

Partial FCC Test Report

Report No.: RFBCYK-WTW-P21010405-2

FCC ID: TX2-RTL8822CE

Test Model: RTL8822CE

Received Date: Jan. 15, 2021

Test Date: Jan. 21, 2021 ~ Feb. 08, 2021

Issued Date: Feb. 20, 2021

Applicant: Realtek Semiconductor Corp.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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FCC Registration /
Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBCYK-WTW-P21010405-2	Original Release	Feb. 20, 2021

1 Certificate of Conformity

Product: 802.11a/b/g/n/ac RTL8822CE Combo module

Brand: Realtek

Test Model: RTL8822CE

Sample Status: Engineering Sample

Applicant: Realtek Semiconductor Corp.

Test Date: Jan. 21, 2021 ~ Feb. 08, 2021

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 : Shelly Hsueh, **Date:** Feb. 20, 2021
Shelly Hsueh / Specialist

Approved by : Dylan Chiou, **Date:** Feb. 20, 2021
Dylan Chiou / Senior 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 -23.63 dB at 0.38200 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1 dB at 2390 MHz.
15.247(d)	Antenna Port Emission	Pass	Refer to Note 2
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Reference only
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Meet the requirement of limit.

Note:

- For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
- Please refer to BV CPS report no. RF180816E04.
- 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) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	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 RTL8822CE Combo module
Brand	Realtek
Test Model	RTL8822CE
Status of EUT	Engineering Sample
Power Supply Rating	19Vdc (adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
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 Mbps 802.11ac: up to 866.7 Mbps
Operating Frequency	2412 ~ 2472 MHz
Number of Channel	13 for 802.11b, 802.11g, 802.11n (HT20/VHT20) 9 for 802.11n (HT40/VHT40)
Output Power	SISO:448.745 mW MIMO:791.333 mW
Antenna Type	PIFA antenna with 2.24 dBi gain
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to BV CPS report no. RF180816E04. The difference compared with original report is added End-product and updated the antenna. Therefore, the EUT is re-tested in this report.
2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx Function
802.11b	1TX / 2TX
802.11g	1TX / 2TX
802.11n (HT20/VHT20)	1TX / 2TX
802.11n (HT40/VHT40)	1TX / 2TX

3. The End-product is not supported beamforming function.
4. The EUT is authorized for use in specific End-product. Please refer to below table for further details.

Product Name	Brand	Model
Developer Board Kit	ASUS	DKSC-101

5. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	DELTA	ADP-65DE B	I/P: 100-240 Vac, 50/60 Hz, 1.5 A O/P: 19 Vdc, 3.42 A, 65W

6. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
7. 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/VHT20):

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/VHT40):

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	
A	√			√	SISO Mode
B	√	√	√	√	MIMO Mode

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 each 3 axis. The worst case was found when positioned on **Z-plane**.

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)
A, B	802.11b	1 to 13	1, 11, 12, 13	DSSS	DBPSK	1.0
A, B	802.11g	1 to 13	1, 11, 12, 13	OFDM	BPSK	6.0
A, B	802.11n (VHT20)	1 to 13	1, 11, 12, 13	OFDM	BPSK	6.5
A, B	802.11n (VHT40)	3 to 11	3, 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)
B	802.11n (VHT40)	3 to 11	3	OFDM	BPSK	13.5

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)
B	802.11n (VHT40)	3 to 11	3	OFDM	BPSK	13.5

Bandedge Measurement:

- ☒ 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)
A, B	802.11b	1 to 13	1, 11, 12, 13	DSSS	DBPSK	1.0
A, B	802.11g	1 to 13	1, 11, 12, 13	OFDM	BPSK	6.0
A, B	802.11n (VHT20)	1 to 13	1, 11, 12, 13	OFDM	BPSK	6.5
A, B	802.11n (VHT40)	3 to 9	3, 9, 10, 11	OFDM	BPSK	13.5

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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)
A, B	802.11b	1 to 13	1, 11, 12, 13	DSSS	DBPSK	1.0
A, B	802.11g	1 to 13	1, 11, 12, 13	OFDM	BPSK	6.0
A, B	802.11n (VHT20)	1 to 13	1, 11, 12, 13	OFDM	BPSK	6.5
A, B	802.11n (VHT40)	3 to 9	3, 9, 10, 11	OFDM	BPSK	13.5

Test Condition:

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

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.

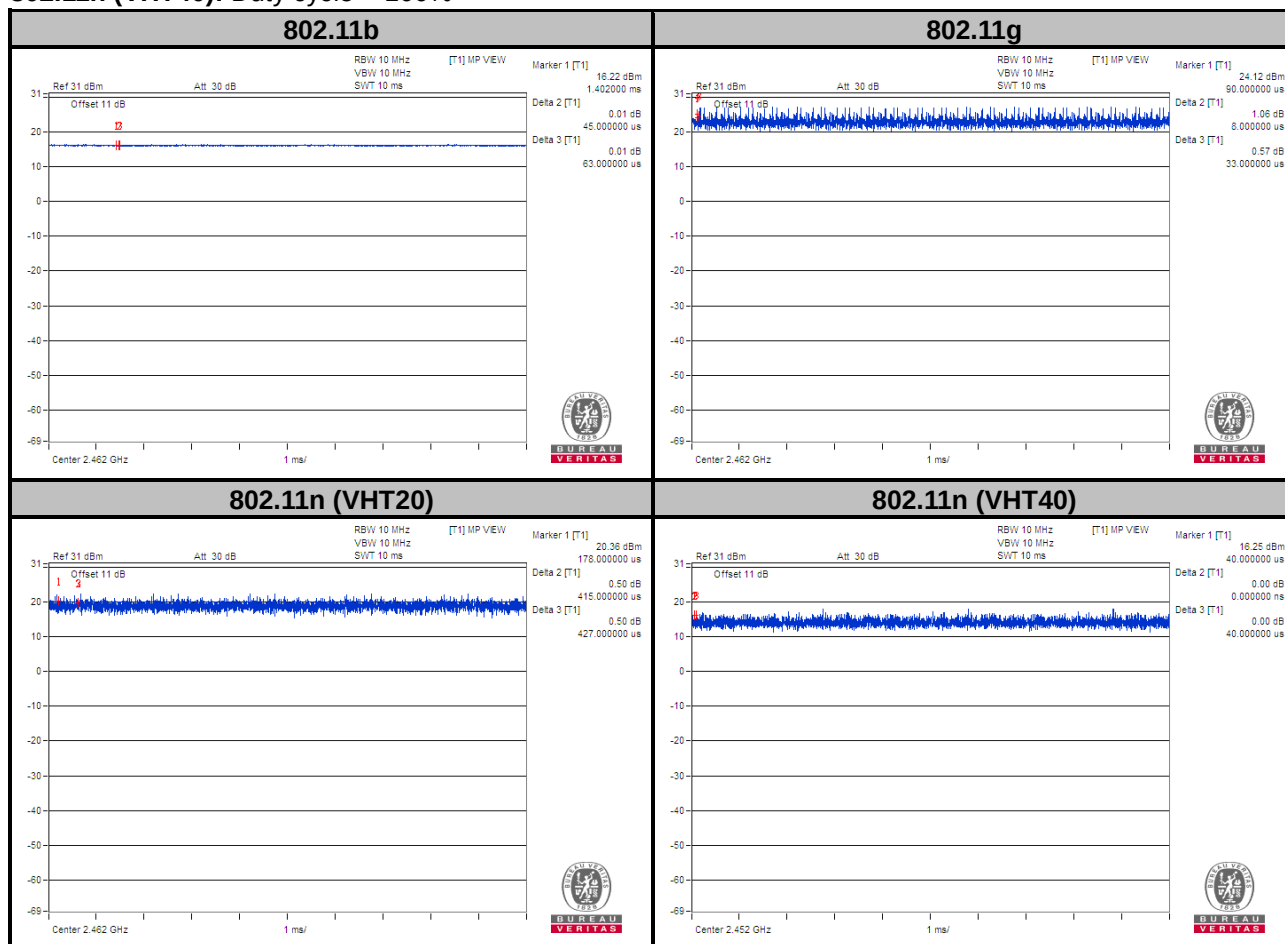
SISO

802.11b: Duty cycle = 100%

802.11g: Duty cycle = 100%

802.11n (VHT20): Duty cycle = 100%

802.11n (VHT40): Duty cycle = 100%



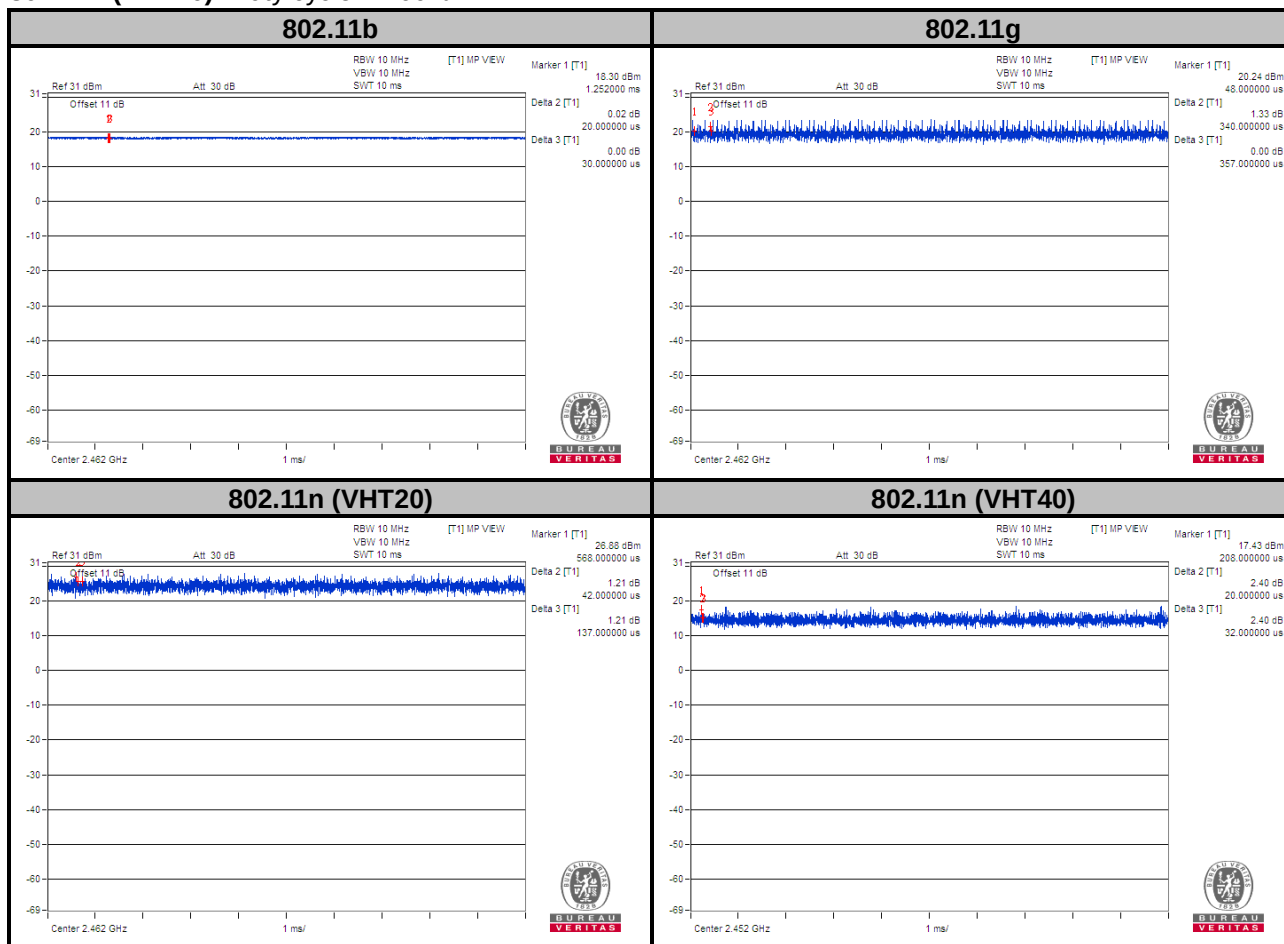
MIMO

802.11b: Duty cycle = 100%

802.11g: Duty cycle = 100%

802.11n (VHT20): Duty cycle = 100%

802.11n (VHT40): Duty cycle = 100%



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

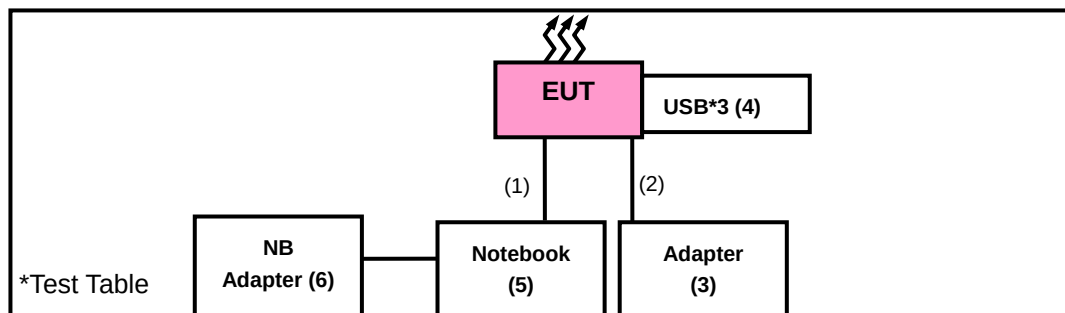
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	LAN cable	NEX1	E142890	N/A	N/A
2.	Adapter Cable	N/A	N/A	N/A	N/A
3.	Adapter	DELTA	ADP-65DE B	N/A	N/A
4.	USB	TOSHIBA	N/A	N/A	N/A
	USB	SP	N/A	N/A	N/A
	USB	Apacer	N/A	N/A	N/A
5.	Notebook	Dell	LATITUDE	F9MQBW1	N/A
6.	NB Adapter	Dell	DA90PM111	0mk947	N/A

No.	Signal Cable Description of The Above Support Units
1.	1.5 m
2.	1.5 m

Note:

1. All power cords of the above support units are non-shielded (1.8m).

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

Test Standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 Meas Guidance v05r02

KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

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 ROHDE & SCHWARZ (Above 1GHz)	ESR7	101471	Mar. 11, 2020	Mar. 10, 2021
Spectrum Analyzer Agilent	E4446A	MY51100039	Dec. 01, 2020	Nov. 30, 2021
PXA S Analyzer KEYSIGHT	N9030B	MY57140953	Jul. 02, 2020	Jul. 01, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-149	Nov. 04, 2020	Nov. 03, 2021
RF signal cable (with 5dB PAD) Times	LMR-400 (18M)	CABLE-CH2-01	Mar. 23, 2020	Mar. 22, 2021
HORN Antenna (with 4dB PAD) SCHWARZBECK	BBHA 9120 D	9120D-405	Nov. 22, 2020	Nov. 21, 2021
Loop Antenna EMCI	EM-6879	269	Sep. 17, 2020	Sep. 16, 2021
Pre-Amplifier Agilent (Above 1GHz)	8449B	3008A01961	Sep. 04, 2020	Sep. 03, 2021
Software BV ADT	BV ADT_Radiated_ V8.7.08	NA	NA	NA
Antenna Tower BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Controller BV ADT	SC100	SC93021702	NA	NA
BandPass Filter (2.4G) MICRO-TRONICS	BRM17690-01	003	Sep. 04, 2020	Sep. 03, 2021
BandPass Filter (5G) MICRO-TRONICS	BRM50716-01	G011	Sep. 04, 2020	Sep. 03, 2021
RF Coaxial Cable EMCI	EMC102-KM-KM-1 000	170819	Sep. 04, 2020	Sep. 03, 2021
RF Coaxial Cable Rosnol	K1K50-UP0279-K1 K50-3000	181129-1	Sep. 04, 2020	Sep. 03, 2021
RF Coaxial Cable JUNFLON+EMC	JUNFLON+EMC10 4-SM-SM-6000	Cable-CH2-02(MW X3221308G003+13 0710)	Jan. 16, 2021	Jan. 15, 2022
Fix tool for Boresight antenna	BAF-01	2	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 04, 2020	Sep. 03, 2021
HORN Antenna (with 3dB PAD) SCHWARZBECK	BBHA 9170	148	Nov. 22, 2020	Nov. 21, 2021

- 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 2 (966 Chamber 1).
 3. The VCCI Site Registration No. is G-10018.

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:

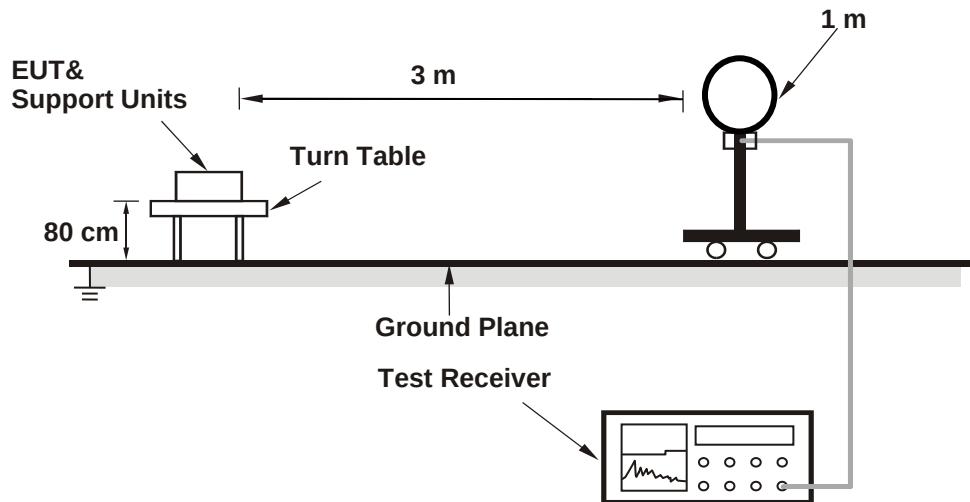
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) 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 = 10 Hz ; 11g: RBW = 1 MHz, VBW = 10 Hz ;
11n (VHT20): RBW = 1 MHz, VBW = 10 Hz ; 11n (VHT40): RBW = 1 MHz, VBW = 10 Hz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

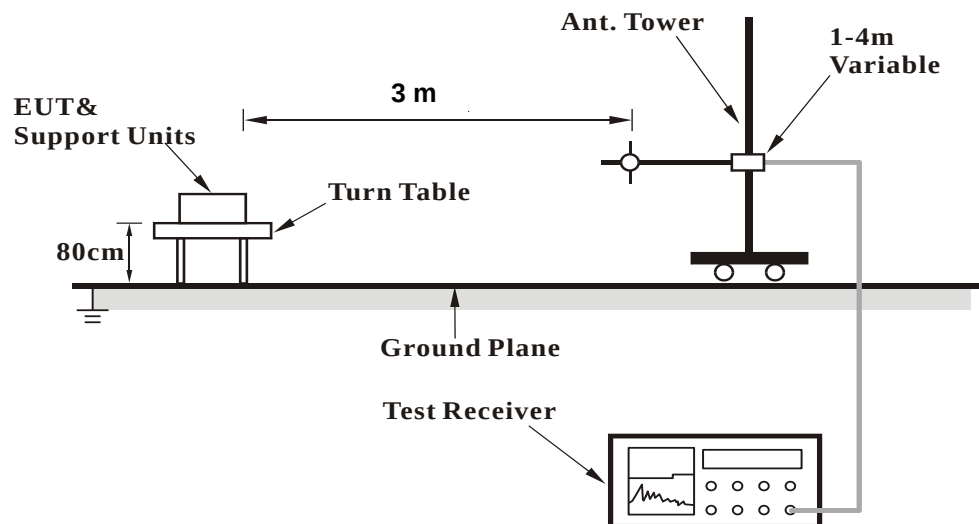
No deviation.

4.1.5 Test Set Up

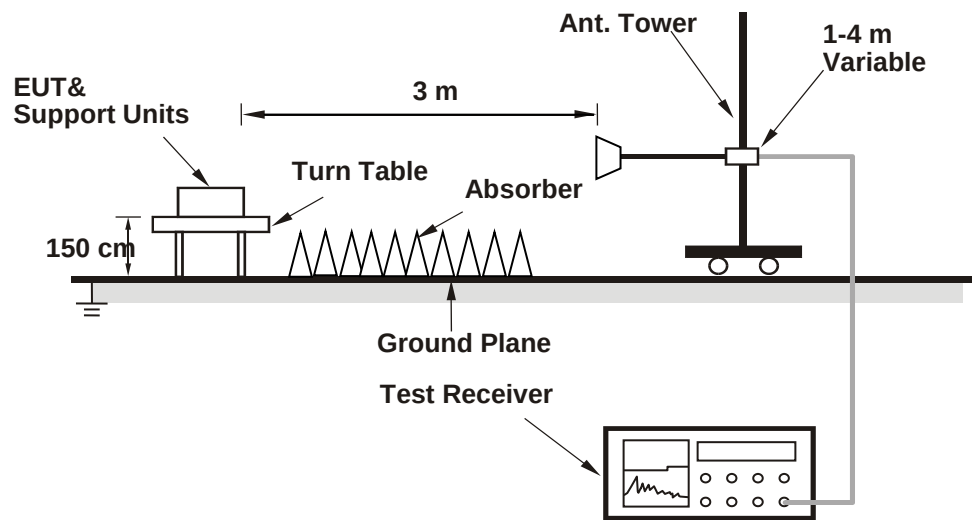
<Radiated Emission below 30 MHz>



<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 :

SISO

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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	43.87	39.37	4.5	54	-10.13	172	69	Average
2390	53.35	48.85	4.5	74	-20.65	172	69	Peak
2412	100.24	95.69	4.55			172	69	Average
2412	103.4	98.85	4.55			172	69	Peak
4824	43.84	33.55	10.29	54	-10.16	298	109	Average
4824	50.16	39.87	10.29	74	-23.84	298	109	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	48.57	44.07	4.5	54	-5.43	144	153	Average
2390	57.07	52.57	4.5	74	-16.93	144	153	Peak
2412	105.24	100.69	4.55			144	153	Average
2412	108.12	103.57	4.55			144	153	Peak
4824	43.16	32.87	10.29	54	-10.84	135	97	Average
4824	49.27	38.98	10.29	74	-24.73	135	97	Peak

Remarks:

1. Emission Level = Read Level + 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 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	100.39	95.77	4.62			172	69	Average
2462	103.16	98.54	4.62			172	69	Peak
2483.5	43.17	38.51	4.66	54	-10.83	172	69	Average
2483.5	53.34	48.68	4.66	74	-20.66	172	69	Peak
4924	41.23	30.98	10.25	54	-12.77	128	56	Average
4924	47.64	37.39	10.25	74	-26.36	128	56	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	105.56	100.94	4.62			258	167	Average
2462	108.04	103.42	4.62			258	167	Peak
2483.5	47.43	42.77	4.66	54	-6.57	258	167	Average
2483.5	55.8	51.14	4.66	74	-18.2	258	167	Peak
4924	42.04	31.79	10.25	54	-11.96	182	131	Average
4924	48.38	38.13	10.25	74	-25.62	182	131	Peak

Remarks:

1. Emission Level = Read Level + 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	95.44	90.81	4.63			172	69	Average
2467	98.4	93.77	4.63			172	69	Peak
2483.5	41.91	37.25	4.66	54	-12.09	172	69	Average
2483.5	53.34	48.68	4.66	74	-20.66	172	69	Peak
4934	42.05	31.79	10.26	54	-11.95	191	112	Average
4934	48.44	38.18	10.26	74	-25.56	191	112	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	100.29	95.66	4.63			258	167	Average
2467	103.6	98.97	4.63			258	167	Peak
2483.5	45.65	40.99	4.66	54	-8.35	258	167	Average
2483.5	55.09	50.43	4.66	74	-18.91	258	167	Peak
4934	43.76	33.5	10.26	54	-10.24	206	151	Average
4934	49.9	39.64	10.26	74	-24.1	206	151	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2467 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	94.48	89.84	4.64			172	69	Average
2472	97.91	93.27	4.64			172	69	Peak
2483.5	42.86	38.2	4.66	54	-11.14	172	69	Average
2483.5	53.72	49.06	4.66	74	-20.28	172	69	Peak
4944	42.24	31.89	10.35	54	-11.76	304	158	Average
4944	48.54	38.19	10.35	74	-25.46	304	158	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	99.36	94.72	4.64			258	167	Average
2472	102.75	98.11	4.64			258	167	Peak
2483.5	47.93	43.27	4.66	54	-6.07	258	167	Average
2483.5	56.33	51.67	4.66	74	-17.67	258	167	Peak
4944	42.2	31.85	10.35	54	-11.8	161	172	Average
4944	48.38	38.03	10.35	74	-25.62	161	172	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2472 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	43.19	38.69	4.5	54	-10.81	172	69	Average
2390	56.56	52.06	4.5	74	-17.44	172	69	Peak
2412	95.59	91.04	4.55			172	69	Average
2412	102.8	98.25	4.55			172	69	Peak
4824	42.17	31.88	10.29	54	-11.83	163	28	Average
4824	48.37	38.08	10.29	74	-25.63	163	28	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	47.16	42.66	4.5	54	-6.84	144	153	Average
2390	62.5	58	4.5	74	-11.5	144	153	Peak
2412	100.15	95.6	4.55			144	153	Average
2412	107	102.45	4.55			144	153	Peak
4824	42.41	32.12	10.29	54	-11.59	231	271	Average
4824	48.66	38.37	10.29	74	-25.34	231	271	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	93.29	88.67	4.62			172	69	Average
2462	100.1	95.48	4.62			172	69	Peak
2483.5	42.07	37.41	4.66	54	-11.93	172	69	Average
2483.5	54.28	49.62	4.66	74	-19.72	172	69	Peak
4924	42.16	31.91	10.25	54	-11.84	131	180	Average
4924	48.25	38	10.25	74	-25.75	131	180	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	98.64	94.02	4.62			258	167	Average
2462	105.43	100.81	4.62			258	167	Peak
2483.5	45.86	41.2	4.66	54	-8.14	258	167	Average
2483.5	59.86	55.2	4.66	74	-14.14	258	167	Peak
4924	43.48	33.23	10.25	54	-10.52	136	228	Average
4924	49.8	39.55	10.25	74	-24.2	136	228	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	89.66	85.03	4.63			172	69	Average
2467	96.56	91.93	4.63			172	69	Peak
2483.5	42.49	37.83	4.66	54	-11.51	172	69	Average
2483.5	53.05	48.39	4.66	74	-20.95	172	69	Peak
4934	42.06	31.8	10.26	54	-11.94	284	199	Average
4934	48.22	37.96	10.26	74	-25.78	284	199	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	94.72	90.09	4.63			258	167	Average
2467	101.39	96.76	4.63			258	167	Peak
2483.5	48.08	43.42	4.66	54	-5.92	258	167	Average
2483.5	58.64	53.98	4.66	74	-15.36	258	167	Peak
4934	42.18	31.92	10.26	54	-11.82	158	211	Average
4934	48.24	37.98	10.26	74	-25.76	158	211	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2467 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	86.37	81.73	4.64			172	69	Average
2472	93.77	89.13	4.64			172	69	Peak
2483.5	41.84	37.18	4.66	54	-12.16	172	69	Average
2483.5	52.94	48.28	4.66	74	-21.06	172	69	Peak
4944	41.94	31.59	10.35	54	-12.06	284	184	Average
4944	48.16	37.81	10.35	74	-25.84	284	184	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	91.11	86.47	4.64			258	167	Average
2472	98.44	93.8	4.64			258	167	Peak
2483.5	44.96	40.3	4.66	54	-9.04	258	167	Average
2483.5	56.73	52.07	4.66	74	-17.27	258	167	Peak
4944	41.43	31.08	10.35	54	-12.57	154	94	Average
4944	47.77	37.42	10.35	74	-26.23	154	94	Peak

Remarks:

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

802.11n (VHT20)

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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	43.9	39.4	4.5	54	-10.1	172	69	Average
2390	55.55	51.05	4.5	74	-18.45	172	69	Peak
2412	94.74	90.19	4.55			172	69	Average
2412	101.51	96.96	4.55			172	69	Peak
4824	42.57	32.28	10.29	54	-11.43	133	229	Average
4824	49.04	38.75	10.29	74	-24.96	133	229	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	47.85	43.35	4.5	54	-6.15	144	153	Average
2390	61.79	57.29	4.5	74	-12.21	144	153	Peak
2412	99.88	95.33	4.55			144	153	Average
2412	106.48	101.93	4.55			144	153	Peak
4824	43.12	32.83	10.29	54	-10.88	109	172	Average
4824	49.32	39.03	10.29	74	-24.68	109	172	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	93.49	88.87	4.62			172	69	Average
2462	100.8	96.18	4.62			172	69	Peak
2483.5	42.81	38.15	4.66	54	-11.19	172	69	Average
2483.5	54.96	50.3	4.66	74	-19.04	172	69	Peak
4924	42.39	32.14	10.25	54	-11.61	100	360	Average
4924	48.87	38.62	10.25	74	-25.13	100	360	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	98.46	93.84	4.62			258	167	Average
2462	105.44	100.82	4.62			258	167	Peak
2483.5	47.79	43.13	4.66	54	-6.21	258	167	Average
2483.5	61.06	56.4	4.66	74	-12.94	258	167	Peak
4924	41.54	31.29	10.25	54	-12.46	151	172	Average
4924	47.84	37.59	10.25	74	-26.16	151	172	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	90.58	85.95	4.63			172	69	Average
2467	97.45	92.82	4.63			172	69	Peak
2483.5	43.1	38.44	4.66	54	-10.9	172	69	Average
2483.5	56.8	52.14	4.66	74	-17.2	172	69	Peak
4934	42.69	32.43	10.26	54	-11.31	180	27	Average
4934	48.86	38.6	10.26	74	-25.14	180	27	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	95.25	90.62	4.63			258	167	Average
2467	102.46	97.83	4.63			258	167	Peak
2483.5	48.77	44.11	4.66	54	-5.23	258	167	Average
2483.5	64.04	59.38	4.66	74	-9.96	258	167	Peak
4934	43.18	32.92	10.26	54	-10.82	192	346	Average
4934	49.25	38.99	10.26	74	-24.75	192	346	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2467 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	87.48	82.84	4.64			172	69	Average
2472	94.39	89.75	4.64			172	69	Peak
2483.5	42.09	37.43	4.66	54	-11.91	172	69	Average
2483.5	56.45	51.79	4.66	74	-17.55	172	69	Peak
4944	43.27	32.92	10.35	54	-10.73	193	58	Average
4944	49.39	39.04	10.35	74	-24.61	193	58	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	92.34	87.7	4.64			258	167	Average
2472	99.32	94.68	4.64			258	167	Peak
2483.5	46.36	41.7	4.66	54	-7.64	258	167	Average
2483.5	63.65	58.99	4.66	74	-10.35	258	167	Peak
4944	42.75	32.4	10.35	54	-11.25	263	181	Average
4944	48.96	38.61	10.35	74	-25.04	263	181	Peak

Remarks:

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

802.11n (VHT40)

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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	46.38	41.88	4.5	54	-7.62	172	69	Average
2390	56.88	52.38	4.5	74	-17.12	172	69	Peak
2422	90.66	86.1	4.56			172	69	Average
2422	97.42	92.86	4.56			172	69	Peak
2483.5	42.02	37.36	4.66	54	-11.98	172	69	Average
2483.5	52.87	48.21	4.66	74	-21.13	172	69	Peak
4844	42.36	32.13	10.23	54	-11.64	118	170	Average
4844	48.55	38.32	10.23	74	-25.45	118	170	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	53	48.5	4.5	54	-1	144	153	Average
2390	64.13	59.63	4.5	74	-9.87	144	153	Peak
2422	95.87	91.31	4.56			144	153	Average
2422	102.88	98.32	4.56			144	153	Peak
2483.5	42.69	38.03	4.66	54	-11.31	144	153	Average
2483.5	53.55	48.89	4.66	74	-20.45	144	153	Peak
4844	43.08	32.85	10.23	54	-10.92	147	32	Average
4844	49.23	39	10.23	74	-24.77	147	32	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2422 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.82	37.32	4.5	54	-12.18	172	69	Average
2390	52.17	47.67	4.5	74	-21.83	172	69	Peak
2452	90.3	85.7	4.6			172	69	Average
2452	98.44	93.84	4.6			172	69	Peak
2483.5	44.73	40.07	4.66	54	-9.27	172	69	Average
2483.5	55.29	50.63	4.66	74	-18.71	172	69	Peak
4904	43.21	33.07	10.14	54	-10.79	151	84	Average
4904	49.4	39.26	10.14	74	-24.6	151	84	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	42.83	38.33	4.5	54	-11.17	180	174	Average
2390	54.27	49.77	4.5	74	-19.73	180	174	Peak
2452	93.63	89.03	4.6			180	174	Average
2452	101.87	97.27	4.6			180	174	Peak
2483.5	52.68	48.02	4.66	54	-1.32	180	174	Average
2483.5	61.81	57.15	4.66	74	-12.19	180	174	Peak
4904	42.3	32.16	10.14	54	-11.7	123	243	Average
4904	48.43	38.29	10.14	74	-25.57	123	243	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2452 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.04	36.54	4.5	54	-12.96	210	154	Average
2390	51.93	47.43	4.5	74	-22.07	210	154	Peak
2457	89.18	84.56	4.62			210	154	Average
2457	95.81	91.19	4.62			210	154	Peak
2483.5	46.06	41.4	4.66	54	-7.94	210	154	Average
2483.5	56.58	51.92	4.66	74	-17.42	210	154	Peak
4914	41.83	31.68	10.15	54	-12.17	105	219	Average
4914	47.91	37.76	10.15	74	-26.09	105	219	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	43.03	38.53	4.5	54	-10.97	299	174	Average
2390	52.95	48.45	4.5	74	-21.05	299	174	Peak
2457	93.58	88.96	4.62			299	174	Average
2457	100.8	96.18	4.62			299	174	Peak
2483.5	50.19	45.53	4.66	54	-3.81	299	174	Average
2483.5	59.23	54.57	4.66	74	-14.77	299	174	Peak
4914	42.47	32.32	10.15	54	-11.53	138	226	Average
4914	48.8	38.65	10.15	74	-25.2	138	226	Peak

Remarks:

1. Emission Level = Read Level + 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.92	36.42	4.5	54	-13.08	210	154	Average
2390	52.21	47.71	4.5	74	-21.79	210	154	Peak
2462	83.64	79.02	4.62			210	154	Average
2462	90.84	86.22	4.62			210	154	Peak
2483.5	44.6	39.94	4.66	54	-9.4	210	154	Average
2483.5	59.05	54.39	4.66	74	-14.95	210	154	Peak
4924	42.04	31.79	10.25	54	-11.96	138	169	Average
4924	48.37	38.12	10.25	74	-25.63	138	169	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	42.6	38.1	4.5	54	-11.4	301	171	Average
2390	52.83	48.33	4.5	74	-21.17	301	171	Peak
2462	90.35	85.73	4.62			301	171	Average
2462	95.92	91.3	4.62			301	171	Peak
2483.5	52.86	48.2	4.66	54	-1.14	301	171	Average
2483.5	66.14	61.48	4.66	74	-7.86	301	171	Peak
4924	41.58	31.33	10.25	54	-12.42	194	121	Average
4924	47.87	37.62	10.25	74	-26.13	194	121	Peak

Remarks:

1. Emission Level = Read Level + 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.

MIMO

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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	47.29	42.79	4.5	54	-6.71	235	198	Average
2390	53.91	49.41	4.5	74	-20.09	235	198	Peak
2412	102.27	97.72	4.55			218	227	Average
2412	104.75	100.2	4.55			218	227	Peak
4824	41.53	31.24	10.29	54	-12.47	120	181	Average
4824	49.12	38.83	10.29	74	-24.88	120	181	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	52.12	47.62	4.5	54	-1.88	216	153	Average
2390	58.4	53.9	4.5	74	-15.6	216	153	Peak
2412	107.57	103.02	4.55			214	189	Average
2412	109.94	105.39	4.55			214	189	Peak
4824	41.71	31.42	10.29	54	-12.29	126	226	Average
4824	49.58	39.29	10.29	74	-24.42	126	226	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	103.3	98.68	4.62			287	246	Average
2462	105.42	100.8	4.62			287	246	Peak
2483.5	44.02	39.36	4.66	54	-9.98	267	291	Average
2483.5	54.67	50.01	4.66	74	-19.33	267	291	Peak
2487.8	45.89	41.21	4.68	54	-8.11	288	54	Average
2487.8	54.67	49.99	4.68	74	-19.33	288	54	Peak
4924	41.52	31.27	10.25	54	-12.48	131	162	Average
4924	49.13	38.88	10.25	74	-24.87	131	162	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	108.36	103.74	4.62			167	168	Average
2462	110.58	105.96	4.62			167	168	Peak
2483.5	47.69	43.03	4.66	54	-6.31	175	168	Average
2483.5	56.1	51.44	4.66	74	-17.9	175	168	Peak
4924	41.53	31.28	10.25	54	-12.47	122	241	Average
4924	49.32	39.07	10.25	74	-24.68	122	241	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	97.44	92.81	4.63			287	246	Average
2467	100.39	95.76	4.63			287	246	Peak
2483.5	46.85	42.19	4.66	54	-7.15	287	246	Average
2483.5	55.6	50.94	4.66	74	-18.4	287	246	Peak
4934	41.31	31.05	10.26	54	-12.69	166	289	Average
4934	49.06	38.8	10.26	74	-24.94	166	289	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	102.25	97.62	4.63			167	168	Average
2467	105.6	100.97	4.63			167	168	Peak
2483.5	46.75	42.09	4.66	54	-7.25	166	168	Average
2483.5	56.62	51.96	4.66	74	-17.38	166	168	Peak
4934	41.5	31.24	10.26	54	-12.5	155	187	Average
4934	49.2	38.94	10.26	74	-24.8	155	187	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2467 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	94.14	89.5	4.64			287	246	Average
2472	97.52	92.88	4.64			287	246	Peak
2483.5	42.62	37.96	4.66	54	-11.38	287	246	Average
2483.5	53.52	48.86	4.66	74	-20.48	287	246	Peak
4944	41.56	31.21	10.35	54	-12.44	157	88	Average
4944	48.22	37.87	10.35	74	-25.78	157	88	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	99.69	95.05	4.64			167	168	Average
2472	102.52	97.88	4.64			167	168	Peak
2483.5	46.95	42.29	4.66	54	-7.05	169	168	Average
2483.5	55.7	51.04	4.66	74	-18.3	169	168	Peak
4944	41.58	31.23	10.35	54	-12.42	105	156	Average
4944	49.71	39.36	10.35	74	-24.29	105	156	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2472 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	44.3	39.8	4.5	54	-9.7	206	211	Average
2390	56.06	51.56	4.5	74	-17.94	206	211	Peak
2412	95.78	91.23	4.55			218	227	Average
2412	102.29	97.74	4.55			218	227	Peak
4824	41.65	31.36	10.29	54	-12.35	159	9	Average
4824	48.5	38.21	10.29	74	-25.5	159	9	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	45.72	41.22	4.5	54	-8.28	214	189	Average
2390	61.15	56.65	4.5	74	-12.85	214	189	Peak
2412	102.23	97.68	4.55			214	189	Average
2412	108.67	104.12	4.55			214	189	Peak
4824	41.57	31.28	10.29	54	-12.43	188	112	Average
4824	49.73	39.44	10.29	74	-24.27	188	112	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	96.02	91.4	4.62			287	246	Average
2462	102.45	97.83	4.62			287	246	Peak
2483.5	43.8	39.14	4.66	54	-10.2	277	230	Average
2483.5	55.37	50.71	4.66	74	-18.63	277	230	Peak
4924	41.53	31.28	10.25	54	-12.47	126	136	Average
4924	48.77	38.52	10.25	74	-25.23	126	136	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	101.38	96.76	4.62			167	168	Average
2462	108.49	103.87	4.62			167	168	Peak
2483.5	46.2	41.54	4.66	54	-7.8	146	168	Average
2483.5	59.95	55.29	4.66	74	-14.05	146	168	Peak
4924	41.67	31.42	10.25	54	-12.33	184	116	Average
4924	48.25	38	10.25	74	-25.75	184	116	Peak

Remarks:

1. Emission Level = Read Level + 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	93.26	88.63	4.63			287	246	Average
2467	100	95.37	4.63			287	246	Peak
2483.5	43.49	38.83	4.66	54	-10.51	287	246	Average
2483.5	56.7	52.04	4.66	74	-17.3	287	246	Peak
4934	41.55	31.29	10.26	54	-12.45	188	256	Average
4934	48.4	38.14	10.26	74	-25.6	188	256	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	98.59	93.96	4.63			167	168	Average
2467	105.36	100.73	4.63			167	168	Peak
2483.5	45.95	41.29	4.66	54	-8.05	167	168	Average
2483.5	59.17	54.51	4.66	74	-14.83	167	168	Peak
4934	41.53	31.27	10.26	54	-12.47	113	254	Average
4934	48.89	38.63	10.26	74	-25.11	113	254	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2467 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	90.7	86.06	4.64			287	246	Average
2472	97.14	92.5	4.64			287	246	Peak
2483.5	43.48	38.82	4.66	54	-10.52	287	246	Average
2483.5	57.44	52.78	4.66	74	-16.56	287	246	Peak
4944	41.77	31.42	10.35	54	-12.23	189	9	Average
4944	48.76	38.41	10.35	74	-25.24	189	9	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	95.54	90.9	4.64			167	168	Average
2472	102.23	97.59	4.64			167	168	Peak
2483.5	44.65	39.99	4.66	54	-9.35	167	168	Average
2483.5	60.55	55.89	4.66	74	-13.45	167	168	Peak
4944	41.8	31.45	10.35	54	-12.2	166	187	Average
4944	48.67	38.32	10.35	74	-25.33	166	187	Peak

Remarks:

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

802.11n (VHT20)

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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	43.94	39.44	4.5	54	-10.06	199	204	Average
2390	52.93	48.43	4.5	74	-21.07	199	204	Peak
2412	94.36	89.81	4.55			218	227	Average
2412	102.08	97.53	4.55			218	227	Peak
4824	41.58	31.29	10.29	54	-12.42	169	54	Average
4824	48.77	38.48	10.29	74	-25.23	169	54	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	48.44	43.94	4.5	54	-5.56	224	191	Average
2390	58.05	53.55	4.5	74	-15.95	224	191	Peak
2412	100.78	96.23	4.55			214	188	Average
2412	108.03	103.48	4.55			214	188	Peak
4824	41.44	31.15	10.29	54	-12.56	105	113	Average
4824	48.93	38.64	10.29	74	-25.07	105	113	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	96.94	92.32	4.62			287	246	Average
2462	103.76	99.14	4.62			287	246	Peak
2483.5	43.01	38.35	4.66	54	-10.99	287	246	Average
2483.5	54.21	49.55	4.66	74	-19.79	287	246	Peak
4924	41.66	31.41	10.25	54	-12.34	150	255	Average
4924	48.01	37.76	10.25	74	-25.99	150	255	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	101.14	96.52	4.62			167	168	Average
2462	108.13	103.51	4.62			167	168	Peak
2483.5	47.22	42.56	4.66	54	-6.78	167	168	Average
2483.5	58.91	54.25	4.66	74	-15.09	167	168	Peak
4924	41.51	31.26	10.25	54	-12.49	113	325	Average
4924	48.32	38.07	10.25	74	-25.68	113	325	Peak

Remarks:

1. Emission Level = Read Level + 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	93.37	88.74	4.63			287	246	Average
2467	100.34	95.71	4.63			287	246	Peak
2483.5	43.48	38.82	4.66	54	-10.52	287	246	Average
2483.5	55.41	50.75	4.66	74	-18.59	287	246	Peak
4934	41.65	31.39	10.26	54	-12.35	151	195	Average
4934	48.45	38.19	10.26	74	-25.55	151	195	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	98.74	94.11	4.63			167	168	Average
2467	105.25	100.62	4.63			167	168	Peak
2483.5	46.46	41.8	4.66	54	-7.54	167	168	Average
2483.5	57.85	53.19	4.66	74	-16.15	167	168	Peak
4934	41.47	31.21	10.26	54	-12.53	133	261	Average
4934	49.29	39.03	10.26	74	-24.71	133	261	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2467 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	89.48	84.84	4.64			287	246	Average
2472	96.45	91.81	4.64			287	246	Peak
2483.5	43	38.34	4.66	54	-11	287	246	Average
2483.5	54.33	49.67	4.66	74	-19.67	287	246	Peak
4944	41.65	31.3	10.35	54	-12.35	148	1	Average
4944	48.49	38.14	10.35	74	-25.51	148	1	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	94.46	89.82	4.64			167	168	Average
2472	101.77	97.13	4.64			167	168	Peak
2483.5	44.93	40.27	4.66	54	-9.07	167	168	Average
2483.5	56.28	51.62	4.66	74	-17.72	167	168	Peak
4944	41.73	31.38	10.35	54	-12.27	157	195	Average
4944	48.34	37.99	10.35	74	-25.66	157	195	Peak

Remarks:

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

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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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	44.38	39.88	4.5	54	-9.62	219	197	Average
2390	54.31	49.81	4.5	74	-19.69	219	197	Peak
2422	90.44	85.88	4.56			218	227	Average
2422	97.76	93.2	4.56			218	227	Peak
2483.5	42.59	37.93	4.66	54	-11.41	218	227	Average
2483.5	52.03	47.37	4.66	74	-21.97	218	227	Peak
4844	41.44	31.21	10.23	54	-12.56	199	345	Average
4844	48.21	37.98	10.23	74	-25.79	199	345	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	47.48	42.98	4.5	54	-6.52	236	191	Average
2390	58.34	53.84	4.5	74	-15.66	236	191	Peak
2422	96.42	91.86	4.56			214	189	Average
2422	104.33	99.77	4.56			214	189	Peak
2483.5	43.68	39.02	4.66	54	-10.32	214	189	Average
2483.5	54.23	49.57	4.66	74	-19.77	214	189	Peak
4844	41.51	31.28	10.23	54	-12.49	145	105	Average
4844	48.48	38.25	10.23	74	-25.52	145	105	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2422 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.15	36.65	4.5	54	-12.85	287	246	Average
2390	52.16	47.66	4.5	74	-21.84	287	246	Peak
2452	92.64	88.04	4.6			287	246	Average
2452	99.63	95.03	4.6			287	246	Peak
2483.5	45.57	40.91	4.66	54	-8.43	287	246	Average
2483.5	56.88	52.22	4.66	74	-17.12	287	246	Peak
4904	41.4	31.26	10.14	54	-12.6	128	87	Average
4904	48.87	38.73	10.14	74	-25.13	128	87	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	42.98	38.48	4.5	54	-11.02	167	168	Average
2390	54.6	50.1	4.5	74	-19.4	167	168	Peak
2452	97.54	92.94	4.6			167	168	Average
2452	104.19	99.59	4.6			167	168	Peak
2483.5	51.8	47.14	4.66	54	-2.2	178	168	Average
2483.5	61.9	57.24	4.66	74	-12.1	178	168	Peak
4904	41.56	31.42	10.14	54	-12.44	133	261	Average
4904	48.39	38.25	10.14	74	-25.61	133	261	Peak

Remarks:

- Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
- 2452 MHz: Fundamental frequency.
- 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.59	37.09	4.5	54	-12.41	287	246	Average
2390	52.07	47.57	4.5	74	-21.93	287	246	Peak
2457	90.51	85.89	4.62			287	246	Average
2457	97.83	93.21	4.62			287	246	Peak
2483.5	44.38	39.72	4.66	54	-9.62	287	246	Average
2483.5	54.95	50.29	4.66	74	-19.05	287	246	Peak
4914	41.45	31.3	10.15	54	-12.55	199	64	Average
4914	48.3	38.15	10.15	74	-25.7	199	64	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	42.61	38.11	4.5	54	-11.39	167	168	Average
2390	53.49	48.99	4.5	74	-20.51	167	168	Peak
2457	95.45	90.83	4.62			167	168	Average
2457	102.39	97.77	4.62			167	168	Peak
2483.5	48.93	44.27	4.66	54	-5.07	170	168	Average
2483.5	59.79	55.13	4.66	74	-14.21	170	168	Peak
4914	41.42	31.27	10.15	54	-12.58	155	194	Average
4914	48.92	38.77	10.15	74	-25.08	155	194	Peak

Remarks:

1. Emission Level = Read Level + 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	Carles Hsiao, Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	40.86	36.36	4.5	54	-13.14	287	246	Average
2390	51.51	47.01	4.5	74	-22.49	287	246	Peak
2462	85.54	80.92	4.62			287	246	Average
2462	92.7	88.08	4.62			287	246	Peak
2483.5	50.67	46.01	4.66	54	-3.33	287	246	Average
2483.5	64.14	59.48	4.66	74	-9.86	287	246	Peak
4924	41.67	31.42	10.25	54	-12.33	147	48	Average
4924	47.95	37.7	10.25	74	-26.05	147	48	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.36	36.86	4.5	54	-12.64	167	168	Average
2390	51.52	47.02	4.5	74	-22.48	167	168	Peak
2462	90.51	85.89	4.62			167	168	Average
2462	97.15	92.53	4.62			167	168	Peak
2483.5	52.9	48.24	4.66	54	-1.1	180	168	Average
2483.5	64.1	59.44	4.66	74	-9.9	180	168	Peak
4924	41.76	31.51	10.25	54	-12.24	158	87	Average
4924	48.62	38.37	10.25	74	-25.38	158	87	Peak

Remarks:

1. Emission Level = Read Level + 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:

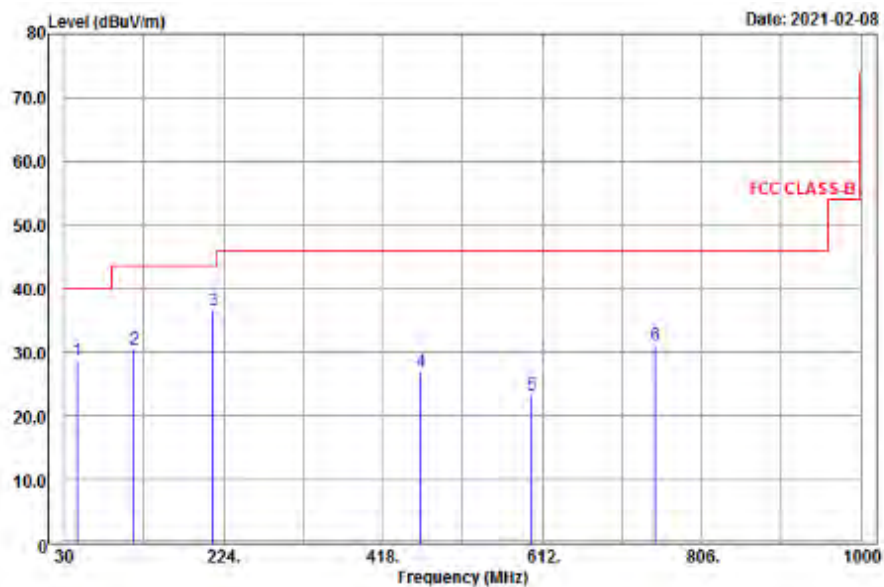
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

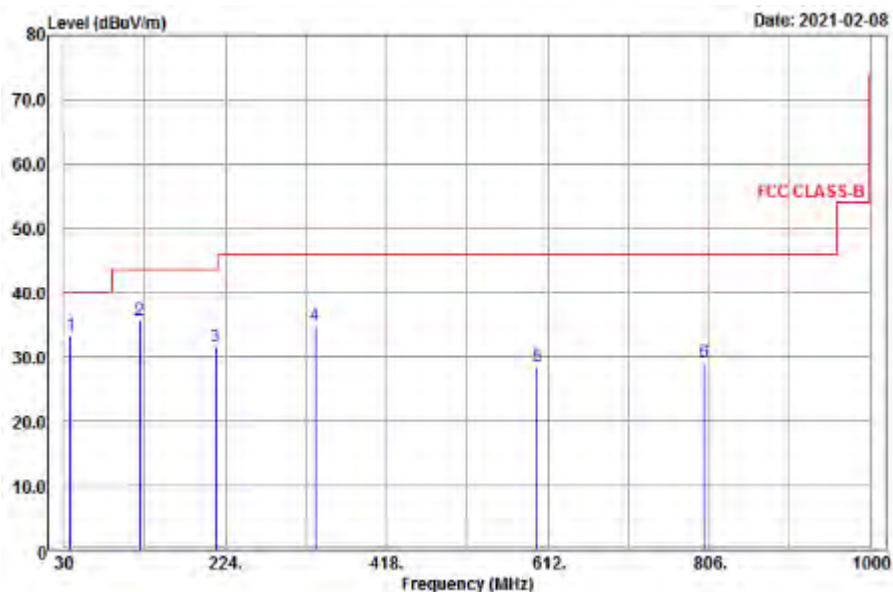
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EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Carles Hsiao, Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
46.74	28.74	43.99	-15.25	40	-11.26	142	168	Peak
115.32	30.55	48.83	-18.28	43.5	-12.95	105	135	Peak
211.71	36.58	54.69	-18.11	43.5	-6.92	155	192	Peak
465.2	27.13	40.18	-13.05	46	-18.87	142	165	Peak
599.6	23.29	33.86	-10.57	46	-22.71	155	178	Peak
750.1	31.09	39.63	-8.54	46	-14.91	103	136	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
37.83	33.33	50.11	-16.78	40	-6.67	102	355	QP
121.26	35.73	55.28	-19.55	43.5	-7.77	125	168	Peak
212.25	31.56	49.63	-18.07	43.5	-11.94	105	132	Peak
332.2	34.81	50.01	-15.2	46	-11.19	144	169	Peak
599.6	28.59	39.16	-10.57	46	-17.41	107	138	Peak
800.5	29.29	36.88	-7.59	46	-16.71	125	137	Peak

Remarks:

- Emission Level = Read Level + 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	ESCI	100613	Dec. 04, 2020	Dec. 03, 2021
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Jan. 16, 2021	Jan. 15, 2022
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	Aug. 28, 2020	Aug. 27, 2021
Software ADT	BV ADT_Cond_ V7.3.7.3	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 1.
 3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

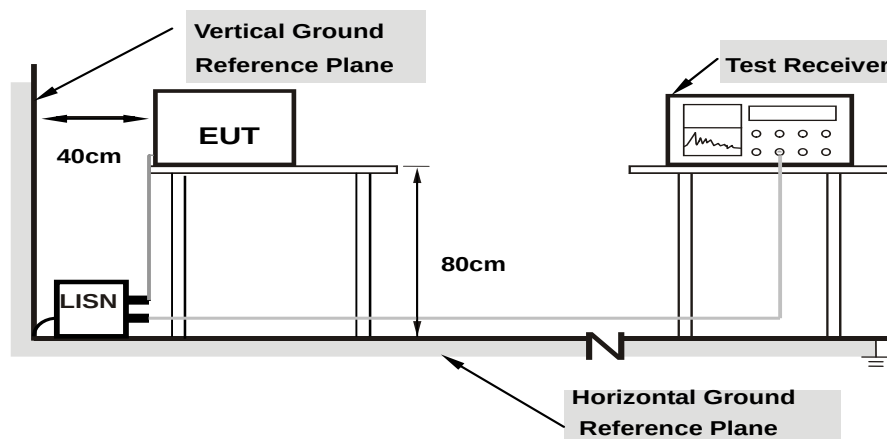
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance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

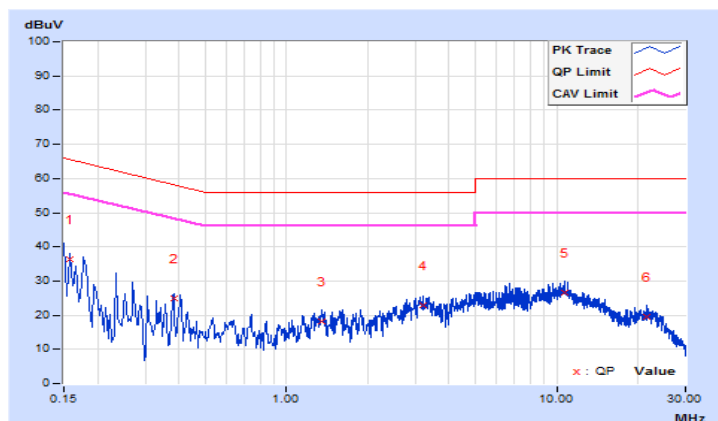
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	0.14	36.17	21.59	36.31	21.73	65.57	55.57	-29.26	-33.84
2	0.38200	0.24	24.61	24.37	24.85	24.61	58.24	48.24	-33.39	-23.63
3	1.34998	0.33	18.01	8.45	18.34	8.78	56.00	46.00	-37.66	-37.22
4	3.22200	0.40	22.35	16.39	22.75	16.79	56.00	46.00	-33.25	-29.21
5	10.67800	0.52	26.03	19.97	26.55	20.49	60.00	50.00	-33.45	-29.51
6	21.65400	0.65	18.89	11.16	19.54	11.81	60.00	50.00	-40.46	-38.19

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.

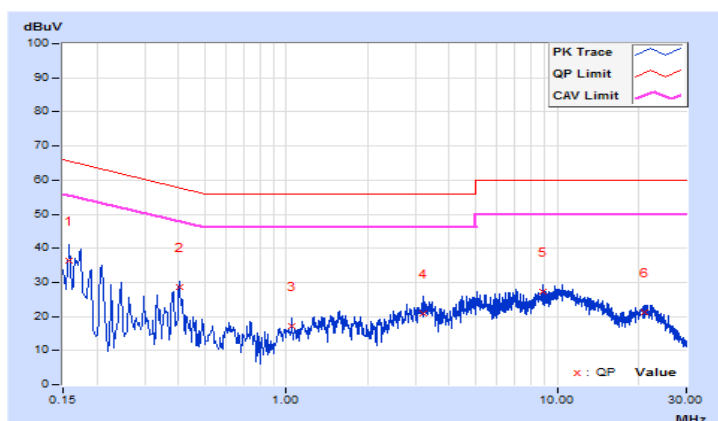


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	0.11	36.11	22.00	36.22	22.11	65.57	55.57	-29.35	-33.46
2	0.40200	0.23	28.42	23.60	28.65	23.83	57.81	47.81	-29.16	-23.98
3	1.05000	0.30	16.85	12.94	17.15	13.24	56.00	46.00	-38.85	-32.76
4	3.22200	0.41	20.44	14.29	20.85	14.70	56.00	46.00	-35.15	-31.30
5	8.91400	0.59	26.69	19.88	27.28	20.47	60.00	50.00	-32.72	-29.53
6	21.03800	0.90	20.46	13.50	21.36	14.40	60.00	50.00	-38.64	-35.60

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.

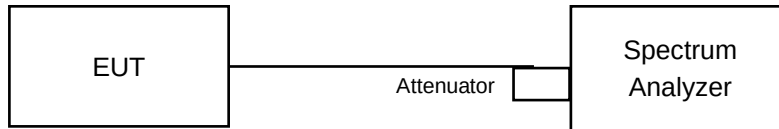


4.3 6 dB Bandwidth Measurement

4.3.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

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 Procedure

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

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

SISO

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.19	0.5	Pass
6	2437	10.19	0.5	Pass
11	2462	10.19	0.5	Pass
12	2467	10.19	0.5	Pass
13	2472	10.18	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.46	0.5	Pass
6	2437	16.44	0.5	Pass
11	2462	16.47	0.5	Pass
12	2467	16.46	0.5	Pass
13	2472	16.53	0.5	Pass

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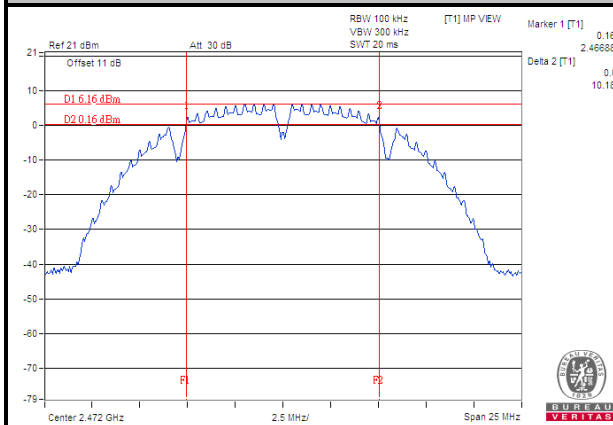
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.78	0.5	Pass
6	2437	17.76	0.5	Pass
11	2462	17.77	0.5	Pass
12	2467	17.78	0.5	Pass
13	2472	17.81	0.5	Pass

802.11n (VHT40)

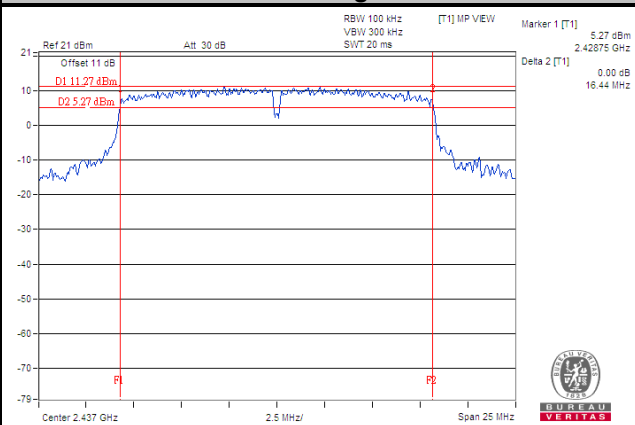
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	36.50	0.5	Pass
6	2437	36.52	0.5	Pass
9	2452	36.52	0.5	Pass
10	2457	36.51	0.5	PASS
11	2462	36.53	0.5	PASS

Spectrum Plot of Worst Value

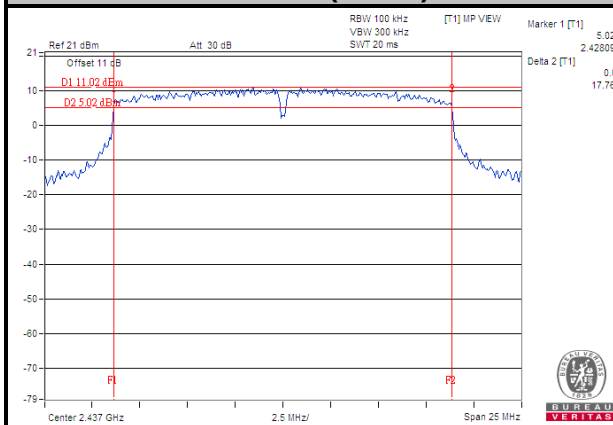
802.11b



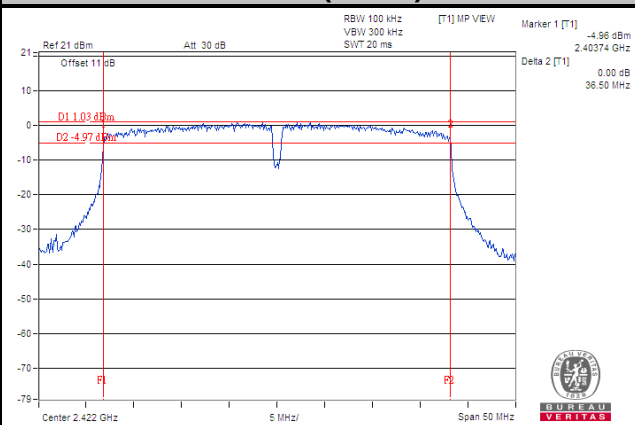
802.11g



802.11n (VHT20)



802.11n (VHT40)



MIMO
802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	10.18	10.18	0.5	Pass
6	2437	10.16	10.17	0.5	Pass
11	2462	10.18	10.18	0.5	Pass
12	2467	10.19	10.19	0.5	Pass
13	2472	10.19	10.19	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.46	16.47	0.5	Pass
6	2437	16.45	16.45	0.5	Pass
11	2462	16.46	16.47	0.5	Pass
12	2467	16.47	16.46	0.5	Pass
13	2472	16.54	16.52	0.5	Pass

802.11n (VHT20)

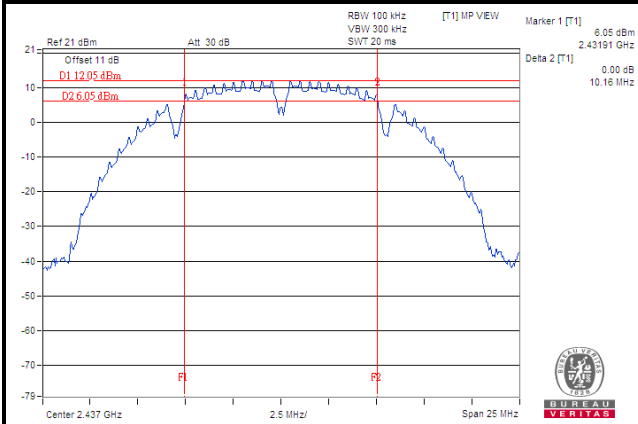
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.76	17.77	0.5	Pass
6	2437	17.78	17.77	0.5	Pass
11	2462	17.77	17.77	0.5	Pass
12	2467	17.77	17.78	0.5	Pass
13	2472	17.80	17.80	0.5	Pass

802.11n (VHT40)

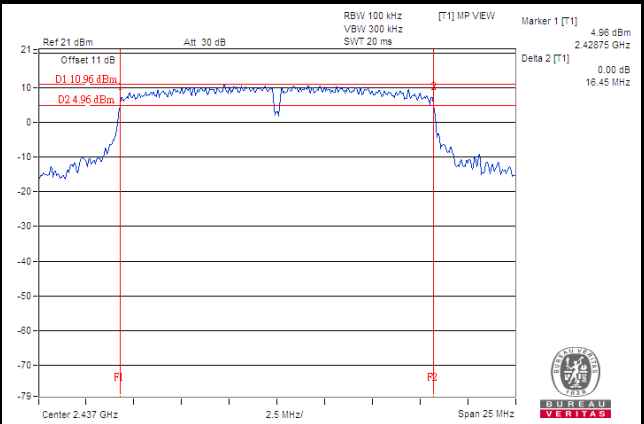
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	36.43	36.43	0.5	Pass
6	2437	36.45	36.46	0.5	Pass
9	2452	36.44	36.44	0.5	Pass
10	2457	36.45	36.44	0.5	Pass
11	2462	36.44	36.45	0.5	Pass

Spectrum Plot of Worst Value

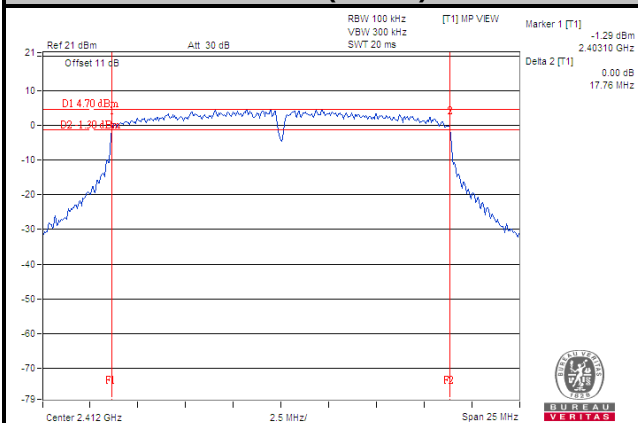
802.11b



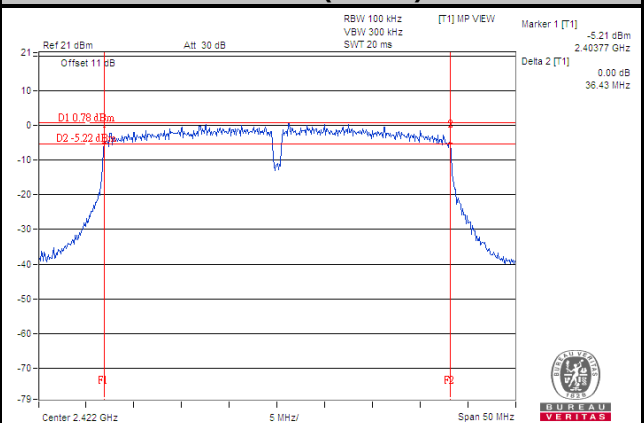
802.11g



802.11n (VHT20)

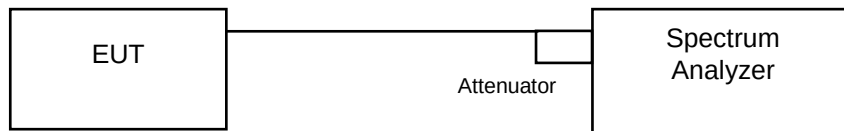


802.11n (VHT40)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Deviation from Test Standard

No deviation.

4.4.5 EUT Operating Conditions

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

4.4.6 Test Results

SISO

802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	14.69	Pass
6	2437	14.76	Pass
11	2462	14.64	Pass
12	2467	14.52	Pass
13	2472	14.52	Pass

802.11g

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	16.56	Pass
6	2437	16.92	Pass
11	2462	16.56	Pass
12	2467	16.56	Pass
13	2472	16.44	Pass

802.11n (VHT20)

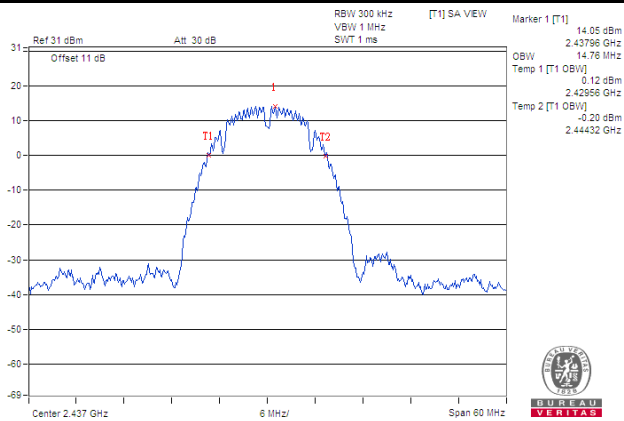
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	17.76	Pass
6	2437	18.00	Pass
11	2462	17.76	Pass
12	2467	17.76	Pass
13	2472	17.64	Pass

802.11n (VHT40)

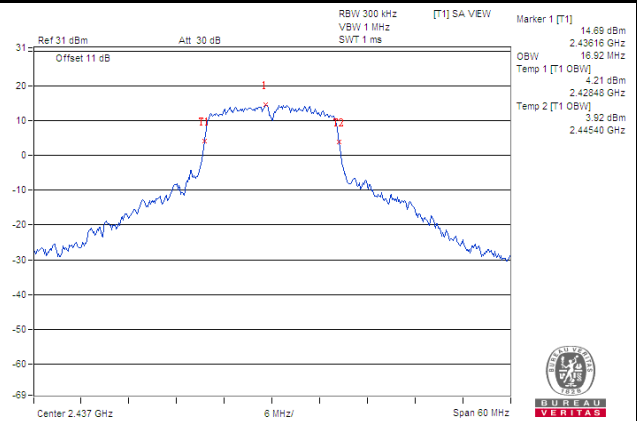
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
3	2422	36.36	Pass
6	2437	36.36	Pass
9	2452	36.36	Pass
10	2457	36.36	Pass
11	2462	36.36	Pass

Spectrum Plot of Worst Value

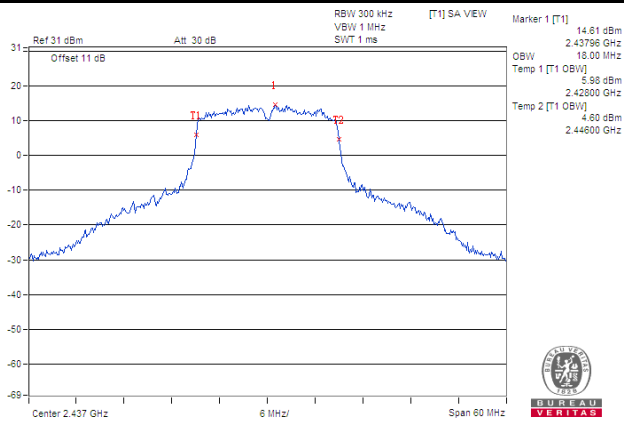
802.11b



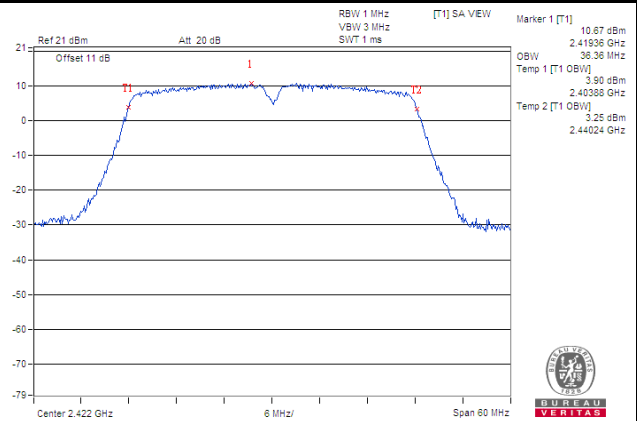
802.11g



802.11n (VHT20)



802.11n (VHT40)



MIMO
802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	14.60	14.60	Pass
6	2437	14.64	14.64	Pass
11	2462	14.64	14.64	Pass
12	2467	14.52	14.52	Pass
13	2472	14.76	14.76	Pass

802.11g

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	16.56	16.56	Pass
6	2437	16.92	16.92	Pass
11	2462	16.56	16.56	Pass
12	2467	16.56	16.56	Pass
13	2472	16.44	16.44	Pass

802.11n (VHT20)

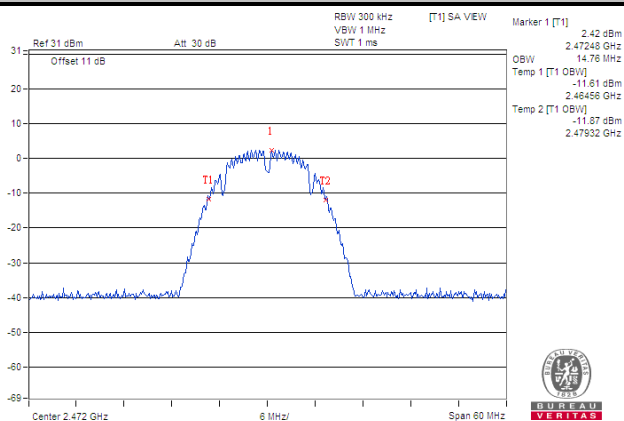
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	17.64	17.64	Pass
6	2437	17.88	17.88	Pass
11	2462	17.64	17.64	Pass
12	2467	17.64	17.64	Pass
13	2472	17.64	17.64	Pass

802.11n (VHT40)

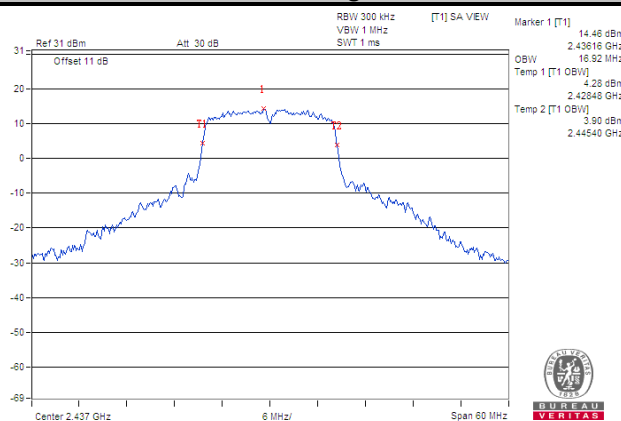
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
3	2422	36.24	36.24	Pass
6	2437	36.24	36.24	Pass
9	2452	36.36	36.24	Pass
10	2457	36.24	36.24	Pass
11	2462	36.24	36.24	Pass

Spectrum Plot of Worst Value

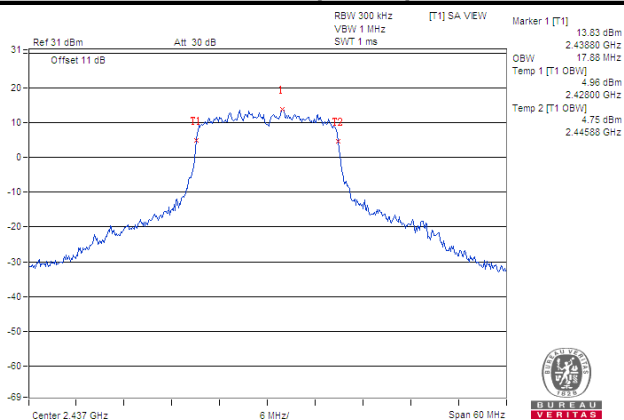
802.11b



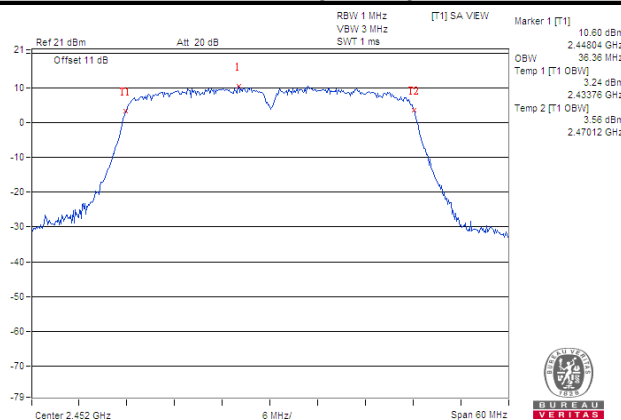
802.11g



802.11n (VHT20)



802.11n (VHT40)



4.5 Conducted Output Power Measurement

4.5.1 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,

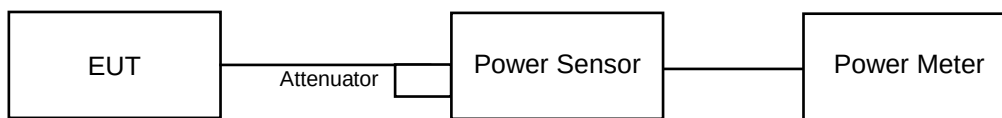
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

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.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 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.

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

SISO

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	122.744	20.89	30	Pass
6	2437	192.752	22.85	30	Pass
11	2462	123.31	20.91	30	Pass
12	2467	41.687	16.20	30	Pass
13	2472	30.974	14.91	30	Pass

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	80.353	19.05
6	2437	130.32	21.15
11	2462	81.846	19.13
12	2467	27.227	14.35
13	2472	20.417	13.10

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	197.242	22.95	30	Pass
6	2437	448.745	26.52	30	Pass
11	2462	204.174	23.10	30	Pass
12	2467	102.094	20.09	30	Pass
13	2472	56.624	17.53	30	Pass

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	25.41	14.05
6	2437	133.35	21.25
11	2462	25.586	14.08
12	2467	13.062	11.16
13	2472	6.683	8.25

802.11n (VHT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	163.305	22.13	30	Pass
6	2437	426.58	26.30	30	Pass
11	2462	190.108	22.79	30	Pass
12	2467	100.231	20.01	30	Pass
13	2472	50.699	17.05	30	Pass

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	26.182	14.18
6	2437	125.89	21.00
11	2462	26.303	14.20
12	2467	12.853	11.09
13	2472	6.607	8.20

802.11n (VHT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	114.288	20.58	30	Pass
6	2437	283.139	24.52	30	Pass
9	2452	92.897	19.68	30	Pass
10	2457	82.604	19.17	30	Pass
11	2462	26.546	14.24	30	Pass

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	21.979	13.42
6	2437	50.466	17.03
9	2452	19.543	12.91
10	2457	13.213	11.21
11	2462	5.023	7.01

MIMO
802.11b

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.05	21.11	256.472	24.09	30	Pass
6	2437	22.52	22.61	361.038	25.58	30	Pass
11	2462	21.03	21.11	255.887	24.08	30	Pass
12	2467	16.14	16.25	83.285	19.21	30	Pass
13	2472	11.85	11.65	29.933	14.76	30	Pass

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	19.82	19.87	192.99	22.86
6	2437	21.05	21.11	256.47	24.09
11	2462	19.10	19.42	168.78	22.27
12	2467	14.38	14.48	55.47	17.44
13	2472	10.12	10.11	20.537	13.13

802.11g

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.31	23.41	433.57	26.37	30	Pass
6	2437	26.30	25.62	791.333	28.98	30	Pass
11	2462	23.11	23.05	406.481	26.09	30	Pass
12	2467	20.75	20.10	221.18	23.45	30	Pass
13	2472	17.54	17.51	113.118	20.54	30	Pass

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	14.01	14.08	50.763	17.06
6	2437	21.03	21.00	252.66	24.03
11	2462	14.12	14.07	51.35	17.11
12	2467	11.41	11.23	27.11	14.33
13	2472	8.37	8.24	13.539	11.32

802.11n (VHT20)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.16	21.15	294.754	24.69	30	Pass
6	2437	26.30	25.10	750.173	28.75	30	Pass
11	2462	22.71	22.71	373.276	25.72	30	Pass
12	2467	20.16	20.10	206.082	23.14	30	Pass
13	2472	17.13	17.09	102.81	20.12	30	Pass

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	14.25	14.31	53.585	17.29
6	2437	21.02	21.01	252.66	24.03
11	2462	14.18	14.18	52.364	17.19
12	2467	11.26	11.17	26.458	14.23
13	2472	8.20	8.16	13.153	11.19

802.11n (VHT40)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	21.72	21.88	302.764	24.81	30	Pass
6	2437	24.38	24.42	550.852	27.41	30	Pass
9	2452	22.01	22.10	321.036	25.07	30	Pass
10	2457	19.07	19.10	162.007	22.10	30	Pass
11	2462	14.72	14.92	60.694	17.83	30	Pass

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	13.05	13.01	40.182	16.04
6	2437	17.02	17.08	101.4	20.06
9	2452	14.21	14.35	53.59	17.29
10	2457	11.10	11.16	25.944	14.14
11	2462	6.21	6.51	8.655	9.37

4.6 Power Spectral Density Measurement

4.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

802.11b SISO

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-3.72	8	Pass
6	2437	-2.05	8	Pass
11	2462	-3.61	8	Pass
12	2467	-8.52	8	Pass
13	2472	-9.70	8	Pass

MIMO

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-4.74	3.01	-1.73	8	Pass
	6	2437	-4.04	3.01	-1.03	8	Pass
	11	2462	-4.97	3.01	-1.96	8	Pass
	12	2467	-9.16	3.01	-6.15	8	Pass
	13	2472	-13.44	3.01	-10.43	8	Pass
1	1	2412	-4.73	3.01	-1.72	8	Pass
	6	2437	-3.85	3.01	-0.84	8	Pass
	11	2462	-4.76	3.01	-1.75	8	Pass
	12	2467	-9.36	3.01	-6.35	8	Pass
	13	2472	-13.45	3.01	-10.44	8	Pass

NOTE:

1. Directional gain = 5.25 dBi <= 6dBi, so there is no need to reduce the power density limit.
2. Method 2) C) of power density measurement of KDB 662911 is using for calculating total power density.

802.11g SISO

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-8.65	8	Pass
6	2437	-2.31	8	Pass
11	2462	-8.97	8	Pass
12	2467	-11.09	8	Pass
13	2472	-15.33	8	Pass

MIMO

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-9.96	3.01	-6.95	8	Pass
	6	2437	-2.82	3.01	0.19	8	Pass
	11	2462	-9.17	3.01	-6.16	8	Pass
	12	2467	-11.24	3.01	-8.23	8	Pass
	13	2472	-17.01	3.01	-14	8	Pass
1	1	2412	-9.22	3.01	-6.21	8	Pass
	6	2437	-2.7	3.01	0.31	8	Pass
	11	2462	-9.12	3.01	-6.11	8	Pass
	12	2467	-11.16	3.01	-8.15	8	Pass
	13	2472	-15.22	3.01	-12.21	8	Pass

NOTE:

- Directional gain = 5.25 dBi <= 6dBi, so there is no need to reduce the power density limit.
- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.

802.11n (VHT20) SISO

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-9.97	8	Pass
6	2437	-2.63	8	Pass
11	2462	-8.69	8	Pass
12	2467	-11.27	8	Pass
13	2472	-16.53	8	Pass

MIMO

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-10.02	3.01	-7.01	8	Pass
	6	2437	-5.25	3.01	-2.24	8	Pass
	11	2462	-11.28	3.01	-8.27	8	Pass
	12	2467	-13.14	3.01	-10.13	8	Pass
	13	2472	-18.03	3.01	-15.02	8	Pass
1	1	2412	-9.74	3.01	-6.73	8	Pass
	6	2437	-4.88	3.01	-1.87	8	Pass
	11	2462	-11.05	3.01	-8.04	8	Pass
	12	2467	-13.17	3.01	-10.16	8	Pass
	13	2472	-17.71	3.01	-14.7	8	Pass

NOTE:

- Directional gain = 5.25 dBi <= 6dBi, so there is no need to reduce the power density limit.
- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.

802.11n (VHT40) SISO

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
3	2422	-12.93	8	Pass
6	2437	-9.79	8	Pass
9	2452	-14.46	8	Pass
10	2457	-14.85	8	Pass
11	2462	-19.52	8	Pass

MIMO

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	3	2422	-15.01	3.01	-12	8	Pass
	6	2437	-17.93	3.01	-14.92	8	Pass
	9	2452	-13.98	3.01	-10.97	8	Pass
	10	2457	-16.08	3.01	-13.07	8	Pass
	11	2462	-20.79	3.01	-17.78	8	Pass
1	3	2422	-15.06	3.01	-12.05	8	Pass
	6	2437	-9.71	3.01	-6.7	8	Pass
	9	2452	-14.16	3.01	-11.15	8	Pass
	10	2457	-16.21	3.01	-13.2	8	Pass
	11	2462	-20.87	3.01	-17.86	8	Pass

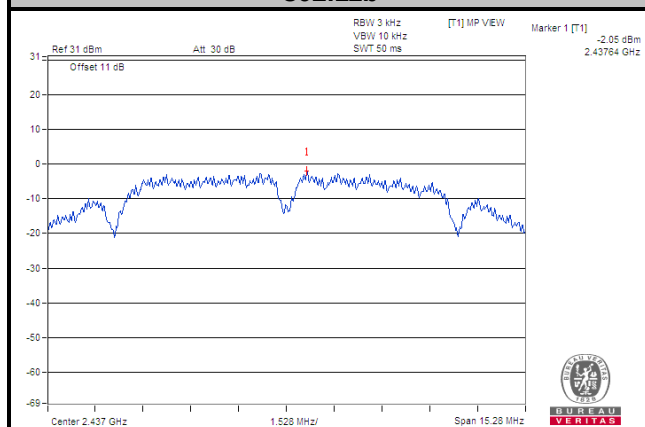
NOTE:

- Directional gain = 5.25 dBi <= 6dBi, so there is no need to reduce the power density limit.
- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.

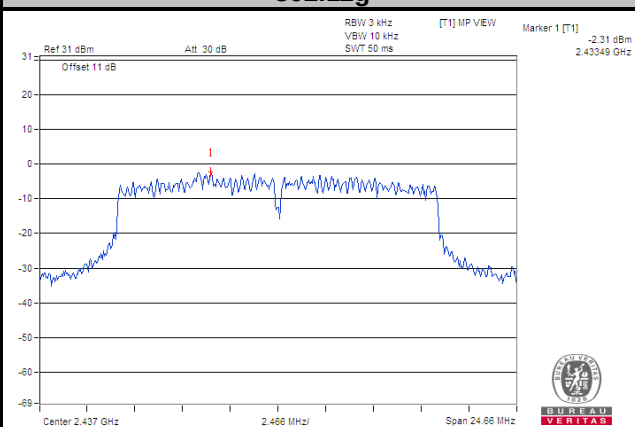
SISO

Spectrum Plot of Worst Value

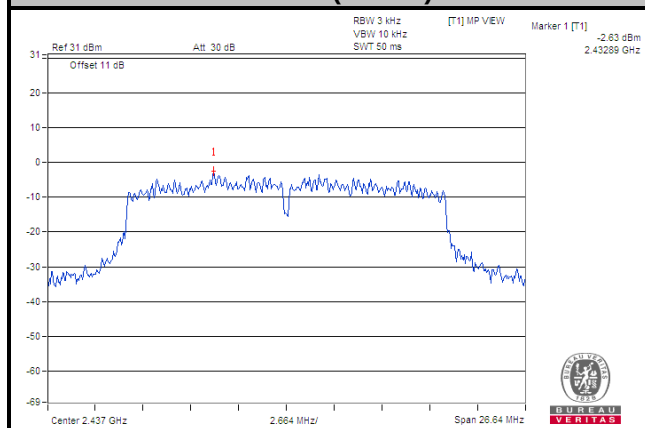
802.11b



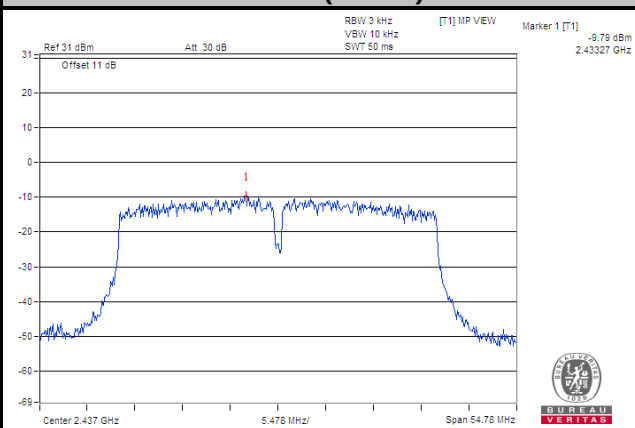
802.11g



802.11n (VHT20)



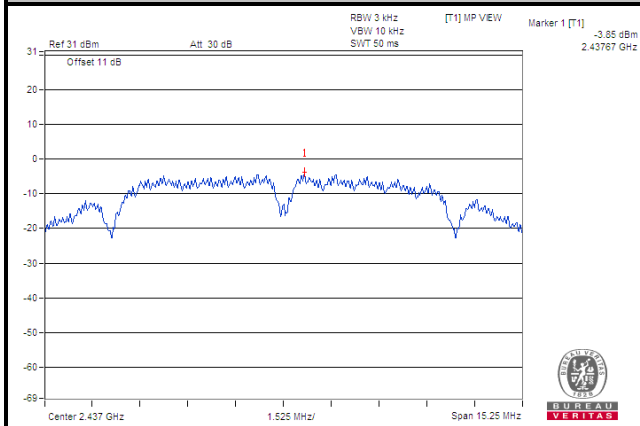
802.11n (VHT40)



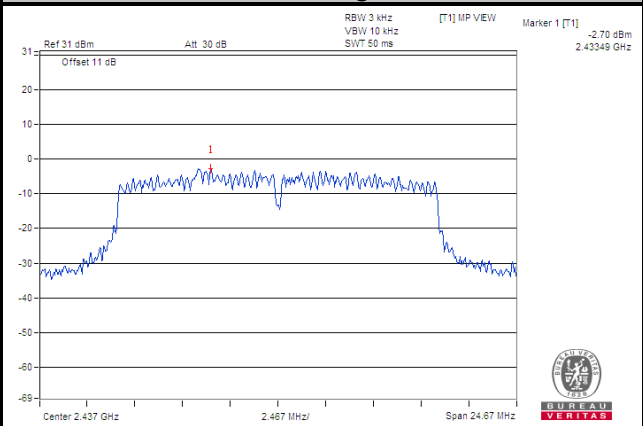
MIMO

Spectrum Plot of Worst Value

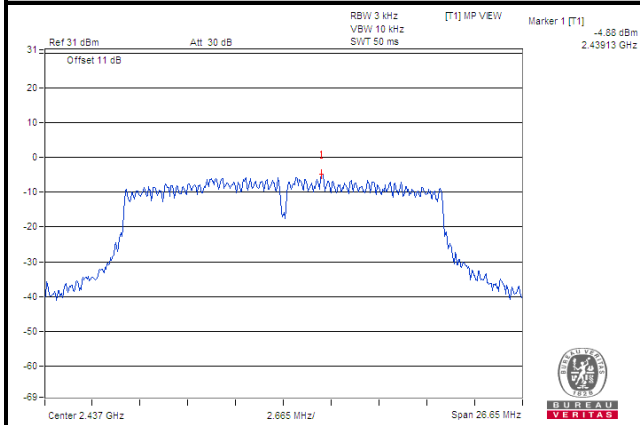
802.11b



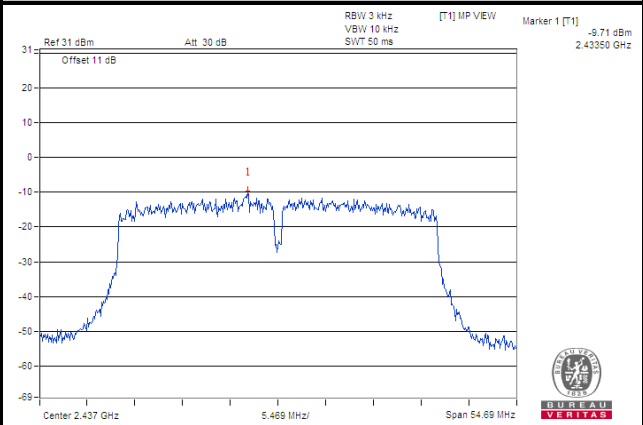
802.11g



802.11n (VHT20)



802.11n (VHT40)



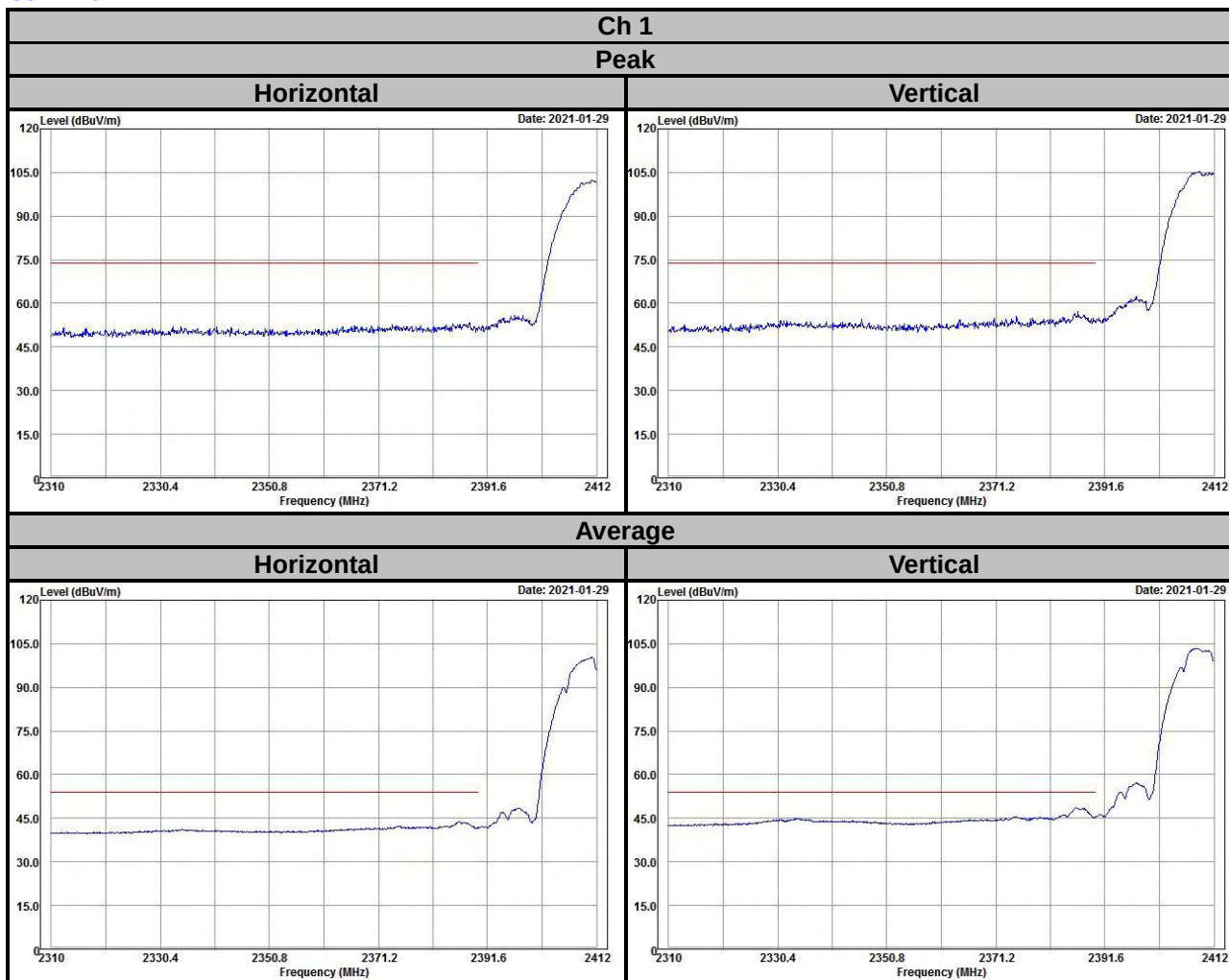
5 Pictures of Test Arrangements

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

Annex A- Band Edge Measurement

SISO

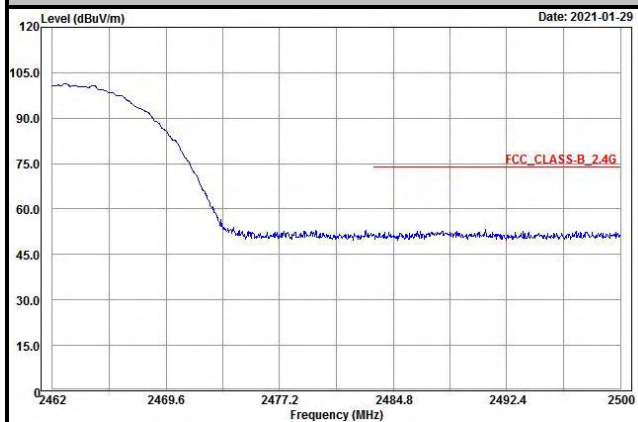
802.11b



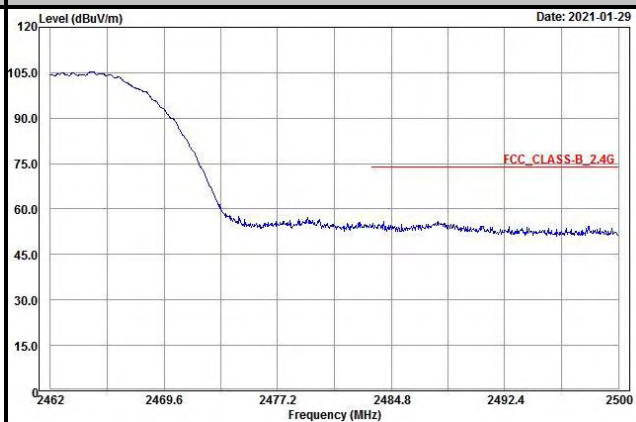
Ch 11

Peak

Horizontal

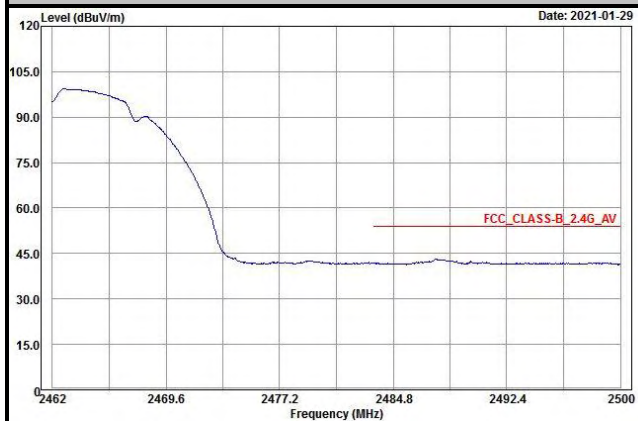


Vertical

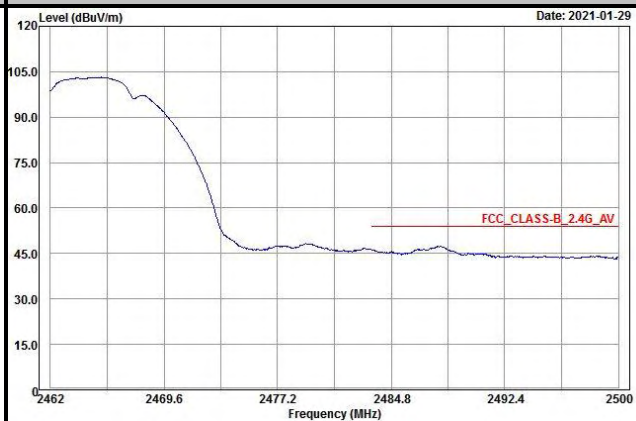


Average

Horizontal



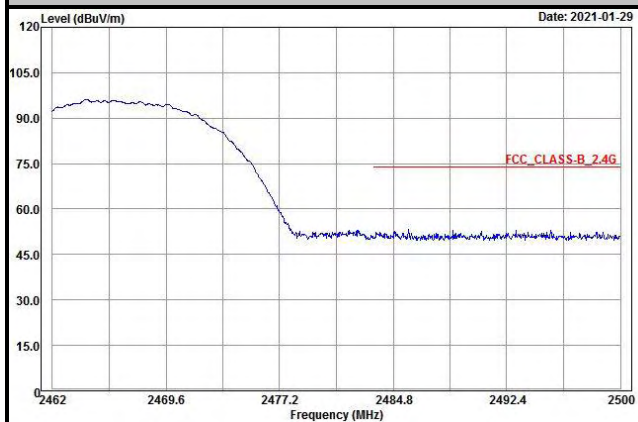
Vertical



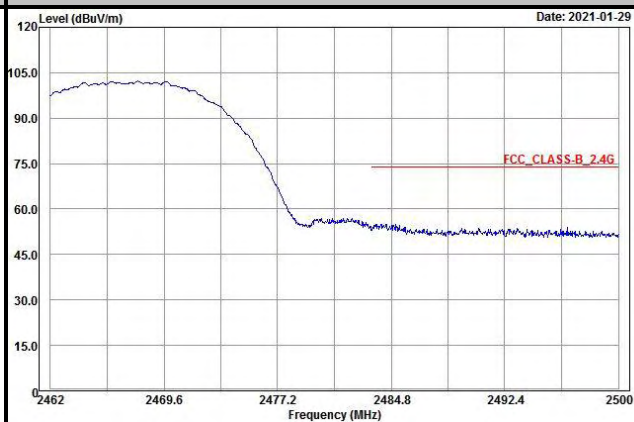
Ch 12

Peak

Horizontal

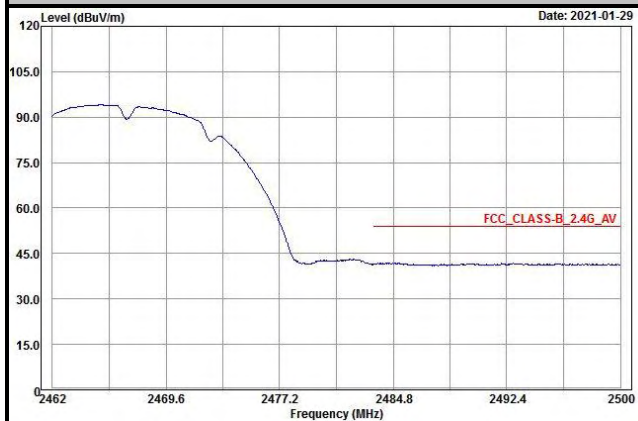


Vertical



Average

Horizontal



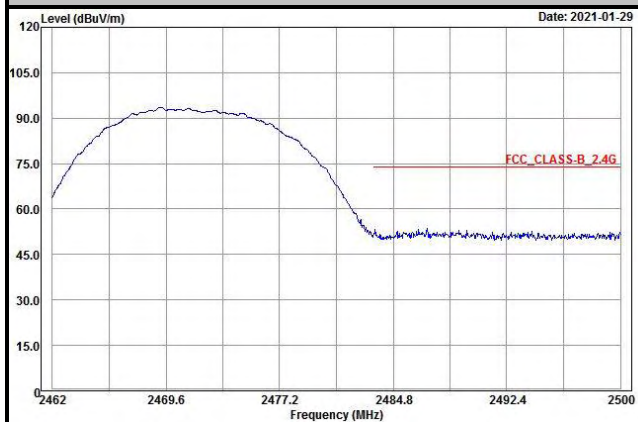
Vertical



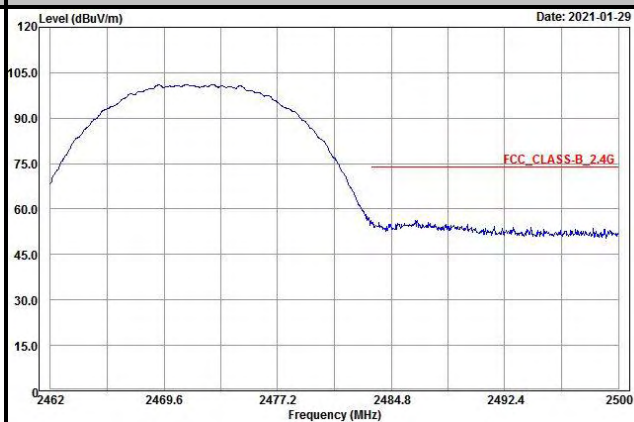
Ch 13

Peak

Horizontal

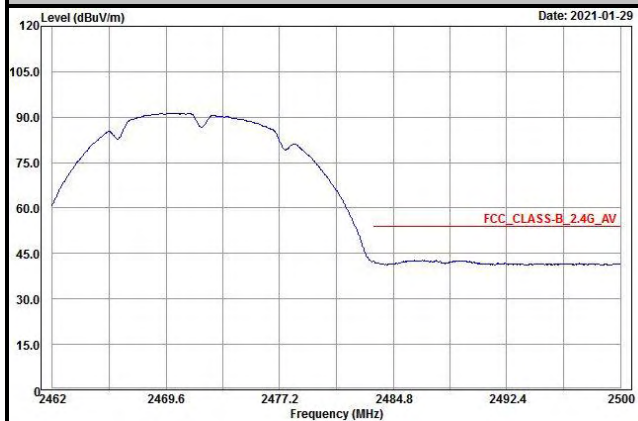


Vertical



Average

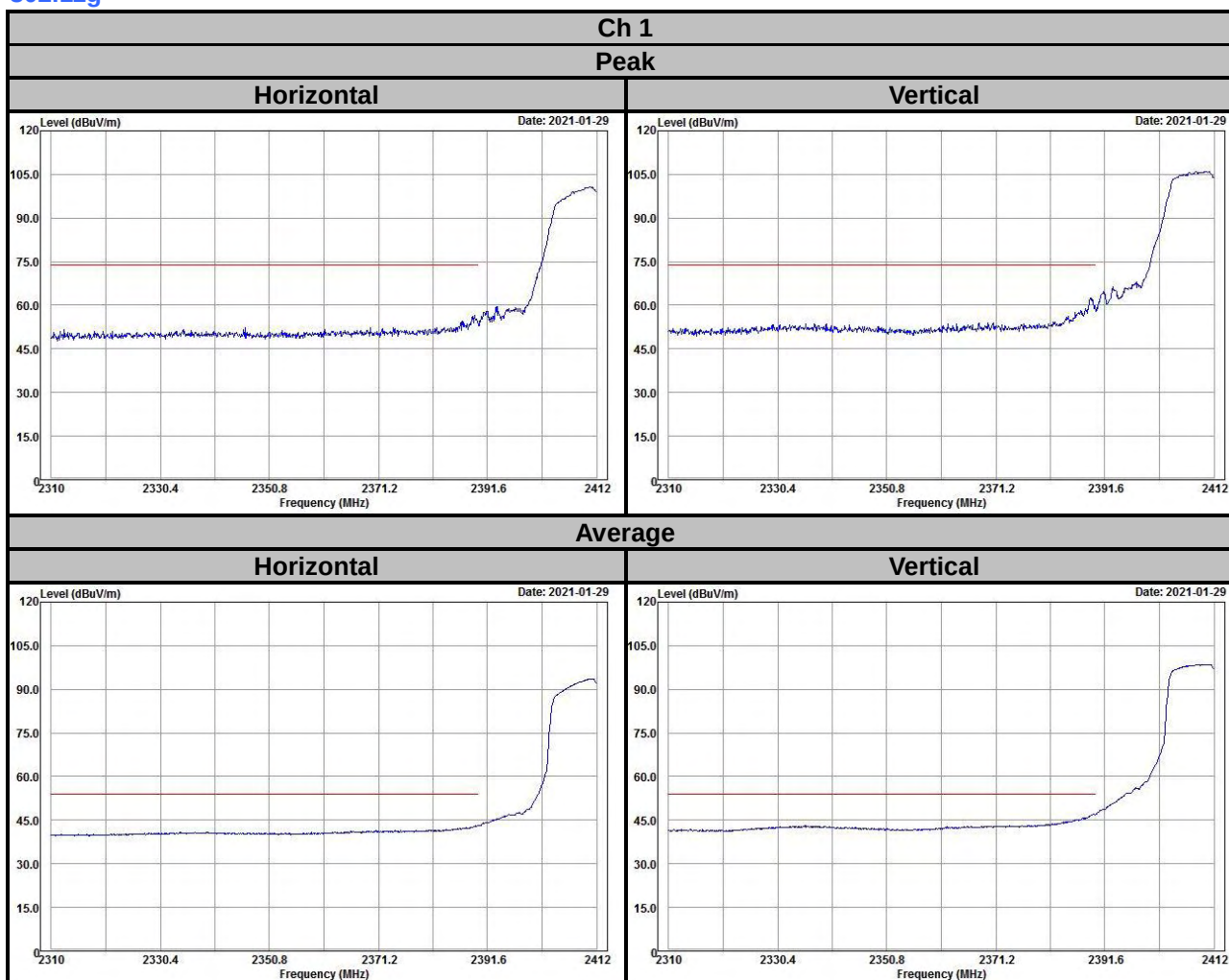
Horizontal



Vertical



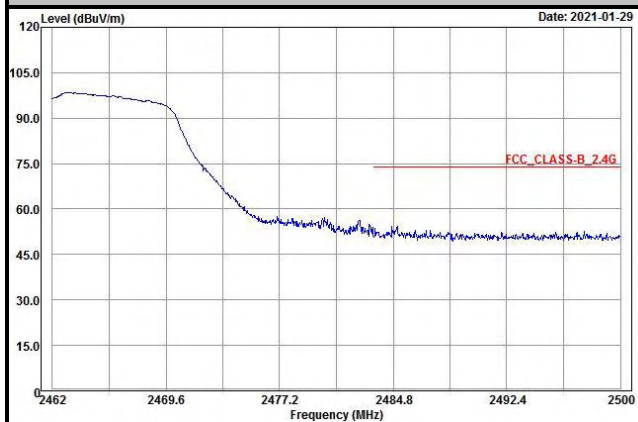
802.11g



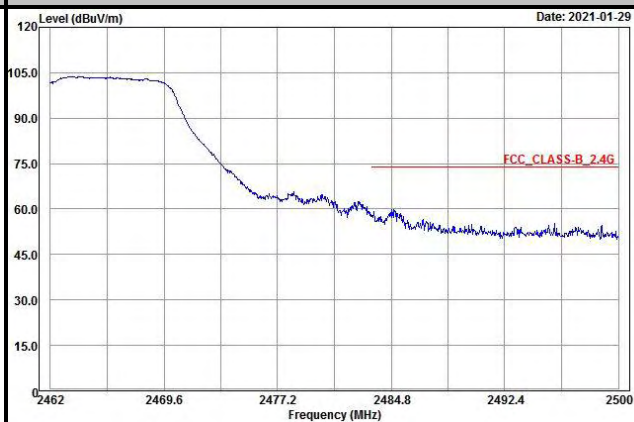
Ch 11

Peak

Horizontal

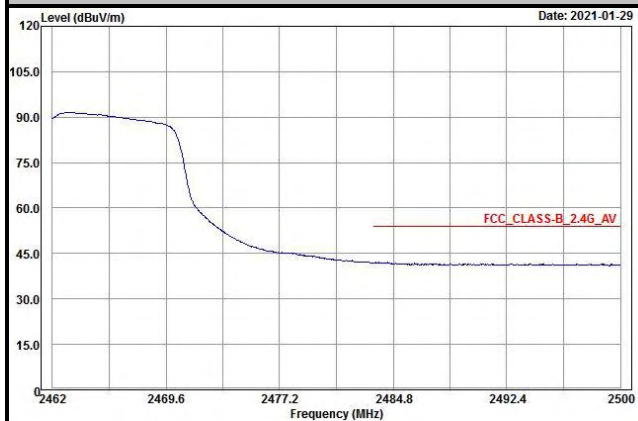


Vertical

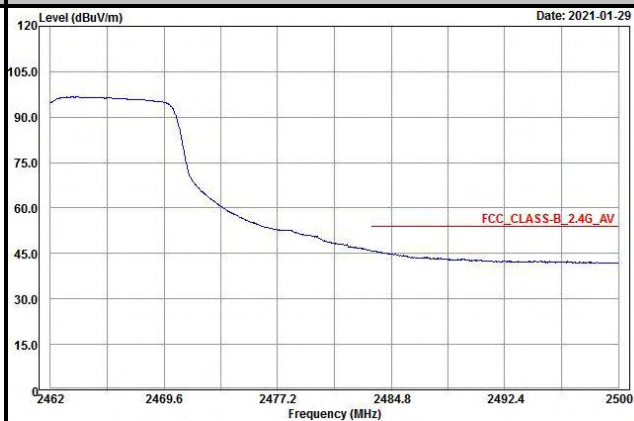


Average

Horizontal



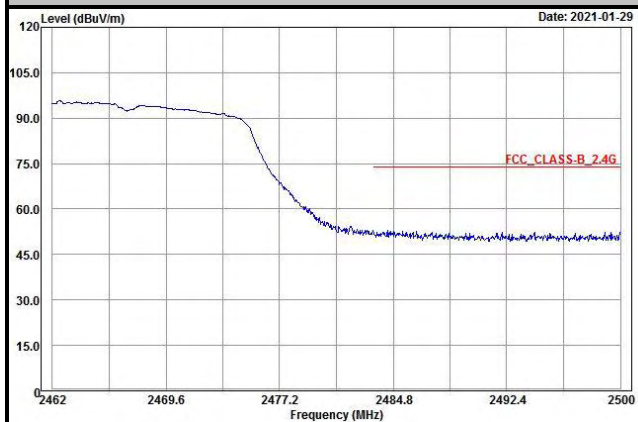
Vertical



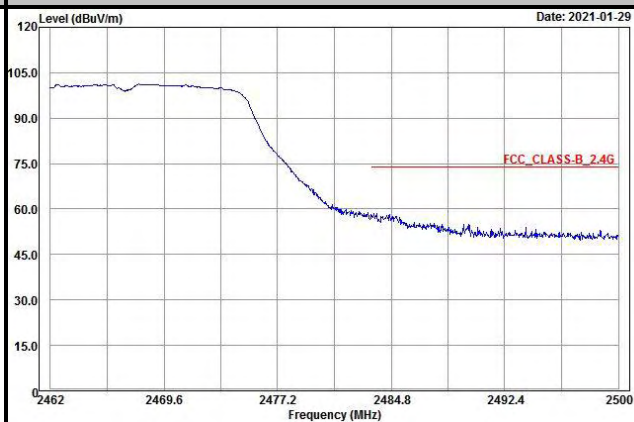
Ch 12

Peak

Horizontal

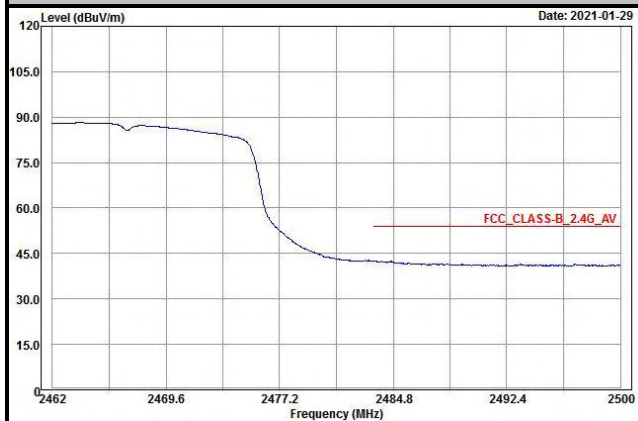


Vertical



Average

Horizontal



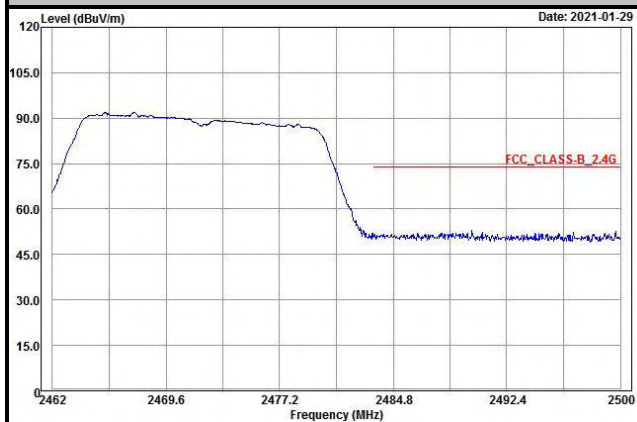
Vertical



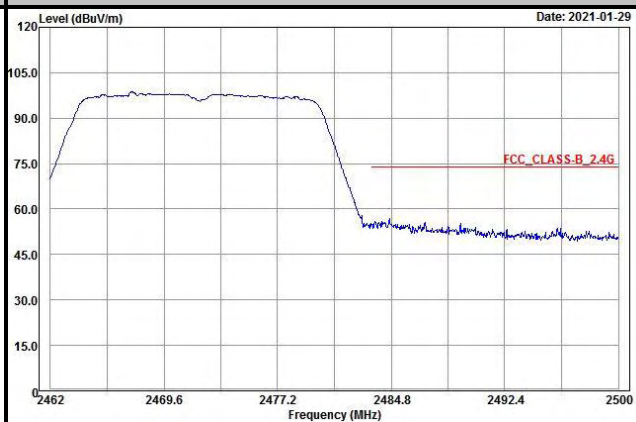
Ch 13

Peak

Horizontal

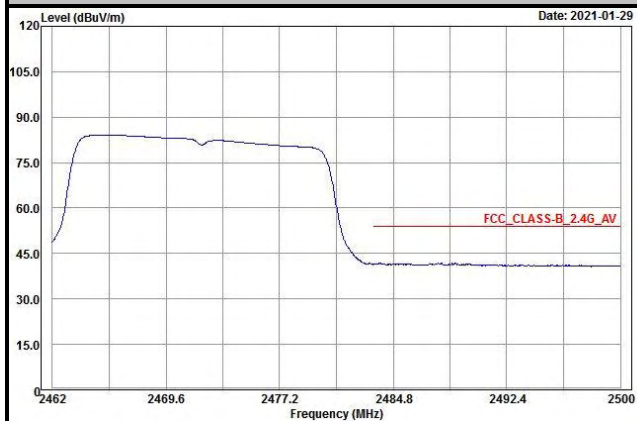


Vertical

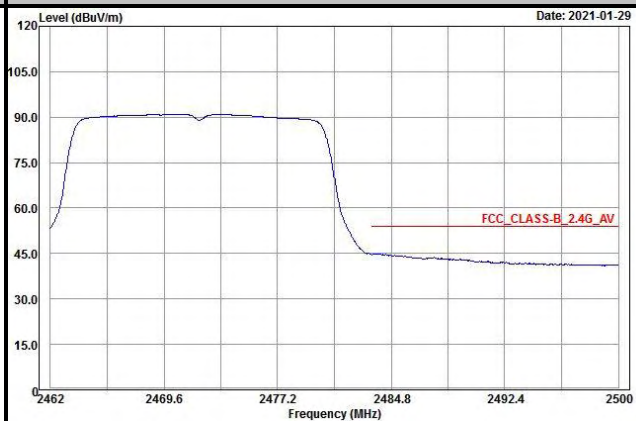


Average

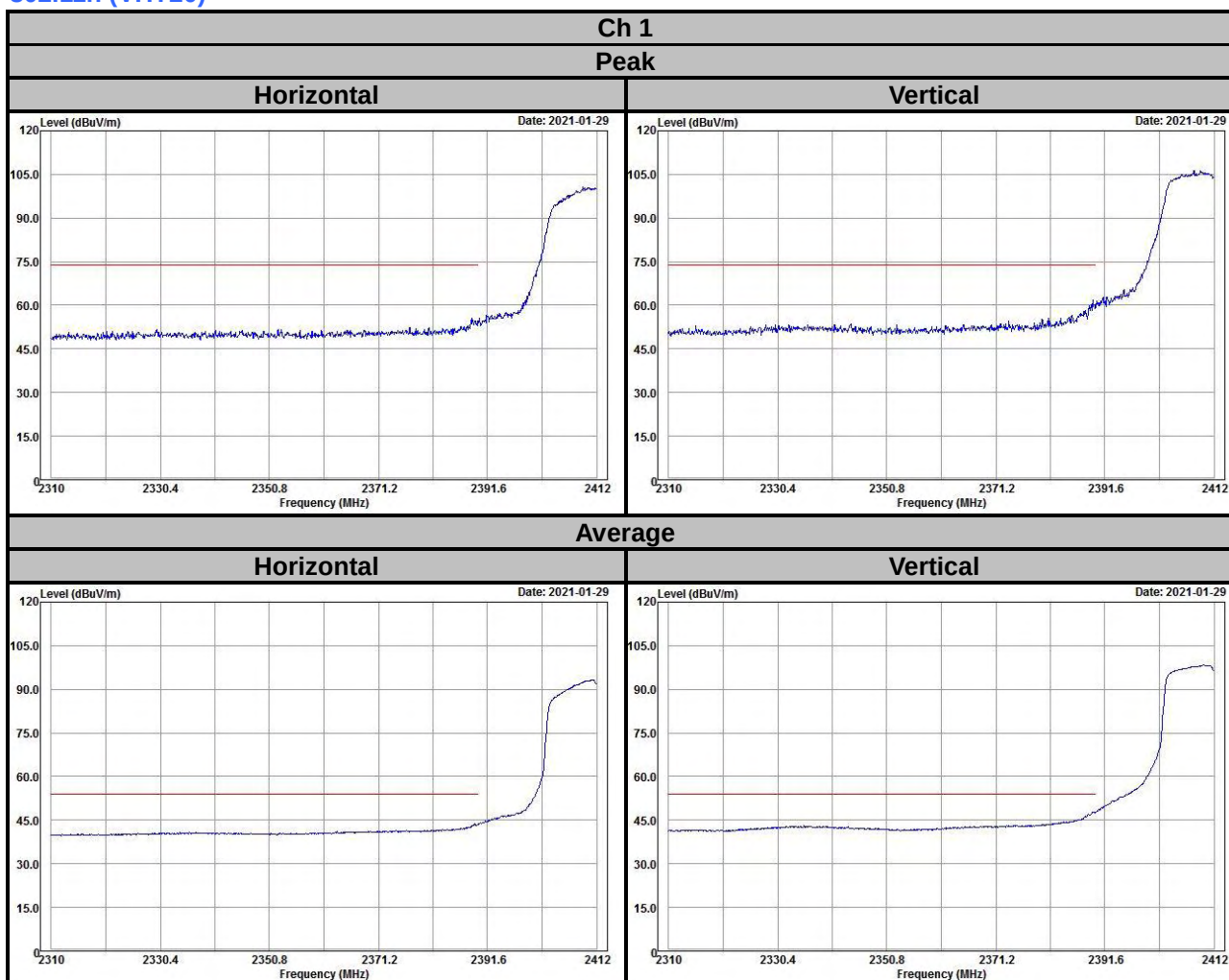
Horizontal



Vertical



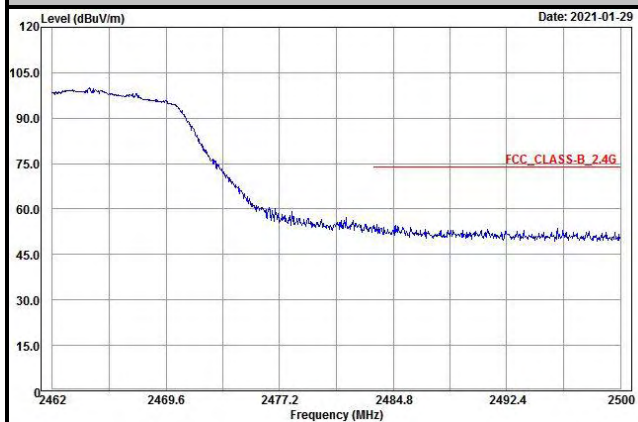
802.11n (VHT20)



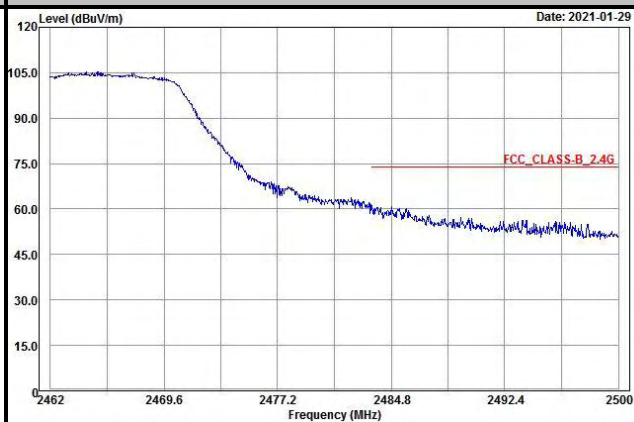
Ch 11

Peak

Horizontal

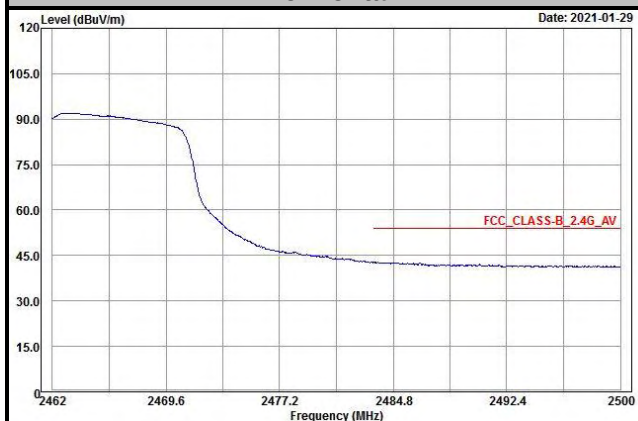


Vertical



Average

Horizontal



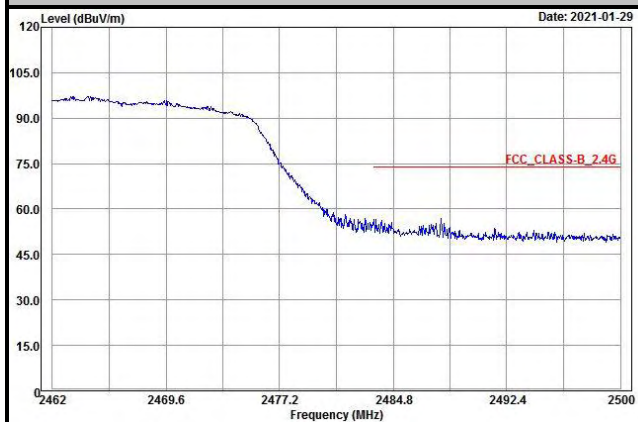
Vertical



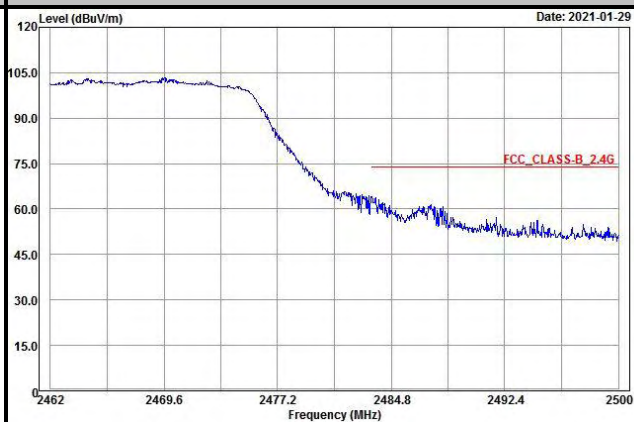
Ch 12

Peak

Horizontal

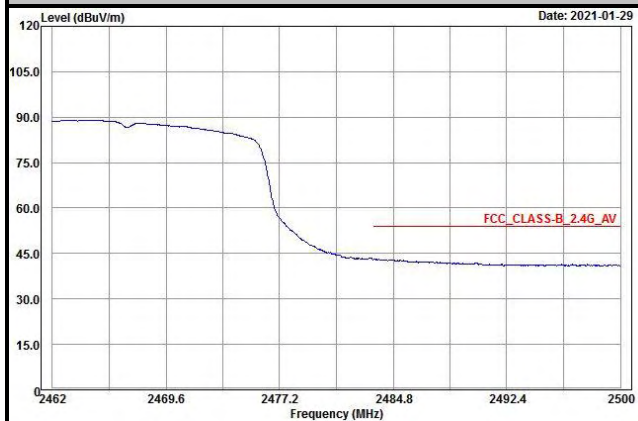


Vertical

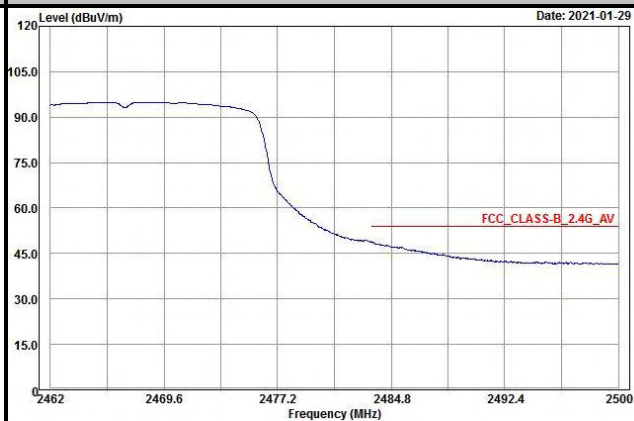


Average

Horizontal



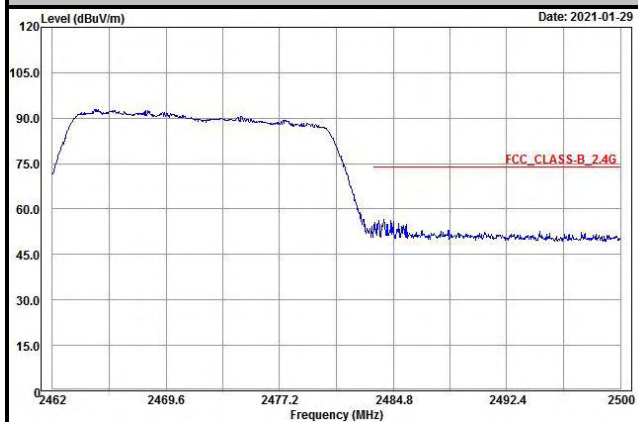
Vertical



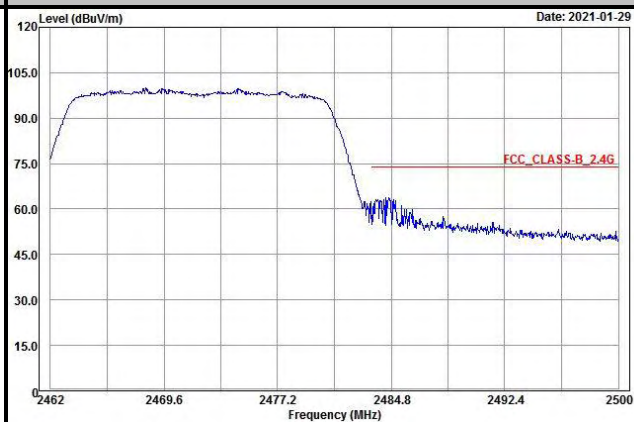
Ch 13

Peak

Horizontal

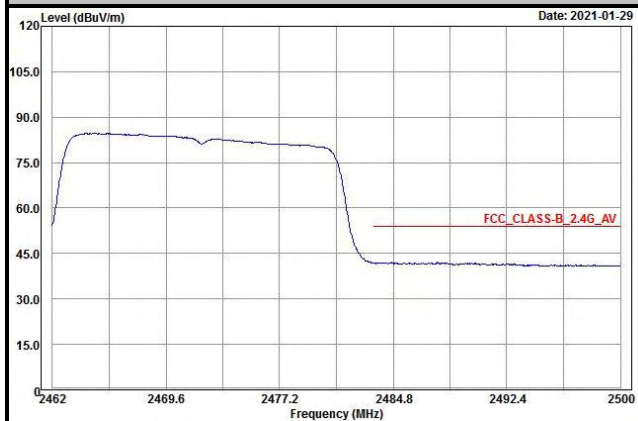


Vertical



Average

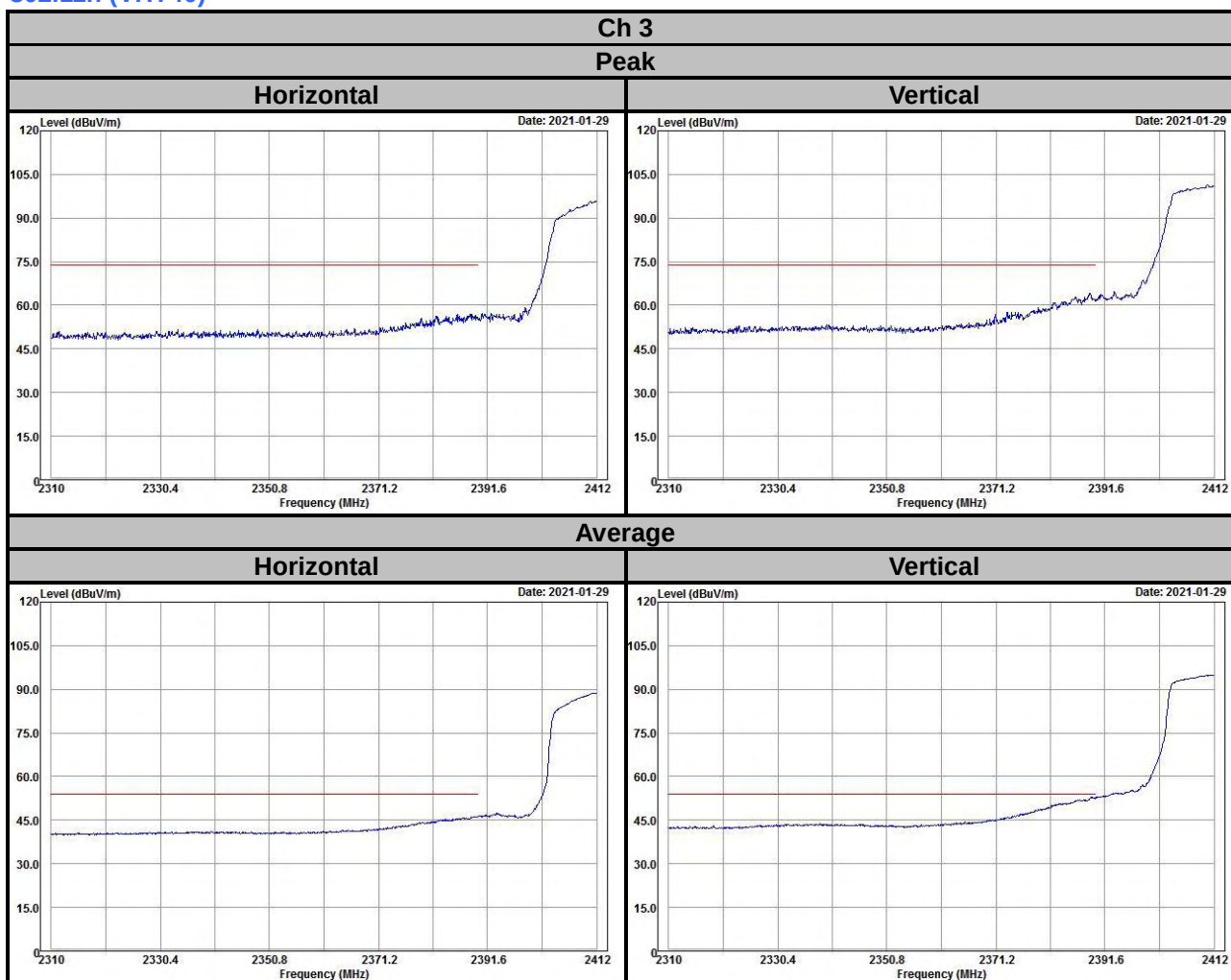
Horizontal



Vertical



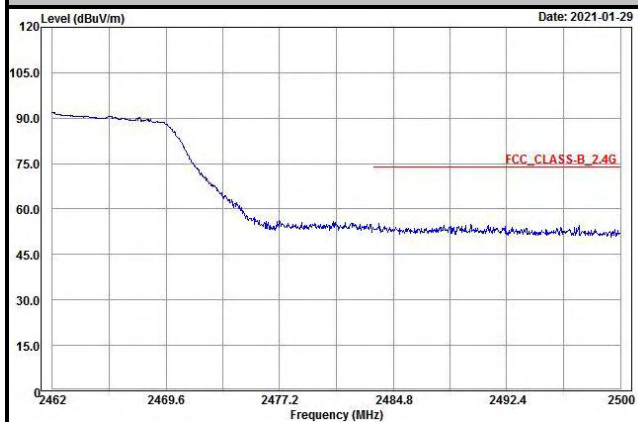
802.11n (VHT40)



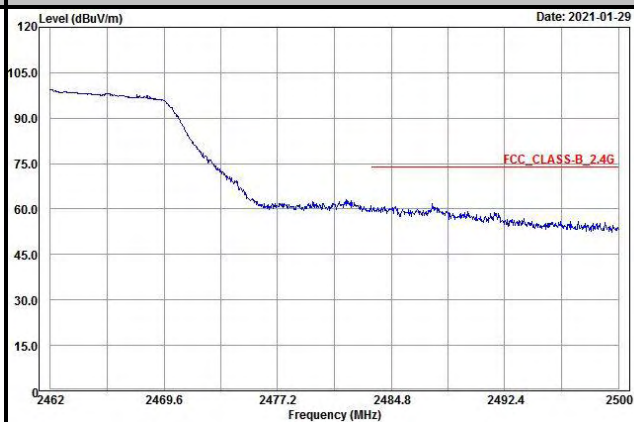
Ch 9

Peak

Horizontal

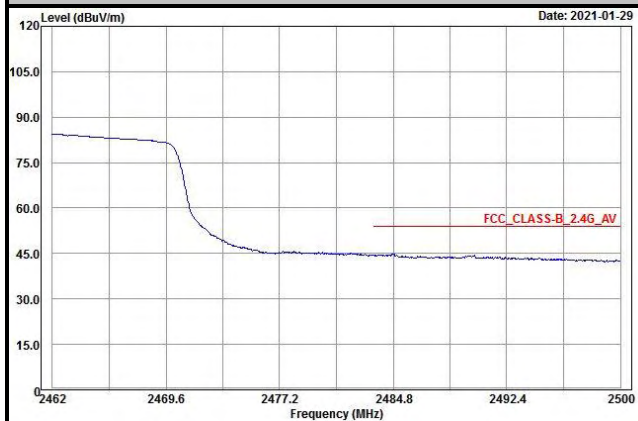


Vertical

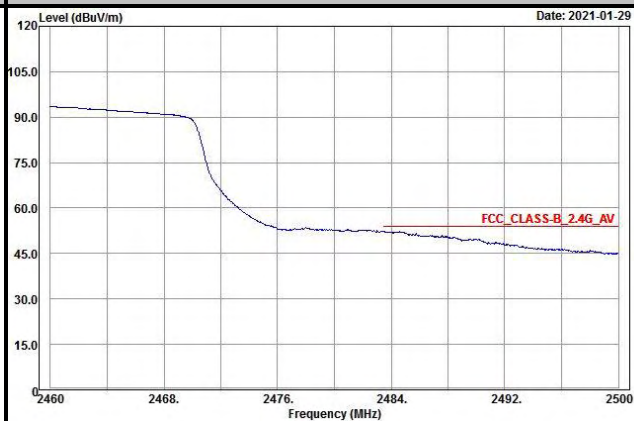


Average

Horizontal



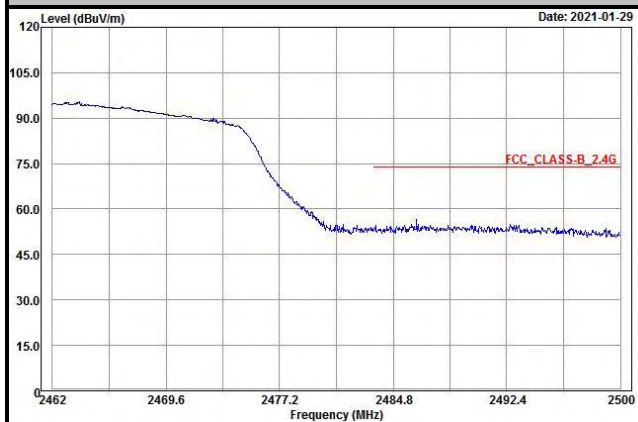
Vertical



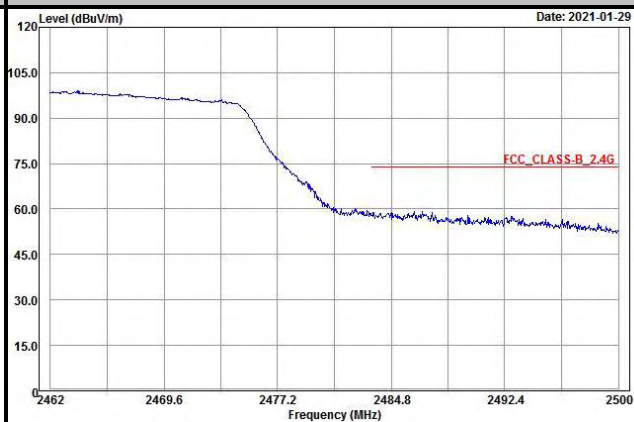
Ch 10

Peak

Horizontal

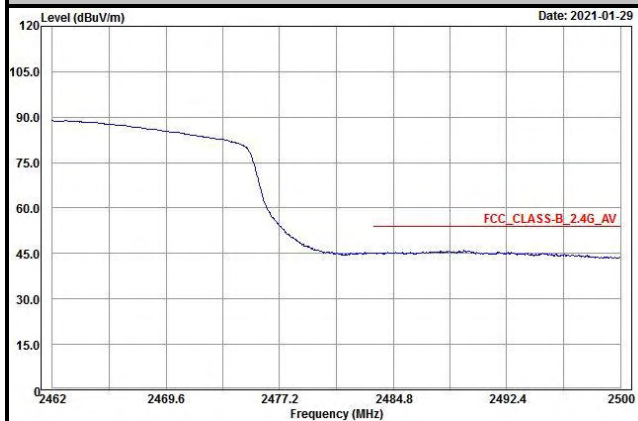


Vertical

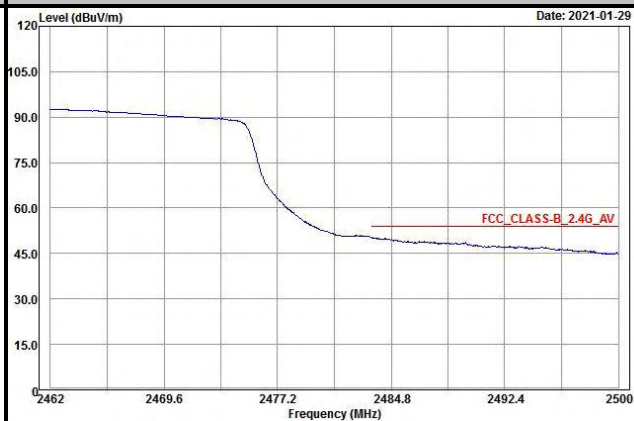


Average

Horizontal



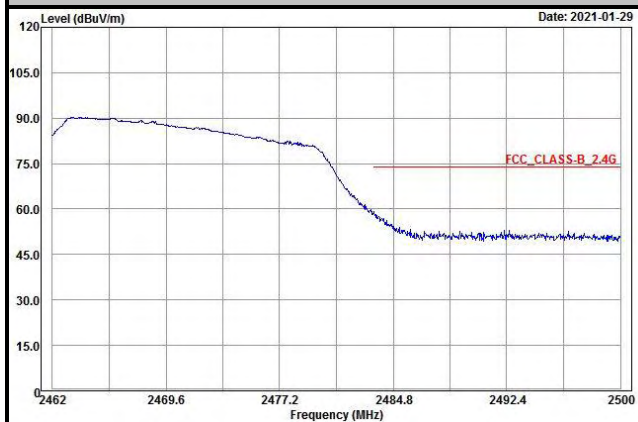
Vertical



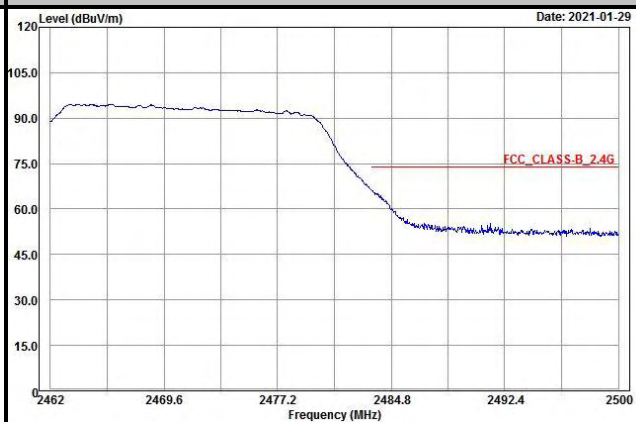
Ch 11

Peak

Horizontal

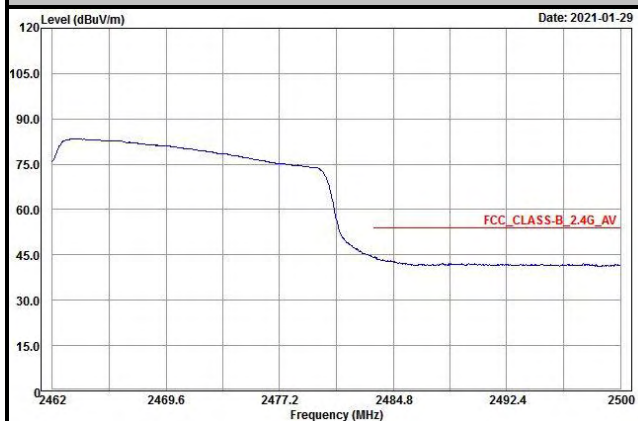


Vertical



Average

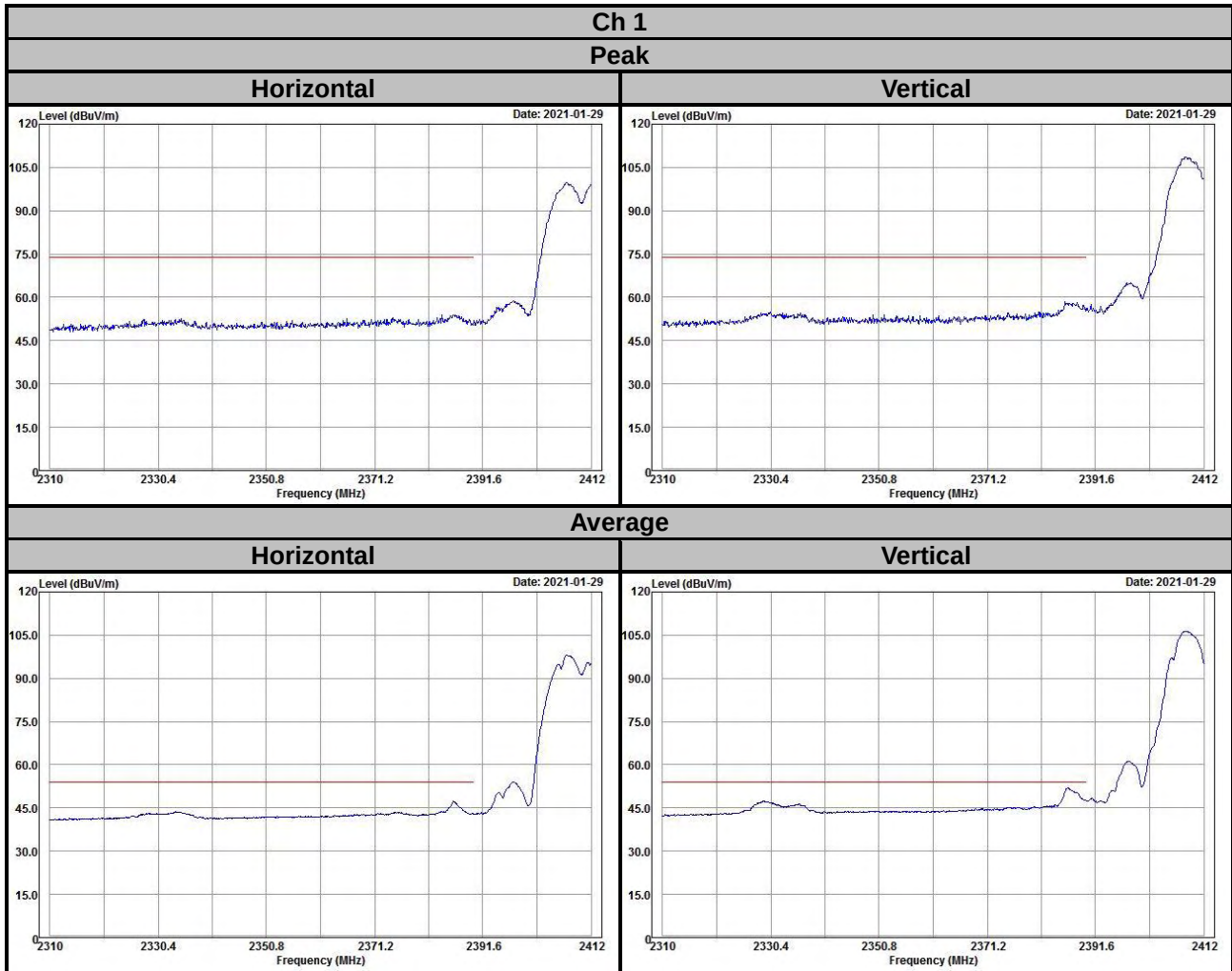
Horizontal



Vertical



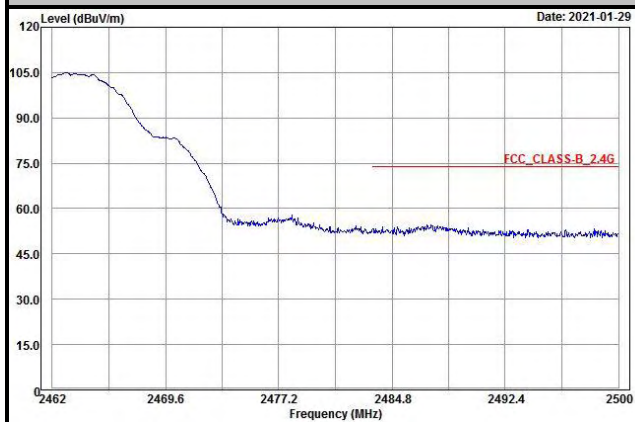
MIMO
802.11b



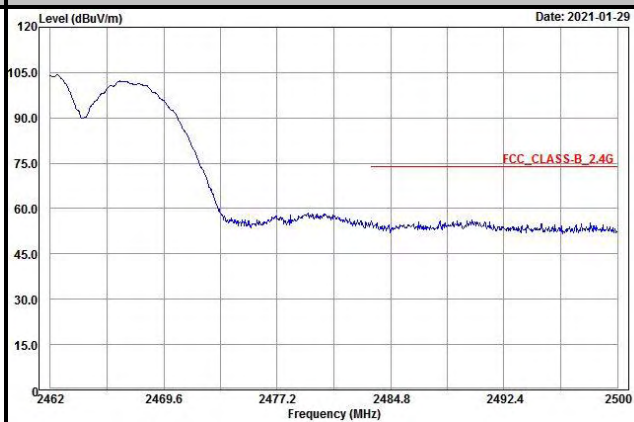
Ch 11

Peak

Horizontal

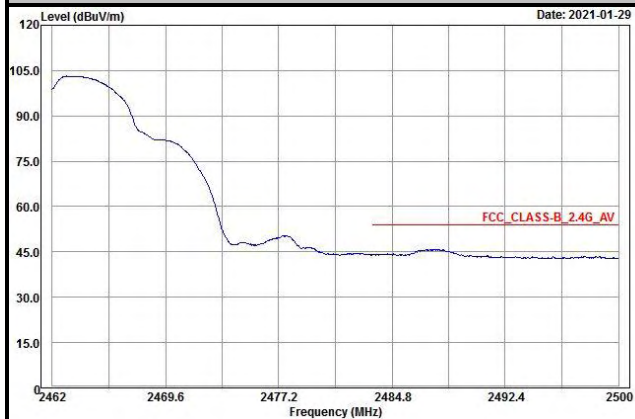


Vertical

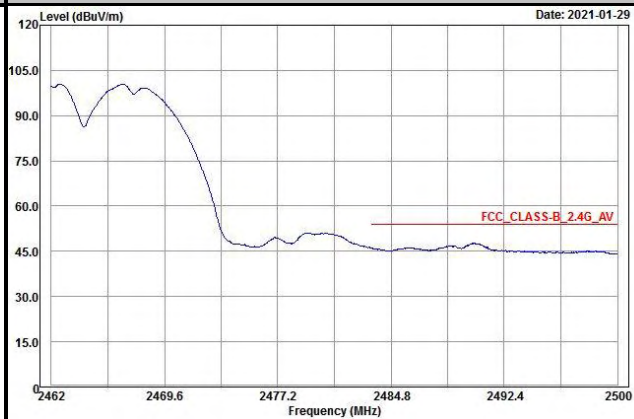


Average

Horizontal



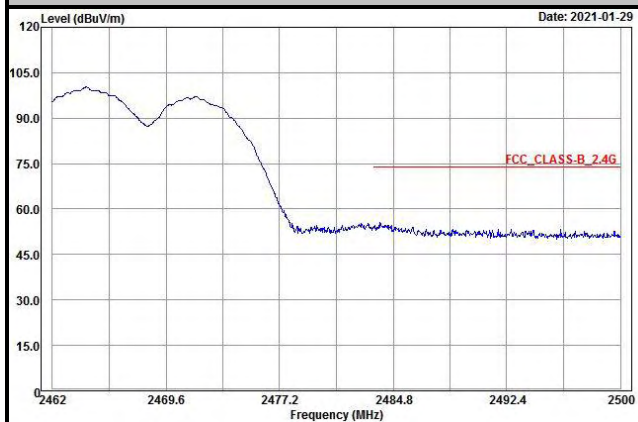
Vertical



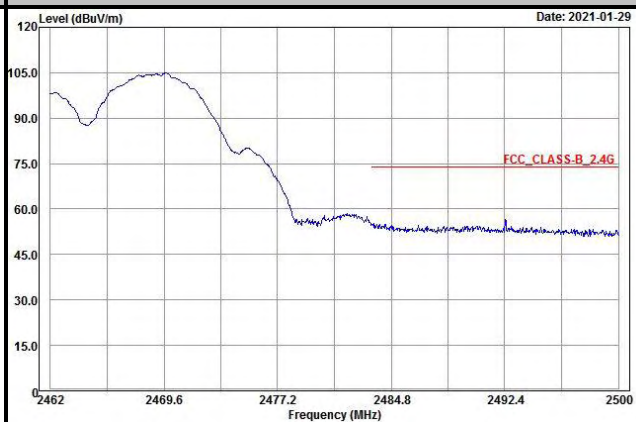
Ch 12

Peak

Horizontal

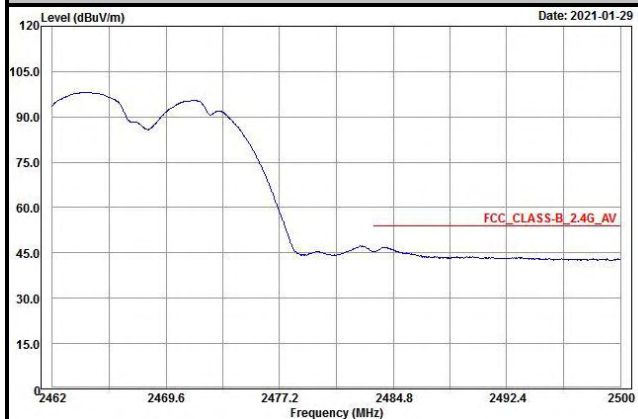


Vertical

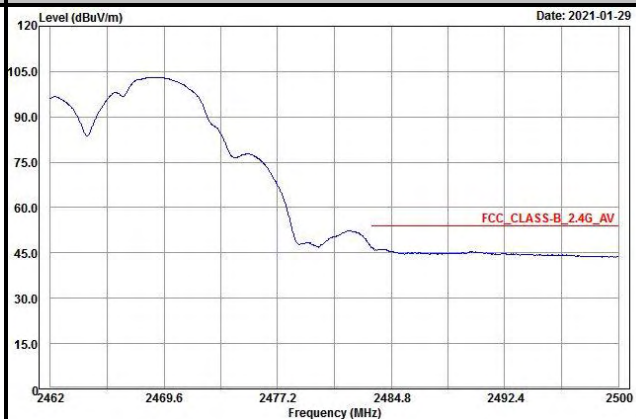


Average

Horizontal



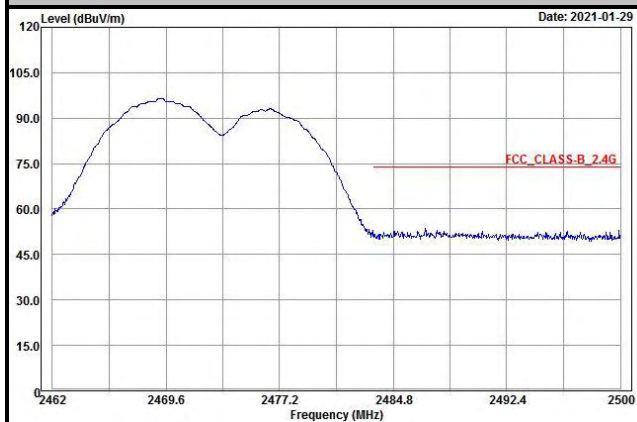
Vertical



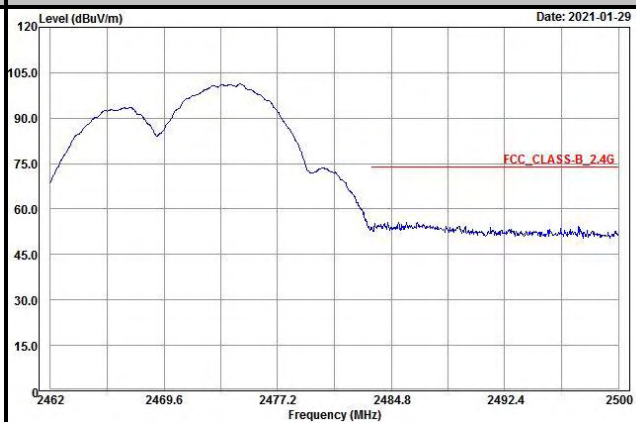
Ch 13

Peak

Horizontal

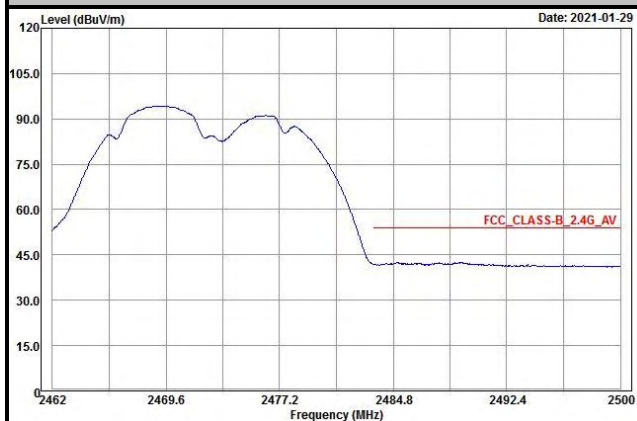


Vertical



Average

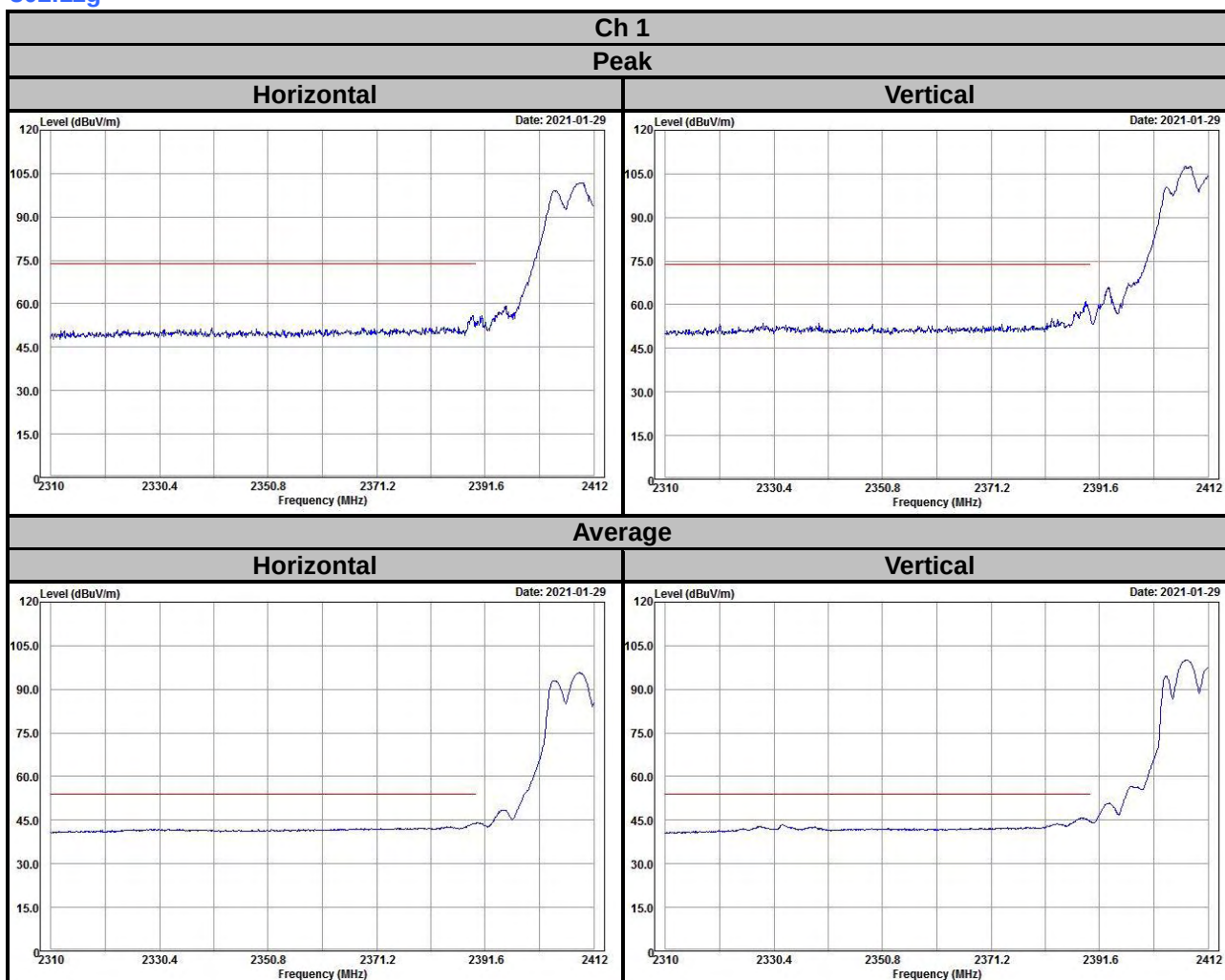
Horizontal



Vertical



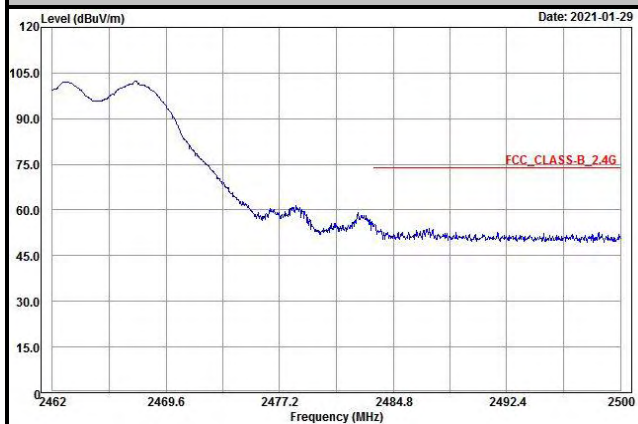
802.11g



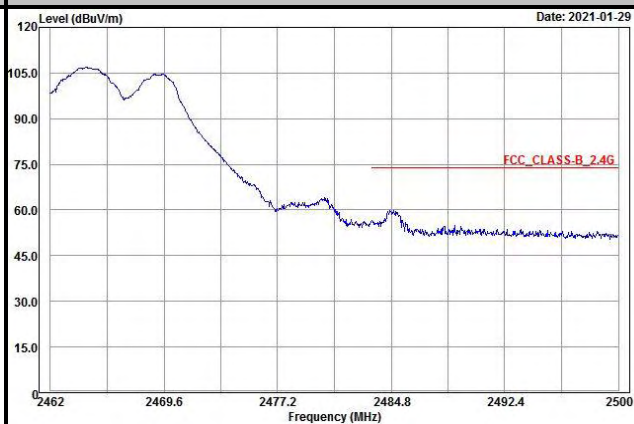
Ch 11

Peak

Horizontal

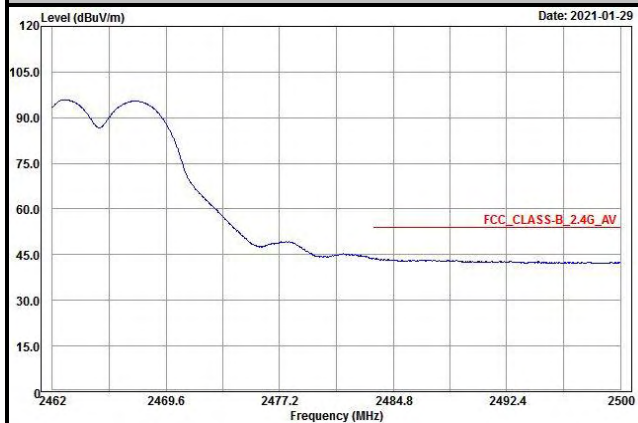


Vertical

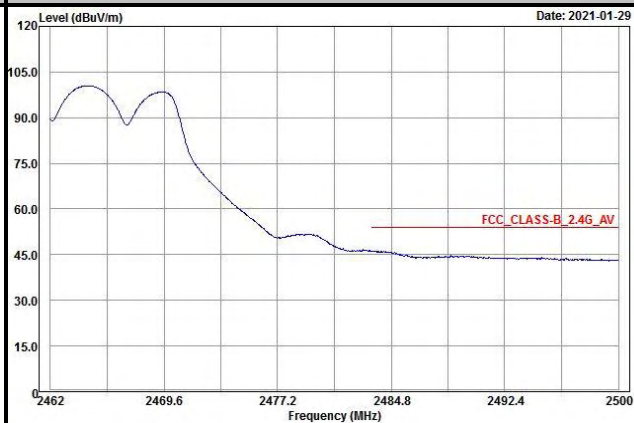


Average

Horizontal



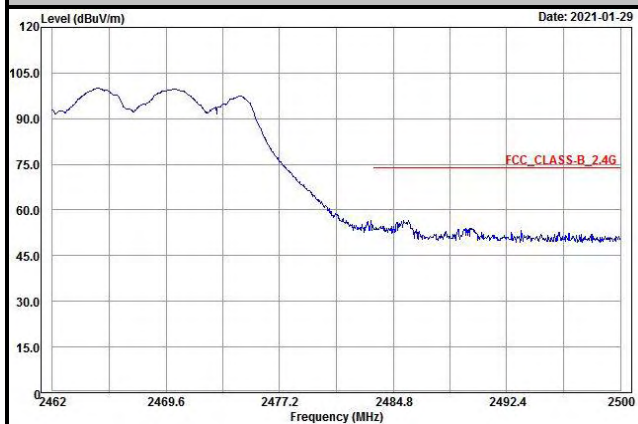
Vertical



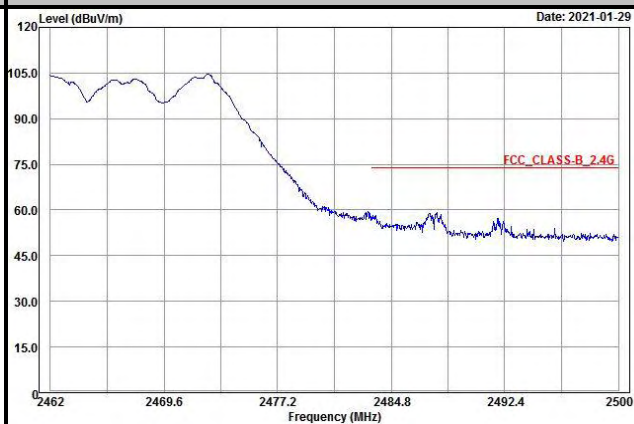
Ch 12

Peak

Horizontal

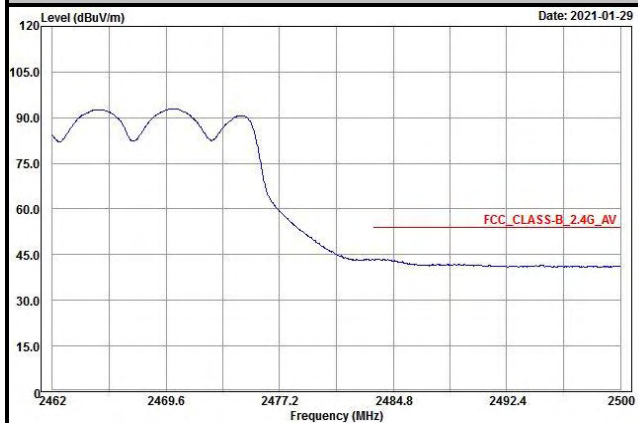


Vertical

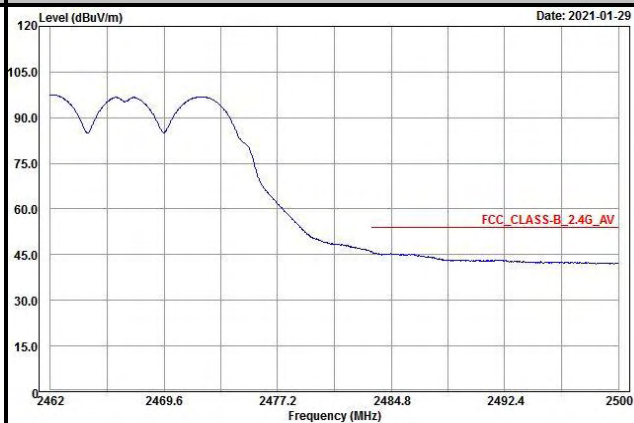


Average

Horizontal



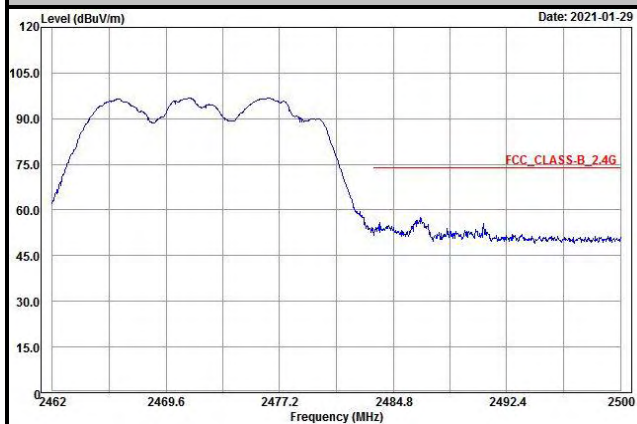
Vertical



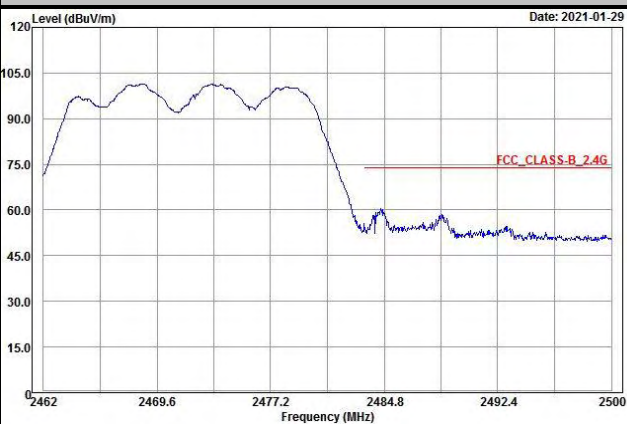
Ch 13

Peak

Horizontal



Vertical



Average

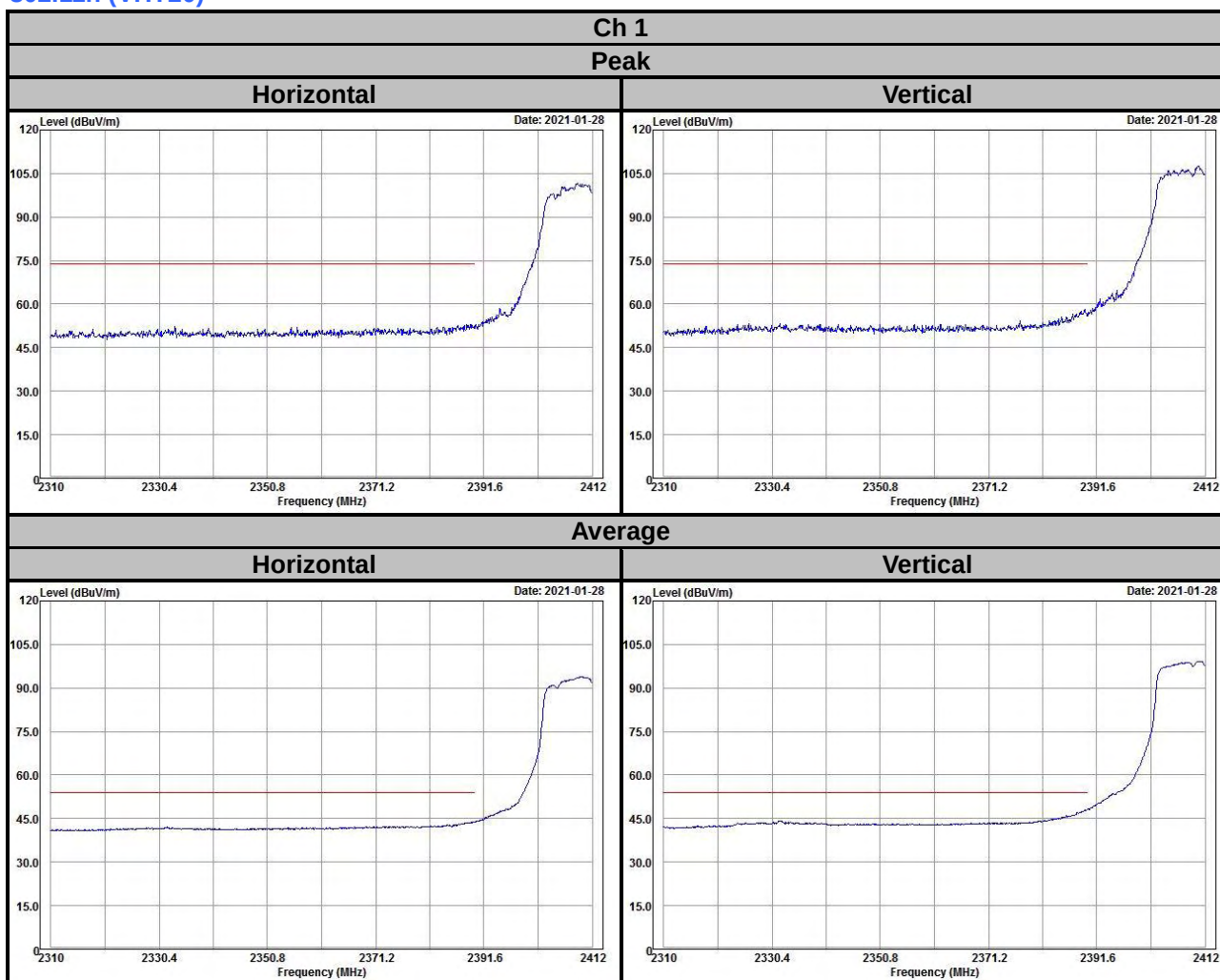
Horizontal



Vertical



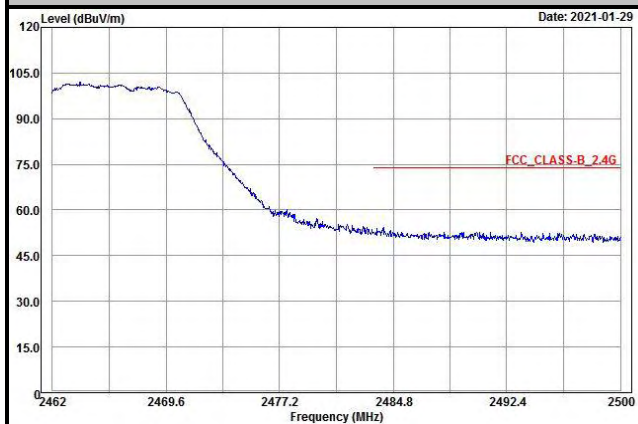
802.11n (VHT20)



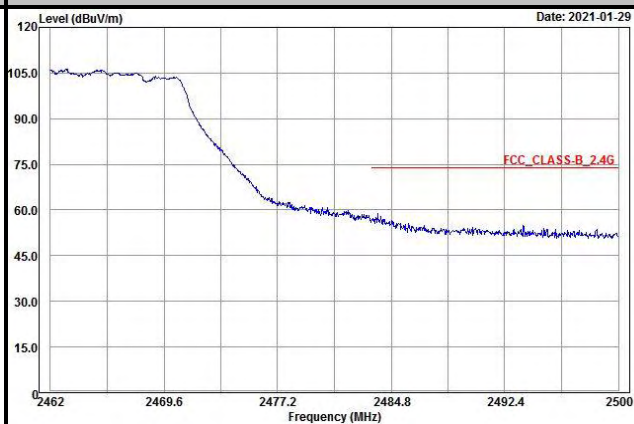
Ch 11

Peak

Horizontal

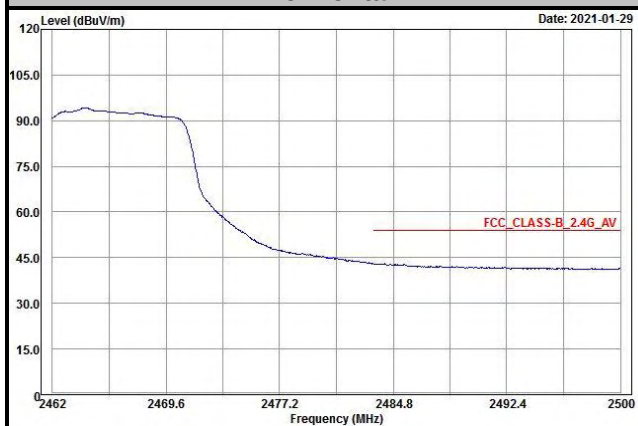


Vertical

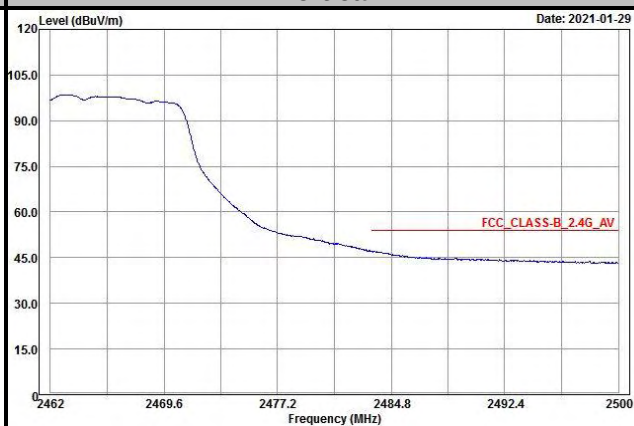


Average

Horizontal



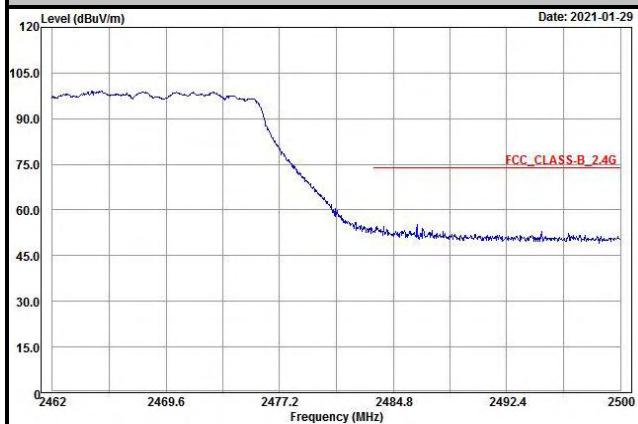
Vertical



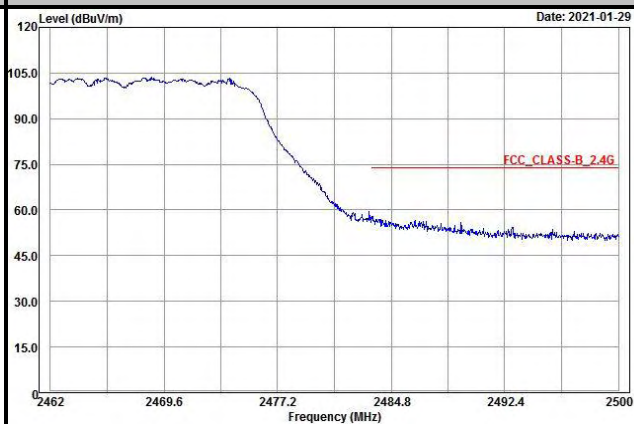
Ch 12

Peak

Horizontal

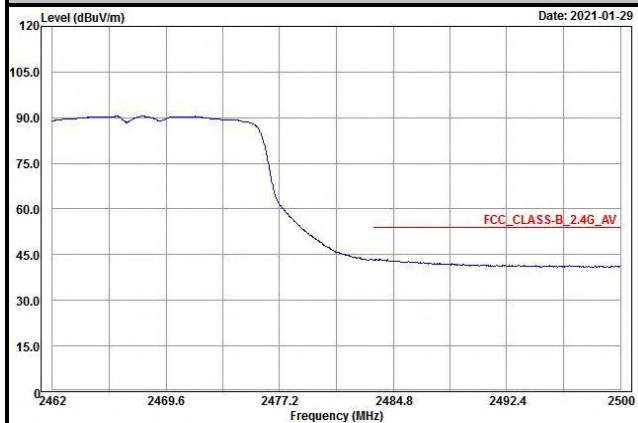


Vertical



Average

Horizontal



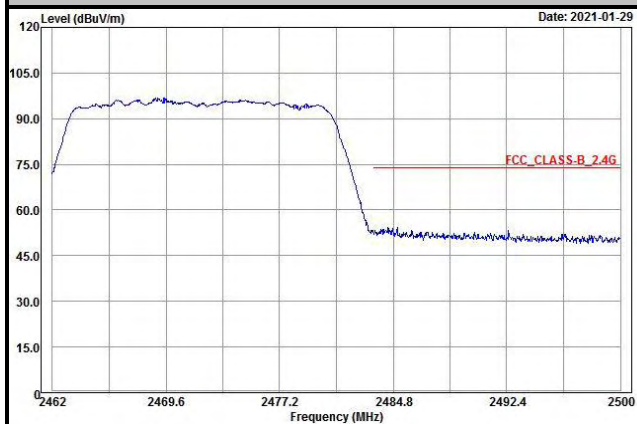
Vertical



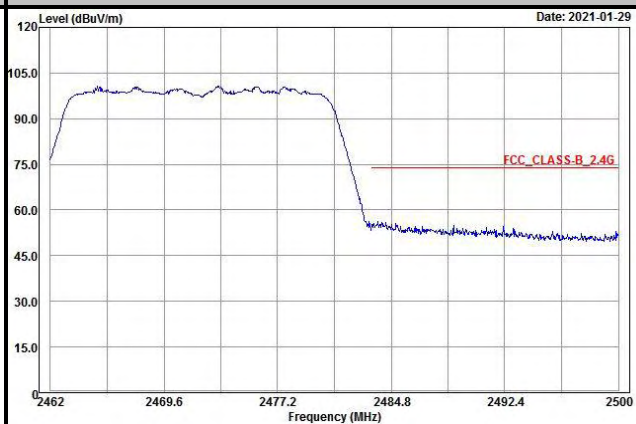
Ch 13

Peak

Horizontal



Vertical

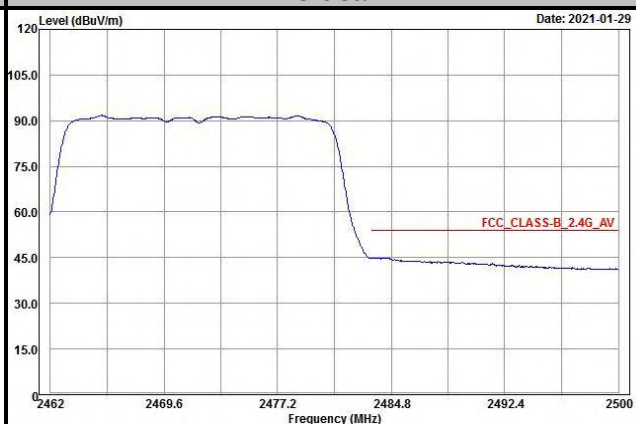


Average

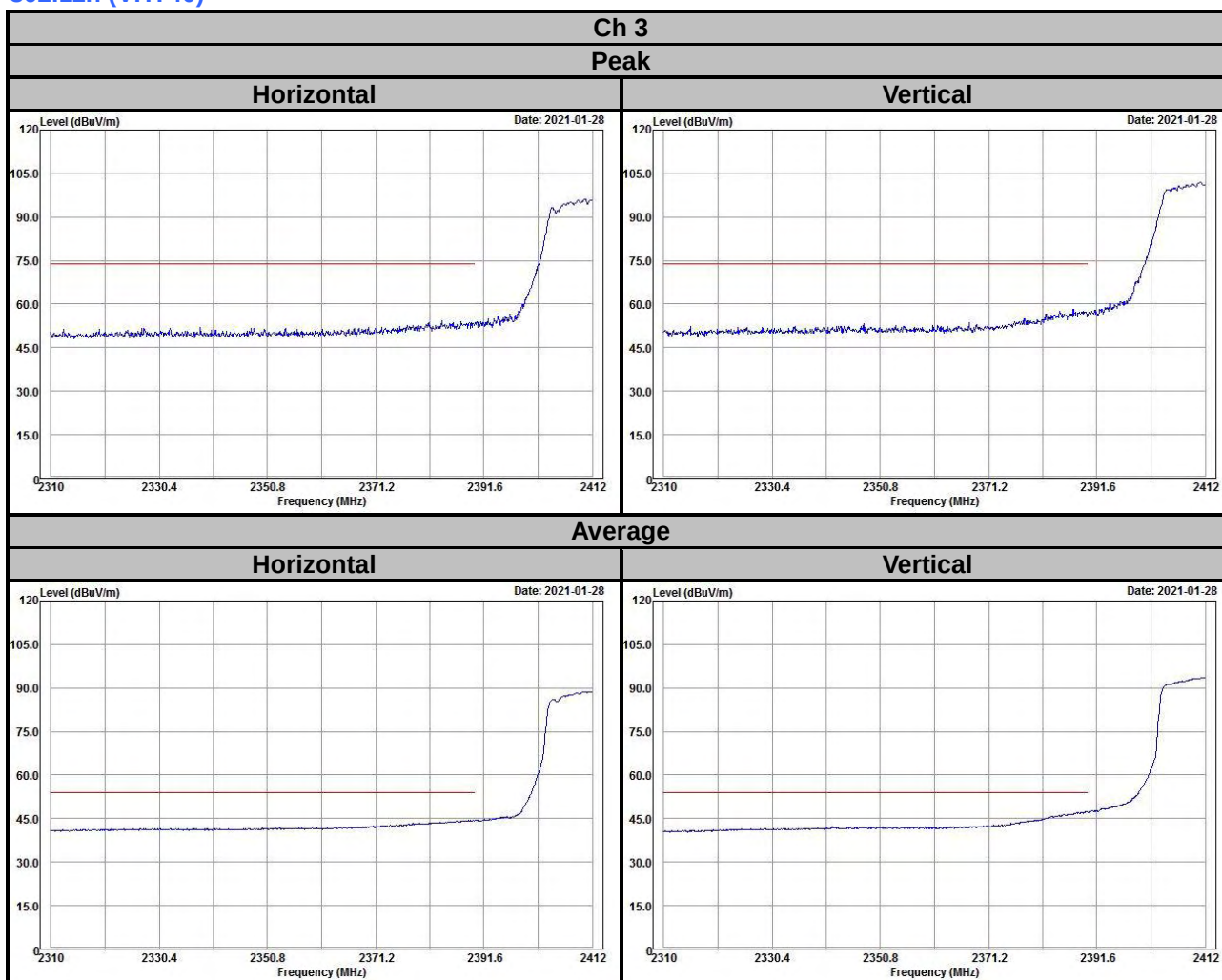
Horizontal



Vertical



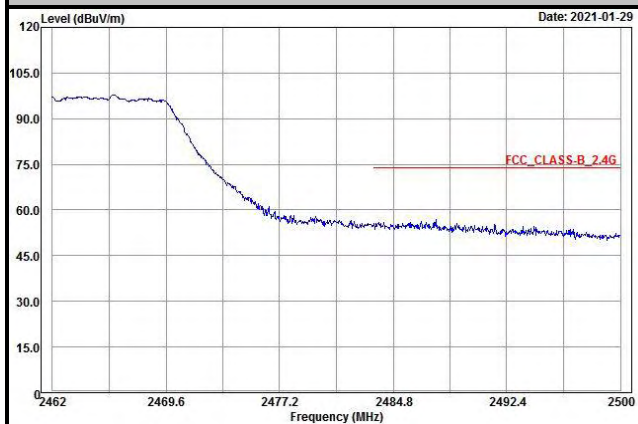
802.11n (VHT40)



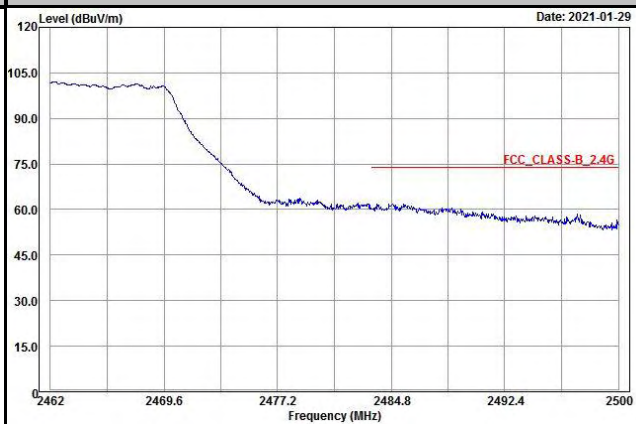
Ch 9

Peak

Horizontal

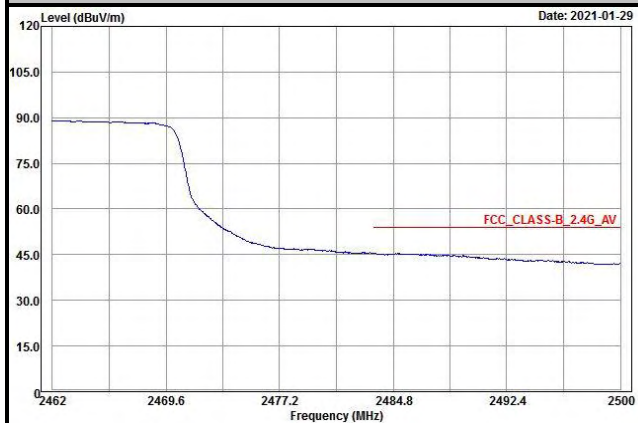


Vertical

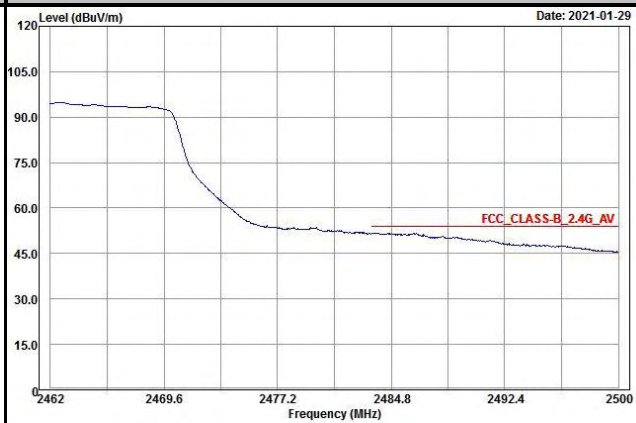


Average

Horizontal



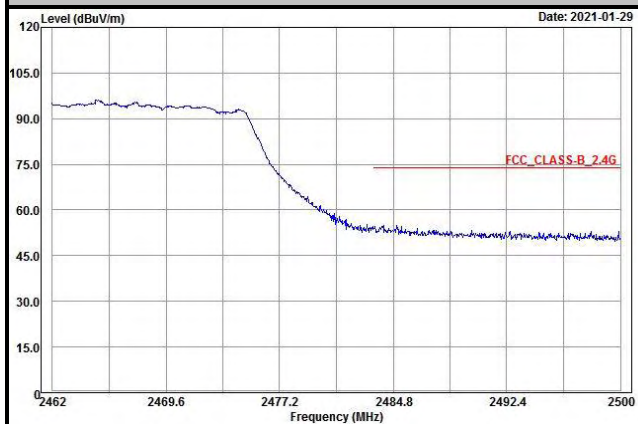
Vertical



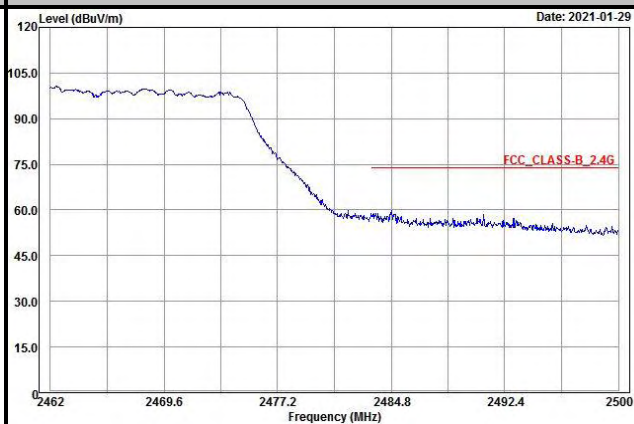
Ch 10

Peak

Horizontal

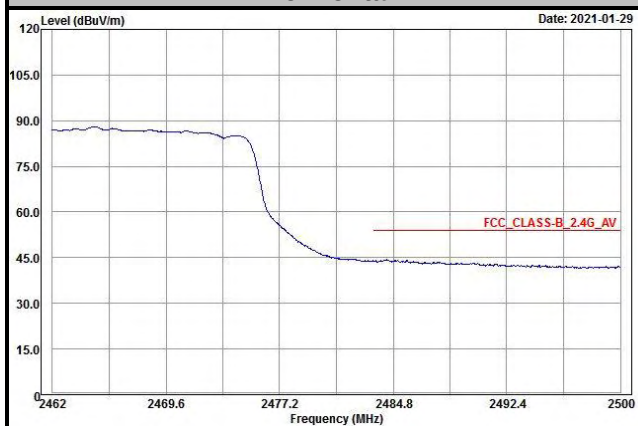


Vertical



Average

Horizontal



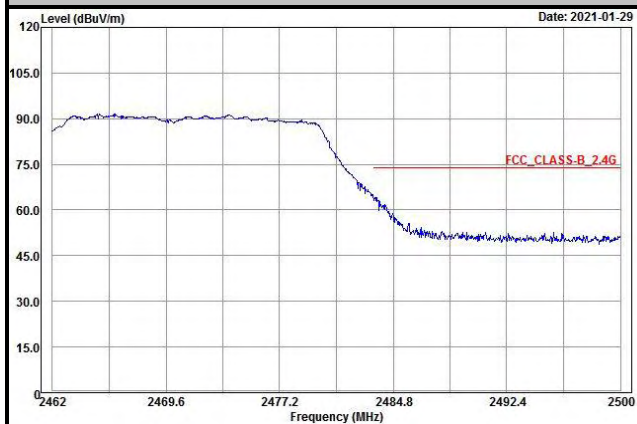
Vertical



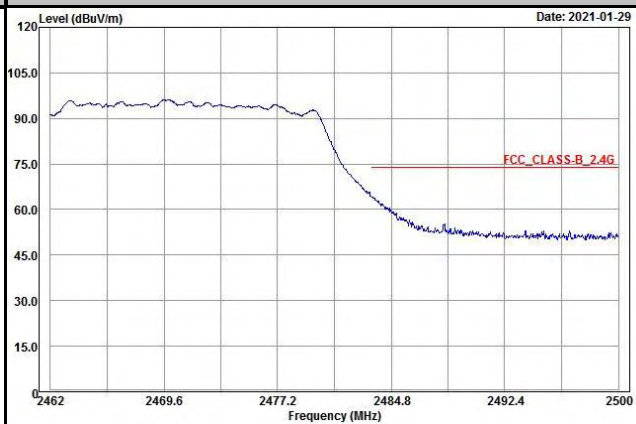
Ch 11

Peak

Horizontal

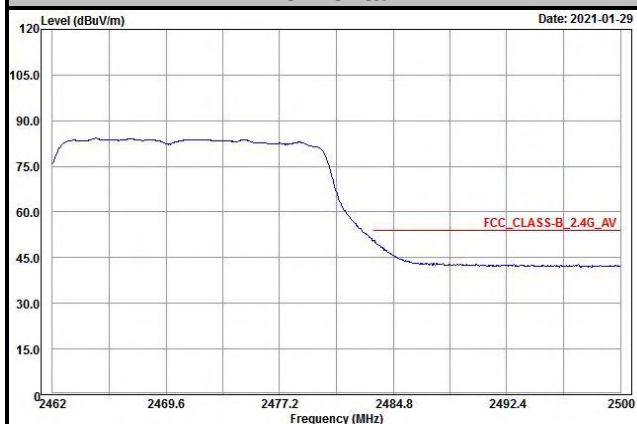


Vertical



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.

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

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