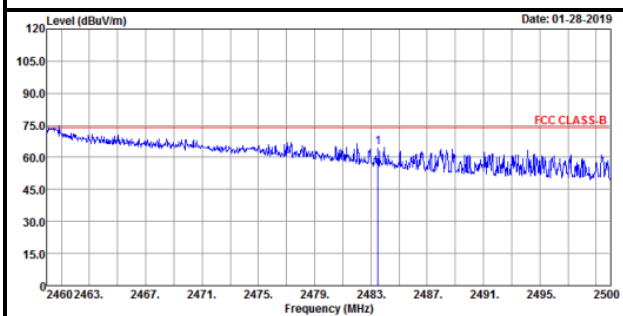
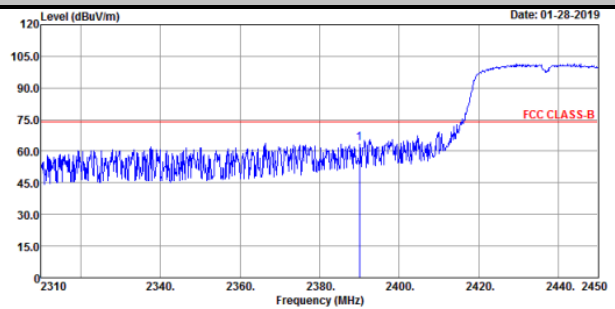


Ch 6 (Peak)

Horizontal

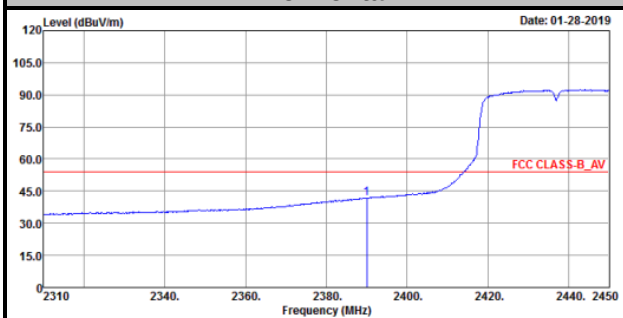


Vertical

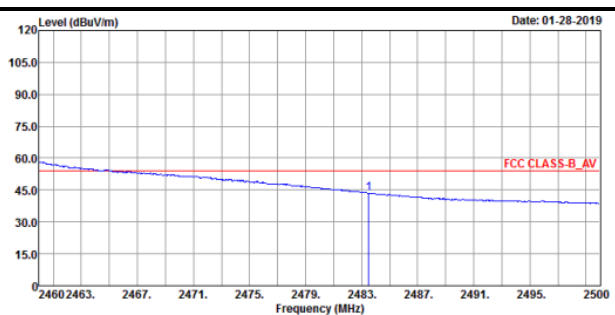
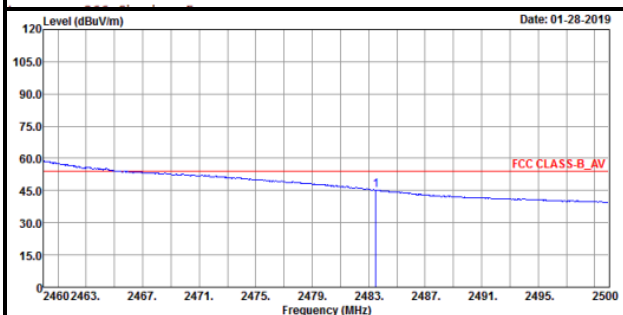
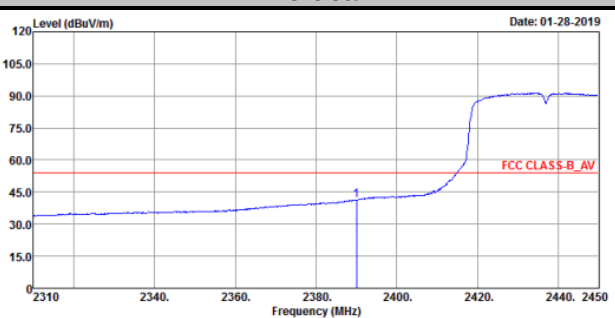


Ch 6 (Average)

Horizontal

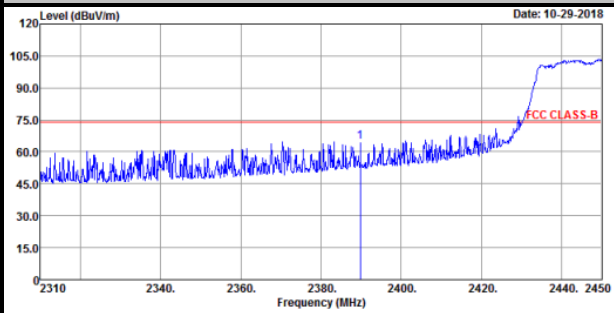


Vertical

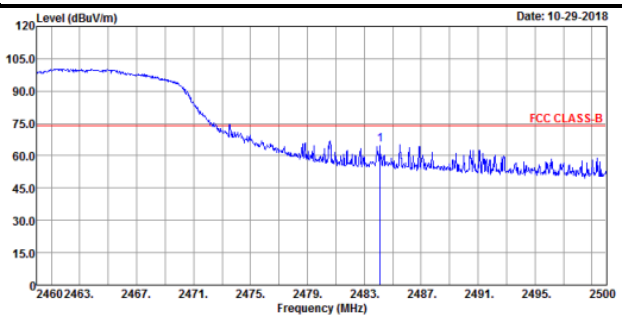
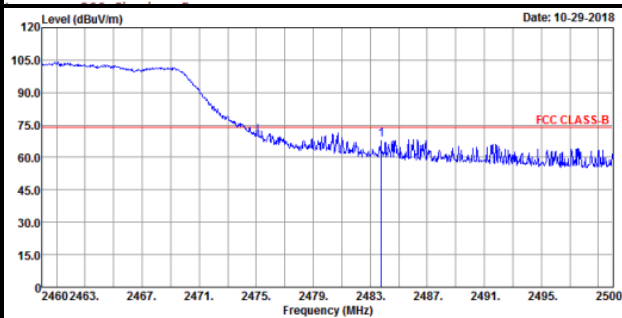
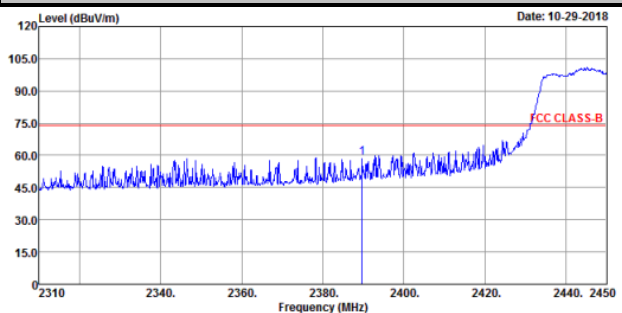


Ch 9 (Peak)

Horizontal

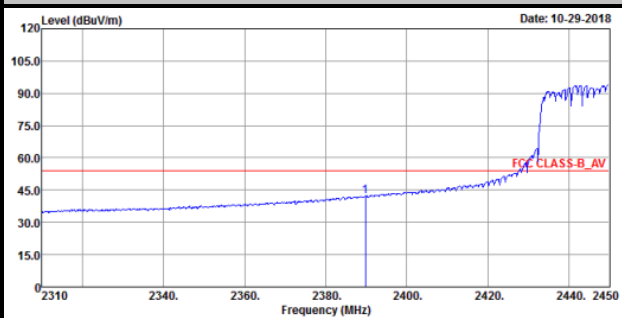


Vertical

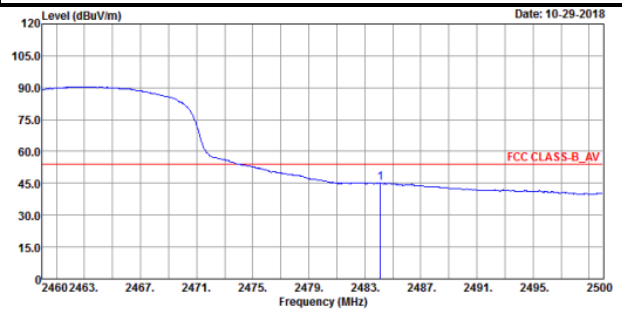
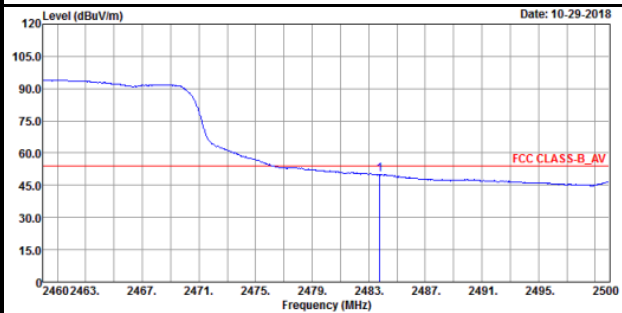
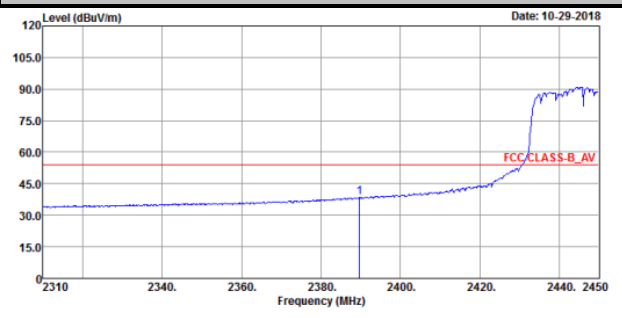


Ch 9 (Average)

Horizontal

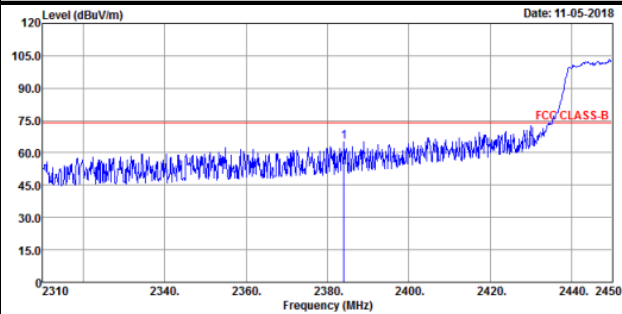


Vertical

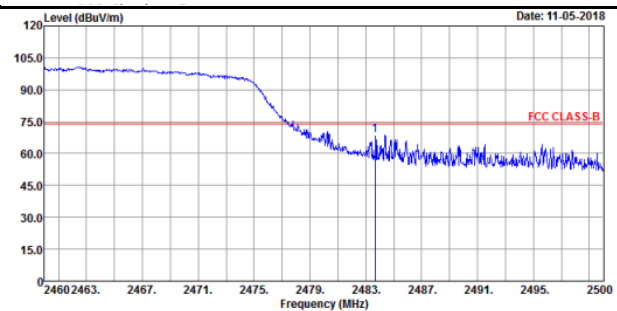
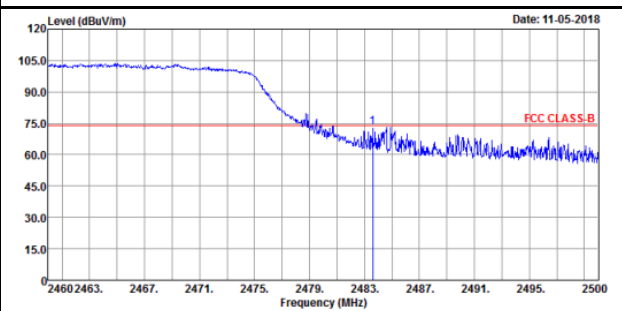
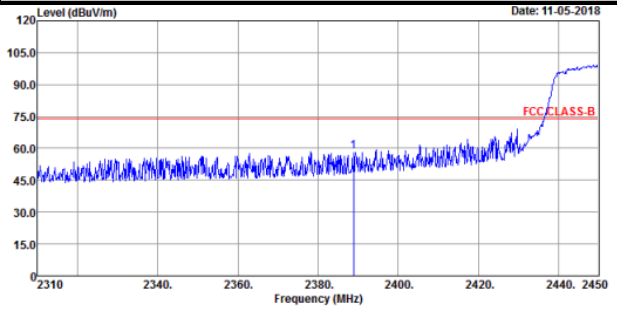


Ch 10 (Peak)

Horizontal

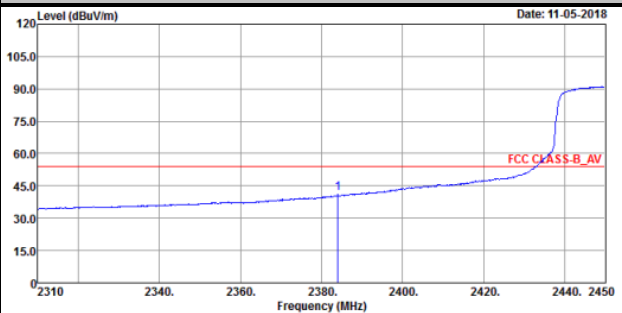


Vertical

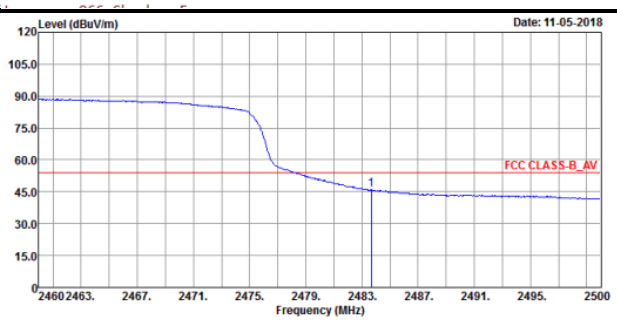
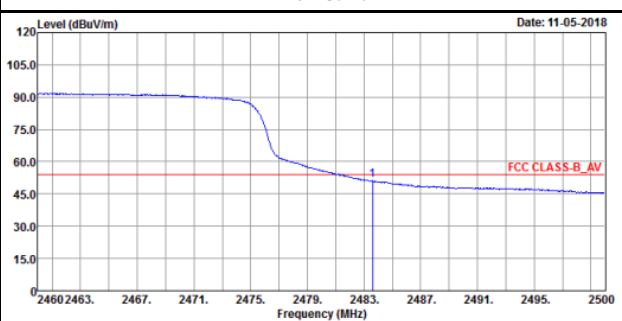
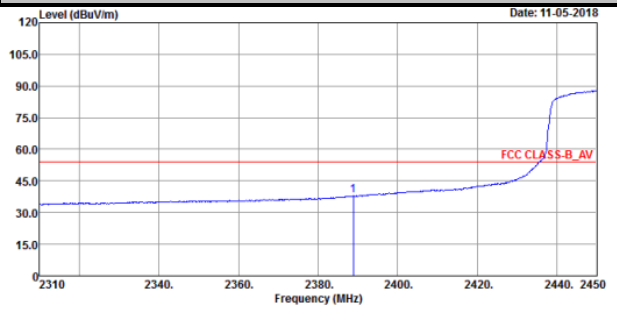


Ch 10 (Average)

Horizontal

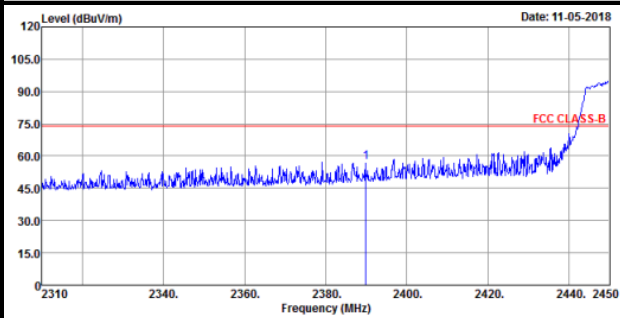


Vertical

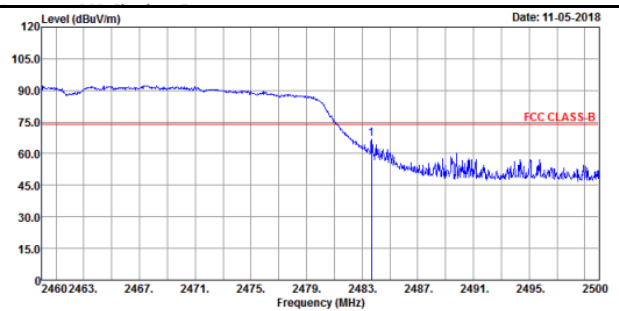
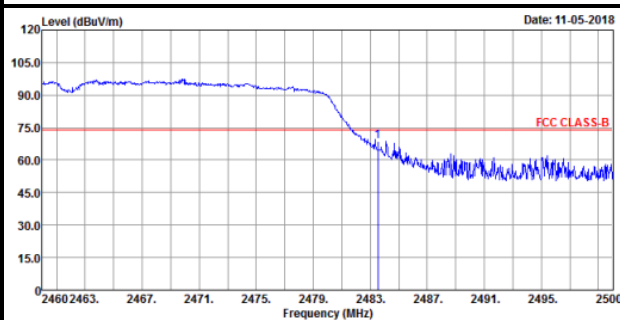
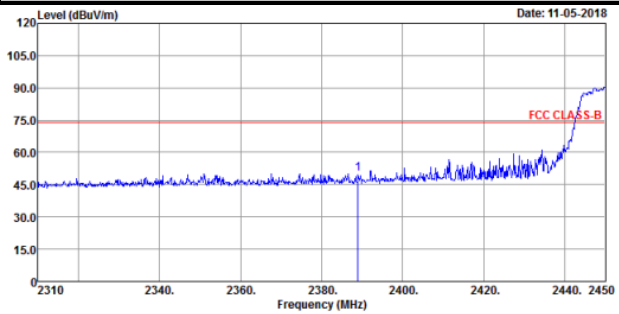


Ch 11 (Peak)

Horizontal

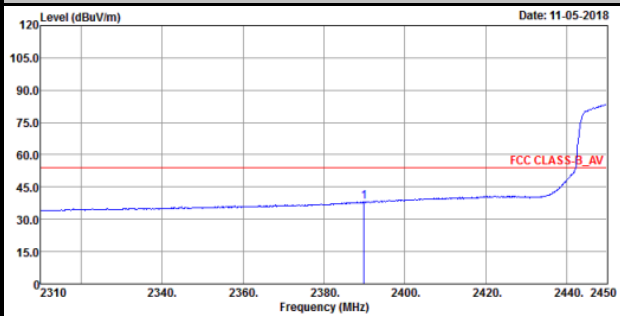


Vertical

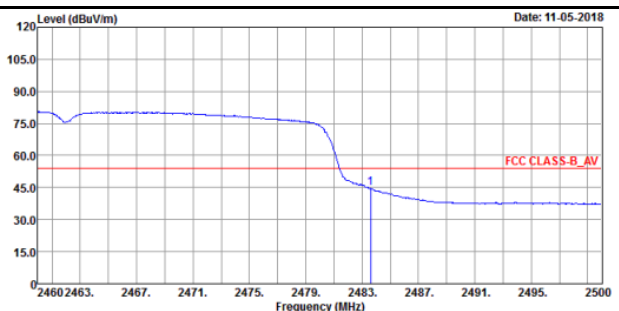
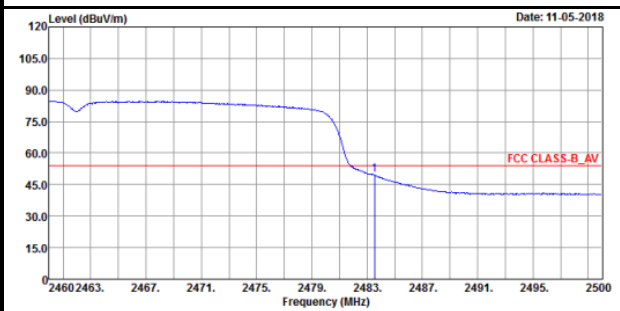
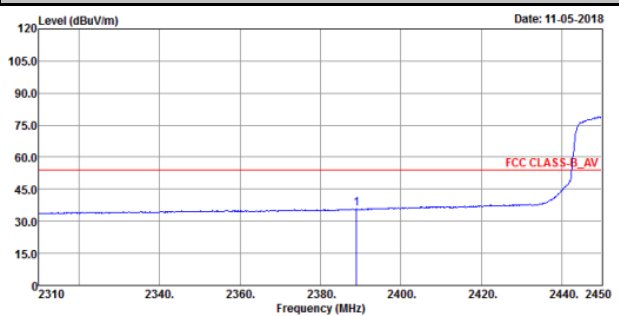


Ch 11 (Average)

Horizontal



Vertical



Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

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

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