RF Test Report

For

SHENZHEN ELEBAO TECHNOLOGY CO., LTD

Test Standards:	Part 15C Subpart C §15.247
Product Description:	TV Dongle
Tested Model:	ST4000
Additional Model No.	Y2, Y2S, Y2 LITE, Y2 PRO
Brand Name.:	Gocast
FCC ID:	2AP2G-EBY2S
Classification	(DTS) Digital Transmission System
Report No.:	EC2002004RF01
Tested Date:	2020-02-17 to 2020-03-03
Issued Date:	2020-03-03
Prepared By:	Jerry Wang / Engineer
Approved By:	Bacon Wu / RF Manager

Hunan Ecloud Testing Technology Co., Ltd.

Building A1, Changsha E Center, No. 18 Xiangtai Avenue, Liuyang Economic and Technological Development Zone, Hunan, P.R.C

Tel.: +86-731-89634887 Fax.: +86-731-89634887

www.hn-ecloud.com

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2020.03.03	Valid	Original Report

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Summary Of Test Result

FCC Rule	Description	Limit	Result	Remark
15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
-	99% Bandwidth	-	Pass	-
15.247(b)(3)	Peak Output Power	≤ 30dBm	Pass	-
15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
15.247(d)	Conducted Band Edges and Spurious Emission	≤ 20dBc	Pass	-
15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.07 dB at 2390 MHz
15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 1.37 dB at 0.573 MHz
15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

1 Test Laboratory

1.1 Test facility

CNAS (accreditation number: L11138)

Hunan Ecloud Testing Technology Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1244 , Test Firm Registration Number: 793308)

Hunan Ecloud Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

ISED(CAB identifier: CN0012, ISED# :24347)

Hunan Ecloud Testing Technology Co., Ltd. has been listed on the Wireless Device Testing Laboratories list of innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements.

A2LA (Certificate Code : 4895.01)

Hunan Ecloud Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

2 General Description

2.1 Applicant

SHENZHEN ELEBAO TECHNOLOGY CO., LTD
Rm. 607, Bldg. A, Zhihui Chuangxin Center,Qianjin 2nd Road, Bao'an District, Shenzhen, China

2.2 Manufacturer

SHENZHEN ELEBAO TECHNOLOGY CO., LTD
Rm. 607, Bldg. A, Zhihui Chuangxin Center,Qianjin 2nd Road, Bao'an District, Shenzhen, China

2.3 General Description Of EUT

Product	TV Dongle
Model No.	ST4000
Additional NO.	Y2, Y2S, Y2 LITE, Y2 PRO
Difference Description	Only the model name is different
Brand Name	Gocast
FCC ID	2AP2G-EBY2S
Power Supply	5Vdc
Modulation Technology	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Type	802.11b : DSSS 802.11g/n : OFDM
Operating Frequency	2412-2462MHz
Number Of Channel	11
Max. Output Power	802.11b : 14.14 dBm (0.0259 W) 802.11g : 13.69 dBm (0.0234 W) 802.11n HT20 : 13.33 dBm (0.0215 W)
Antenna Type	PIFA Antenna type with 2dBi gain
HW Version	V1.0
SW Version	Android 8.1.0
I/O Ports	Refer to user's manual

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3. The EUT was powered by the following adapters:

MODEL:	KA12C-0502000US
INPUT:	110-240V~50/60Hz 0.35A MAX
OUTPUT:	5V DC 2A
DC LINE:	1.0 m

4. The EUT matched the following Remote controller:

MODEL:	N/A

5. The EUT matched the following HDMI Cable:

MODEL:	N/A
LINE:	0 .29 Meter/Shielded

2.4 Modification of EUT

No modifications are made to the EUT during all test items.

2.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- ANSI C63.10-2013
- KDB 558074 D01 15.247 Meas Guidance v05r02

Remark:

1. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

3 Test Configuration of Equipment Under Test

3.1 Descriptions of Test Mode

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

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

The transmitter has a maximum conducted output power as follows:

Frequency Range(MHz)	Mode	Rate	Output Power(dBm)
2412~2462	802.11b	1Mbps	14.14
2412~2462	802.11g	6Mbps	13.69
2412~2462	802.11n HT20	MCS0	13.33

a. Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

3.2 Test Mode

3.2.1 Antenna Port Conducted Measurement

Summary table of Test Cases			
Test Item	Modulation		
	802.11 b	802.11 g	802.11n HT20
Conducted Test Cases	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 4: CH01 Mode 5: CH06 Mode 6: CH011	Mode 7: CH01 Mode 8: CH06 Mode 9: CH011

3.2.2 Radiated Emission Test (Below 1GHz)

Radiated Test Cases	802.11 b
	Mode 1: CH01

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna

diversity architecture) and packet type. Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

2. Following channel(s) was (were) selected for the final test as listed above

3.2.3 Radiated Emission Test (Above 1GHz)

Test Item	Modulation		
	802.11 b	802.11 g	802.11n HT20
Radiated Test Cases	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 4: CH01 Mode 5: CH06 Mode 6: CH011	Mode 7: CH01 Mode 8: CH06 Mode 9: CH011

Note : 1. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

2. Following channel(s) was (were) selected for the final test as listed above

3. For frequency above 18GHz, the measured value is much lower than the limit, therefore, it is not reflected in the report.

3.2.4 Power Line Conducted Emission Test:

AC Conducted Emission	Mode 1 : 2.4G WLAN Linking + HDMI + TF Card Upload + USB playing

3.3 Support Equipment

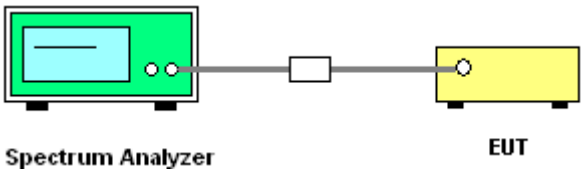
Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	NETGARE	R7800	PY315100319	N/A	unshielded AC I/P cable1.2 m
2.	Notebook	Lenovo	E470C	FCC DoC	N/A	shielded cable DC O/P 1.8 m unshielded AC I/P cable1.2 m
3.	Flat Panel Monitor	Dell	P2317H	FCC DoC	N/A	Unshielded, 1.5 m
4.	Bluetooth Keyboard	Sariana LLC	ST-ACBKM	ZE9-ST-ACBKM	N/A	N/A

3.4 Test Setup

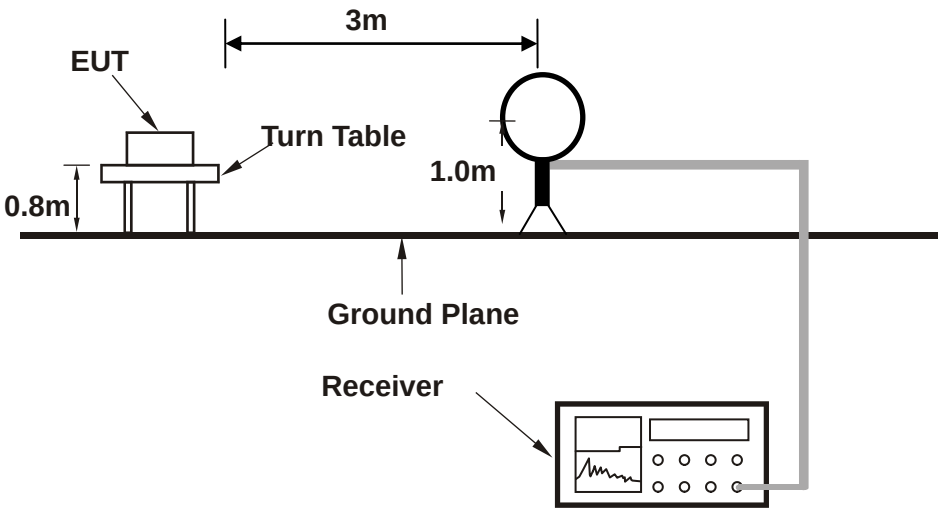
The EUT is continuously communicating to the WIFI tester during the tests.

EUT was set in the Hidden menu mode to enable WIFI communications.

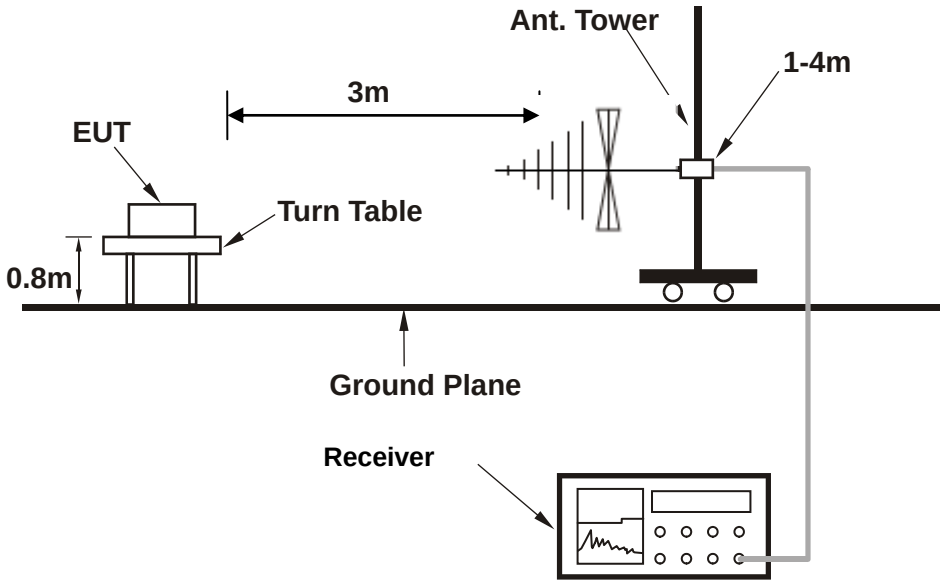
Setup diagram for Conducted Test



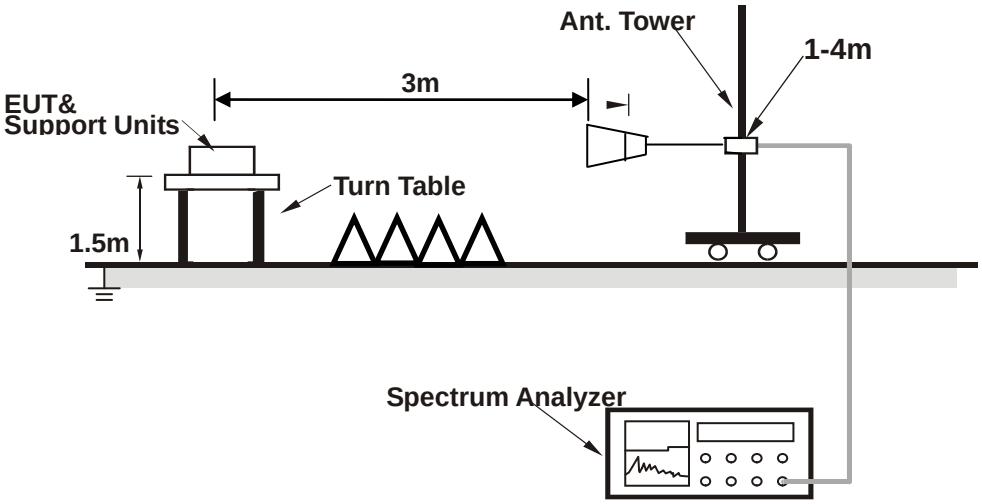
Setup diagram for Raidation(9KHz~30MHz) Test



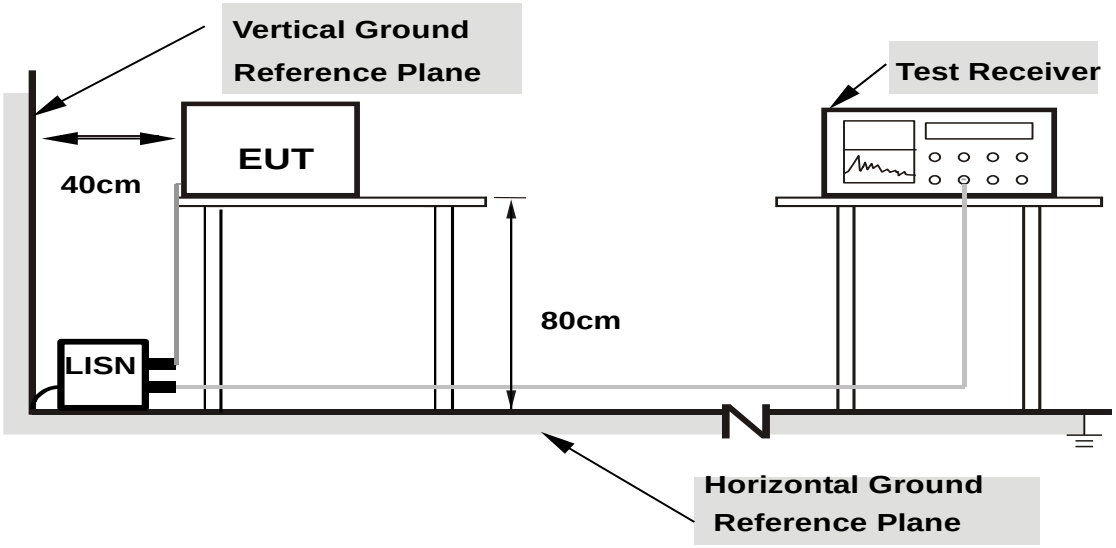
Setup diagram for Raidation(Below 1G) Test



Setup diagram for Raidation(Above1G) Test



Setup diagram for AC Conducted Emission Test



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 5 + 10 = 15 (dB)

For all radiated test items:

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

Over Limit (dB μ V/m) = Level(dB μ V/m) - Limit Level (dB μ V/m)

4 Test Result

4.1 DTS and Occupied Channel Bandwidth Measurement

4.1.1 Limit of 6dB Bandwidth

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

4.1.2 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v05r02.
2. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
3. Turn on the EUT and connect it to measurement instrument.
4. Set to the maximum power setting and enable Transmitting the EUT transmit continuously
5. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
6. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) setting should be 1%-5% of OBW, please revise and set the Video bandwidth (VBW) ≥3* RBW.

4.1.3 Test Result of 6dB Bandwidth

Refer to Appendix A of this test report.

4.1.4 Test Result of 99% Bandwidth

Refer to Appendix B of this test report.

4.2 Maximum Conducted Output Power Measurement

4.2.1 Limit of Output Power

FCC §15.247 (b)(3)

For systems using digital modulation in the 2400-2483.5 MHz bands: 30dBm.

4.2.2 Test Procedures

7. The testing follows the Measurement Procedure of ANSI C63.10-2013 section 11.9.2.2.4 Measurement using a spectrum analyzer.
8. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
9. Turn on the EUT and connect it to spectrum analyzer.
10. Set to the maximum power setting and enaBle Transmitting the EUT transmit continuously
11. Measure the duty cycle, x, of the transmitter output signal as described in below:
    a. Set the center frequency of the instrument to the center frequency of the transmission.
    b. Set RBW to the largest availaBle Transmitting value.
    c. Set detector = peak
12. Set span to at least 1.5*OBW.Set RBW=510KHz,VBW=2MHz, Number of points in sweep ≥ 2/3* span, Sweep time = auto. Detector = RMS
13. Allow the sweep to “free run”. Trace average 100 traces in RMS mode
14. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s Channel power measurement function with band limits set equal to the OBW band edges.
15. Add 10 log (1/x), where x is the duty cycle.

4.2.3 Test Result of Output Power

Refer to Appendix C of this test report.

4.2.4 Test Result of Duty Cycle

Refer to Appendix D of this test report.

4.3 Maximum Power Spectral Density Measurement

4.3.1 Limits of Power Spectral Density

FCC§15.247(e)

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

4.3.2 Test Procedure

1. The testing follows Measurement Procedure 8.4 DTS maximum power spectral density level in the fundamental emission of ANSI C63.10-2013 section 11.9.2.2.4
2. Turn on the EUT and connect it to measurement instrument.
3. Measure the duty cycle, x, of the transmitter output signal as described in below:
   a. Set the center frequency of the instrument to the center frequency of the transmission.
   b. Set RBW to the largest availaBle Transmitting value.
   c. Set detector = peak
4. Set span to at least 1.5*OBW.Set RBW= 30 KHz,VBW=100 KHz, Number of points in sweep ≥ 2/3* span, Sweep time = auto.
5. Detector = power averaging (rms), Sweep time = auto couple, Trace mode = averaging (rms) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level.
6. Add 10 log (1/x), where x is the duty cycle.
7. Measure and record the results in the test report.
8. The Measured power density (dBm)/ 100kHz is a reference level and used as 30dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.
9. Add 10 log(1/x), where x is the duty cycle. The duty cycle factor has been compensated to the ‘offset ” of the spectrum analyser.

4.3.3 Test Result of Power Spectral Density

Refer to Appendix E of this test report.

4.4 Band Edges and Spurious Emission Measurement

4.4.1 Limit of Conducted Band Edges and Spurious Emission

FCC §15.247 (d)

Maximum conducted (average) output power was used to determine compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

4.4.2 Test Procedures

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

4.4.3 Test Result of Conducted Band Edges

Refer to Appendix F of this test report.

4.4.4 Test Result of Conducted Spurious Emission

Refer to Appendix G of this test report.

4.5 Radiated Band Edges and Spurious Emission Measurement

4.5.1 Limit of Radiated Band Edges and Spurious Emission

FCC §15.247 (d)

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 30 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (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

4.5.2 Test Procedures

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW=3*RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement:
   VBW = 10 Hz, when duty cycle is no less than 98 percent.
   VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
5. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP.
6. Convert the resultant EIRP to an equivalent electric field strength using the following relationship:

   $E = EIRP - 20 \log d + 104.8$

   Where:

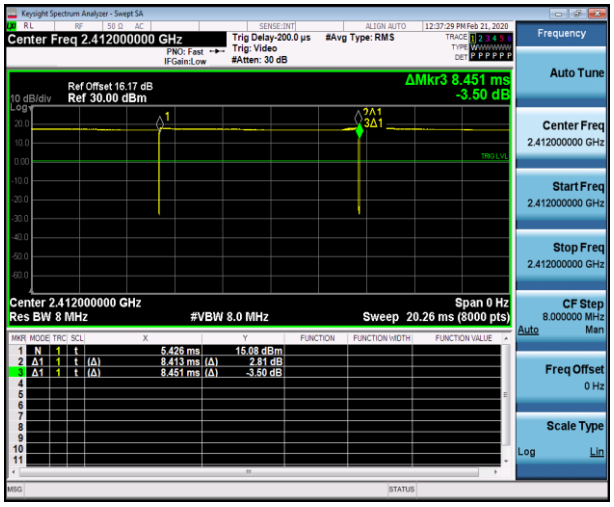
   E is the electric field strength in dBμV/m

   EIRP is the equivalent isotropically radiated power in dBm

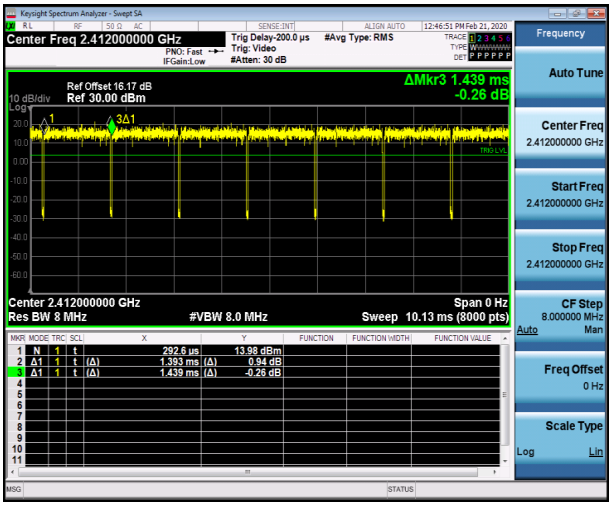
   d is the specified measurement distance in m

   E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 m.
7. Compare the resultant electric field strength level with the applicable regulatory limit.

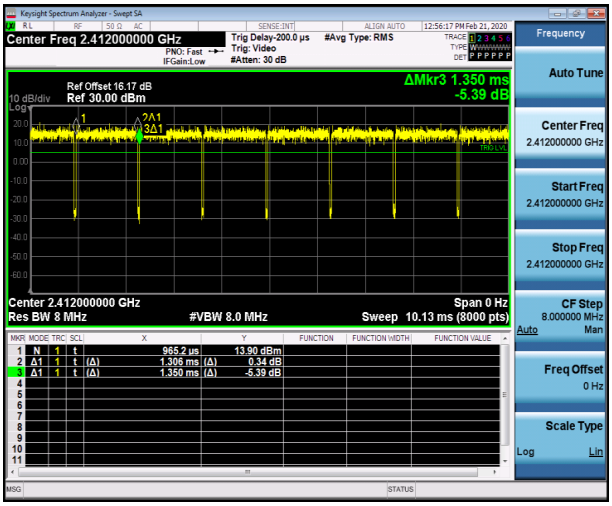
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	99.55	8.41	0.12	10Hz
802.11g	96.83	1.39	0.72	1kHz
802.11n HT20	96.72	1.30	0.76	1kHz



802.11b



802.11g



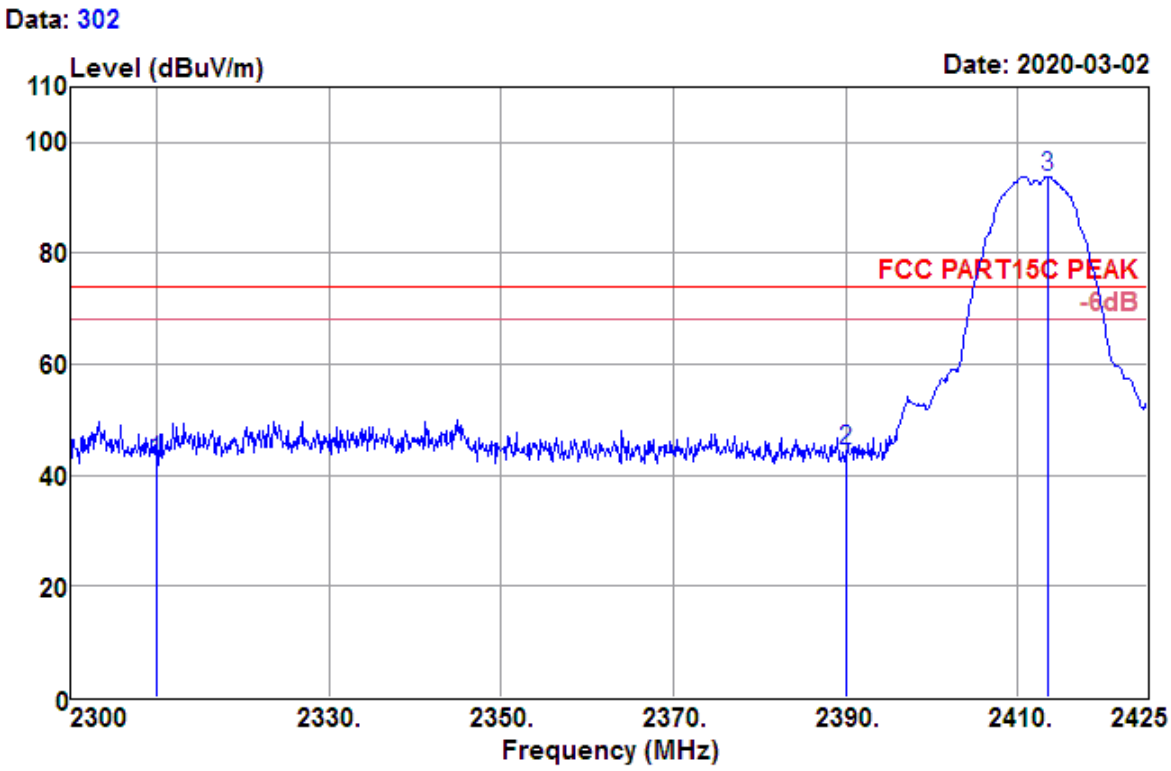
802.11n HT20

4.5.3 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

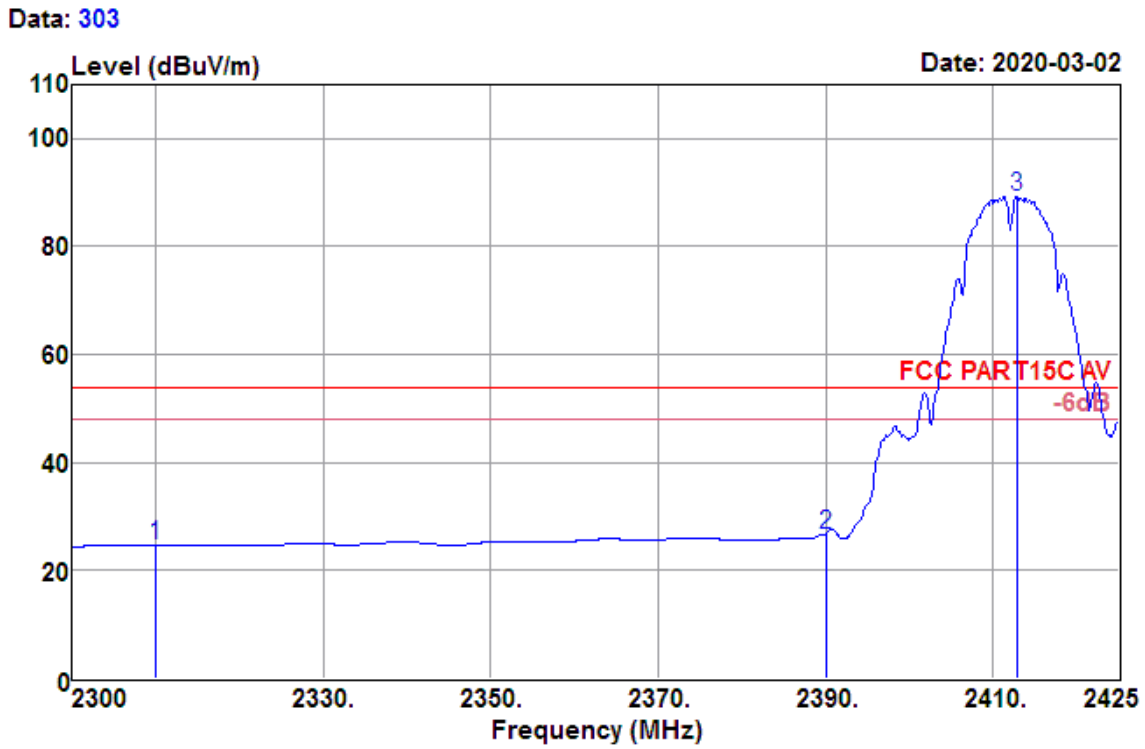
4.5.4 Test Result of Radiated Spurious at Band Edges

Test Mode :	802.11b CH01 (2412 MHz)	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	2.3GHz~2.425GHz	**Polarization :**	Horizontal



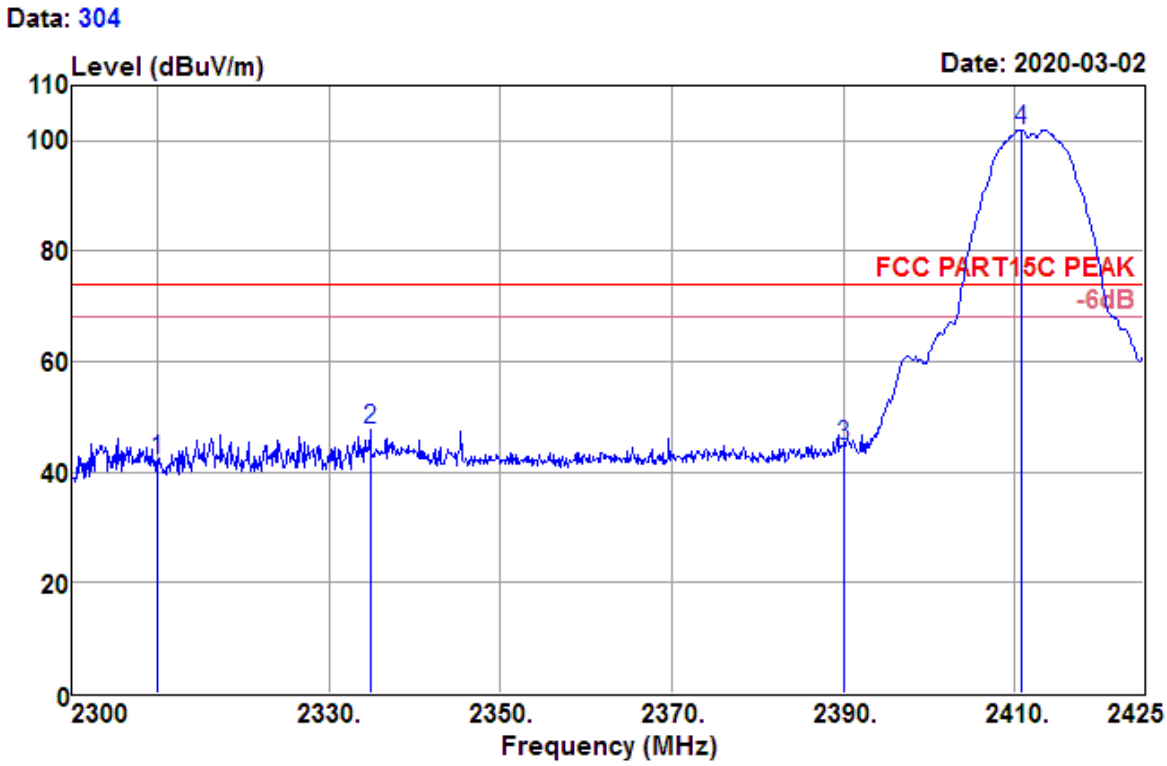
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	47.38	27.38	3.48	35.61	42.63	74.00	-31.37	Peak
2390.000	49.21	27.56	3.53	35.79	44.51	74.00	-29.49	Peak
2413.500	98.52	27.61	3.55	35.84	93.84	74.00	19.84	Peak

Test Mode :	802.11b CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Horizontal



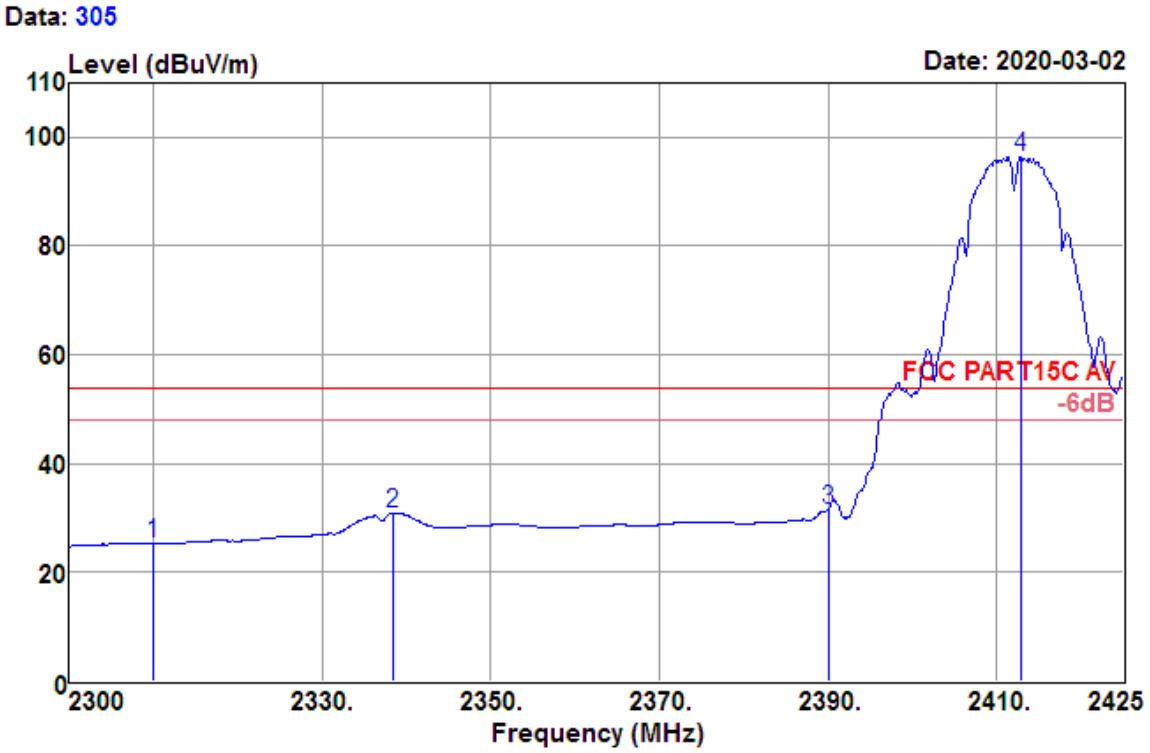
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	29.37	27.38	3.48	35.61	24.62	54.00	-29.38	Average
2390.000	31.44	27.56	3.53	35.79	26.74	54.00	-27.26	Average
2412.875	94.03	27.61	3.55	35.84	89.35	54.00	35.35	Average

Test Mode :	802.11b CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Vertical



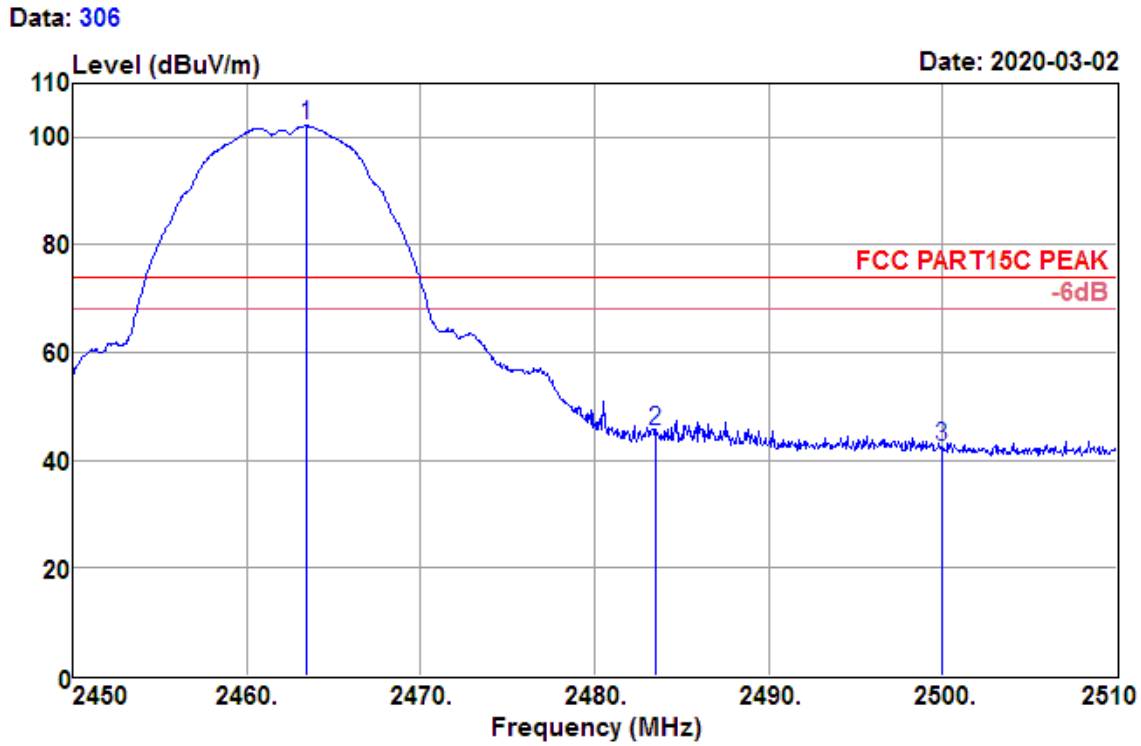
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	46.86	27.38	3.48	35.61	42.11	74.00	-31.89	Peak
2334.875	52.34	27.44	3.49	35.66	47.61	74.00	-26.39	Peak
2390.000	49.52	27.56	3.53	35.79	44.82	74.00	-29.18	Peak
2410.750	106.67	27.60	3.55	35.84	101.98	74.00	27.98	Peak

Test Mode :	802.11b CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Vertical



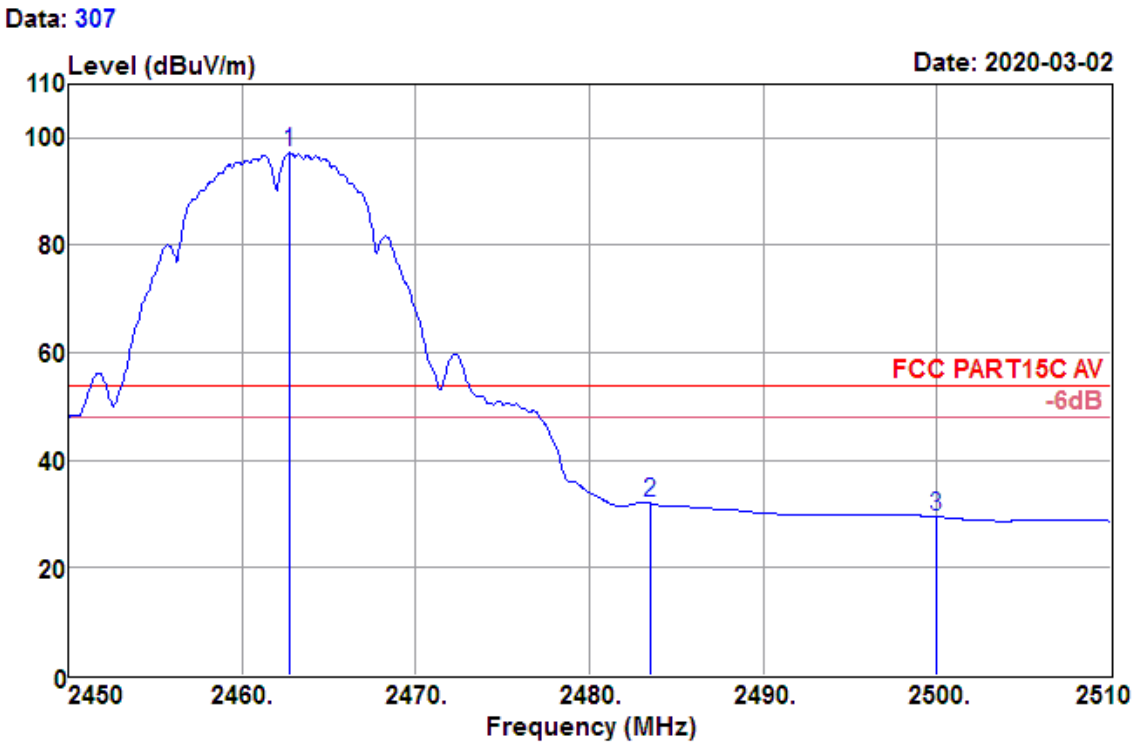
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	30.12	27.38	3.48	35.61	25.37	54.00	-28.63	Average
2338.375	35.60	27.44	3.50	35.67	30.87	54.00	-23.13	Average
2390.000	36.29	27.56	3.53	35.79	31.59	54.00	-22.41	Average
2412.875	101.14	27.61	3.55	35.84	96.46	54.00	42.46	Average

Test Mode :	802.11b CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



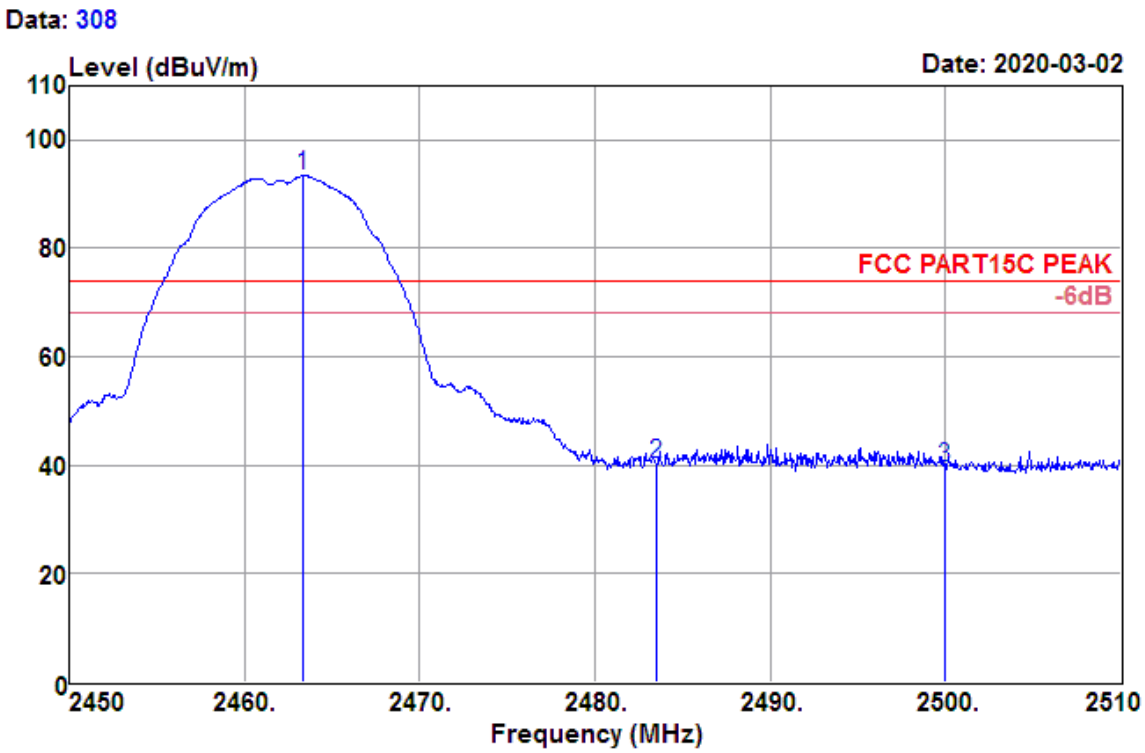
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2463.440	106.77	27.72	3.58	35.96	102.11	74.00	28.11	Peak
2483.500	50.03	27.76	3.59	36.00	45.38	74.00	-28.62	Peak
2500.000	47.11	27.80	3.60	36.04	42.47	74.00	-31.53	Peak

Test Mode :	802.11b CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



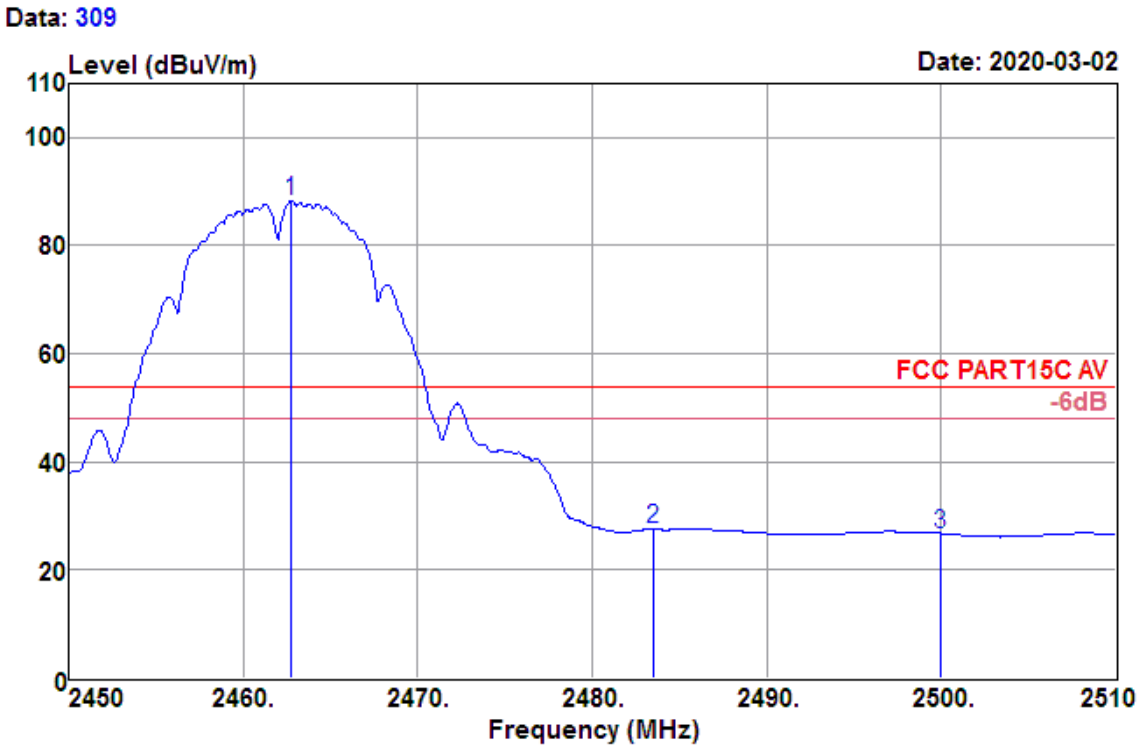
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2462.720	101.91	27.72	3.58	35.96	97.25	54.00	43.25	Average
2483.500	36.74	27.76	3.59	36.00	32.09	54.00	-21.91	Average
2500.000	34.15	27.80	3.60	36.04	29.51	54.00	-24.49	Average

Test Mode :	802.11b CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



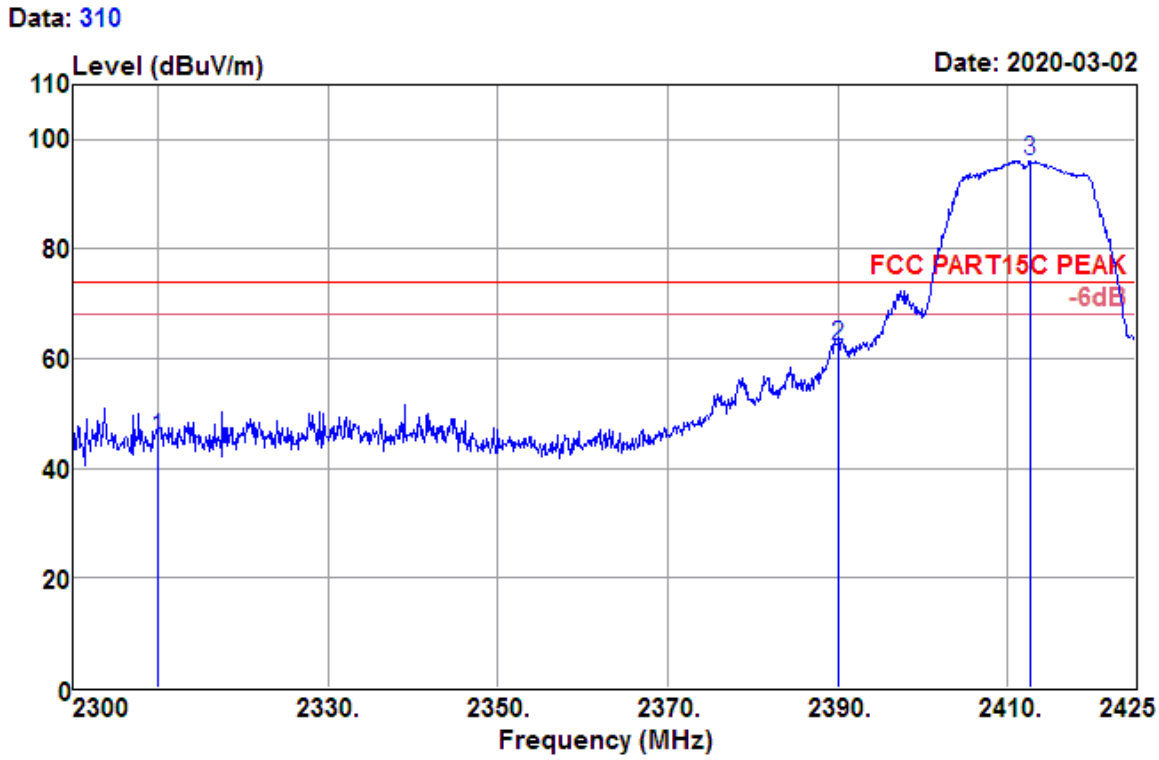
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2463.380	98.04	27.72	3.58	35.96	93.38	74.00	19.38	Peak
2483.500	44.84	27.76	3.59	36.00	40.19	74.00	-33.81	Peak
2500.000	44.24	27.80	3.60	36.04	39.60	74.00	-34.40	Peak

Test Mode :	802.11b CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



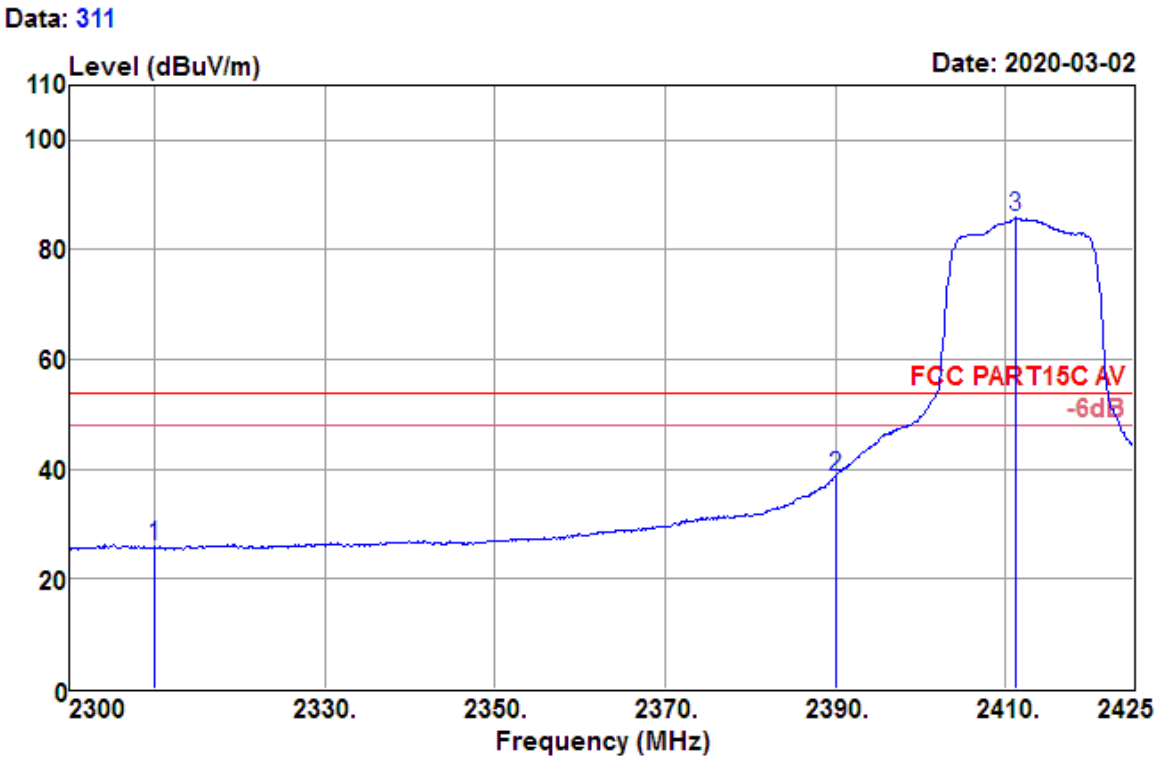
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2462.720	92.89	27.72	3.58	35.96	88.23	54.00	34.23	Average
2483.500	32.22	27.76	3.59	36.00	27.57	54.00	-26.43	Average
2500.000	31.42	27.80	3.60	36.04	26.78	54.00	-27.22	Average

Test Mode :	802.11g CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Horizontal



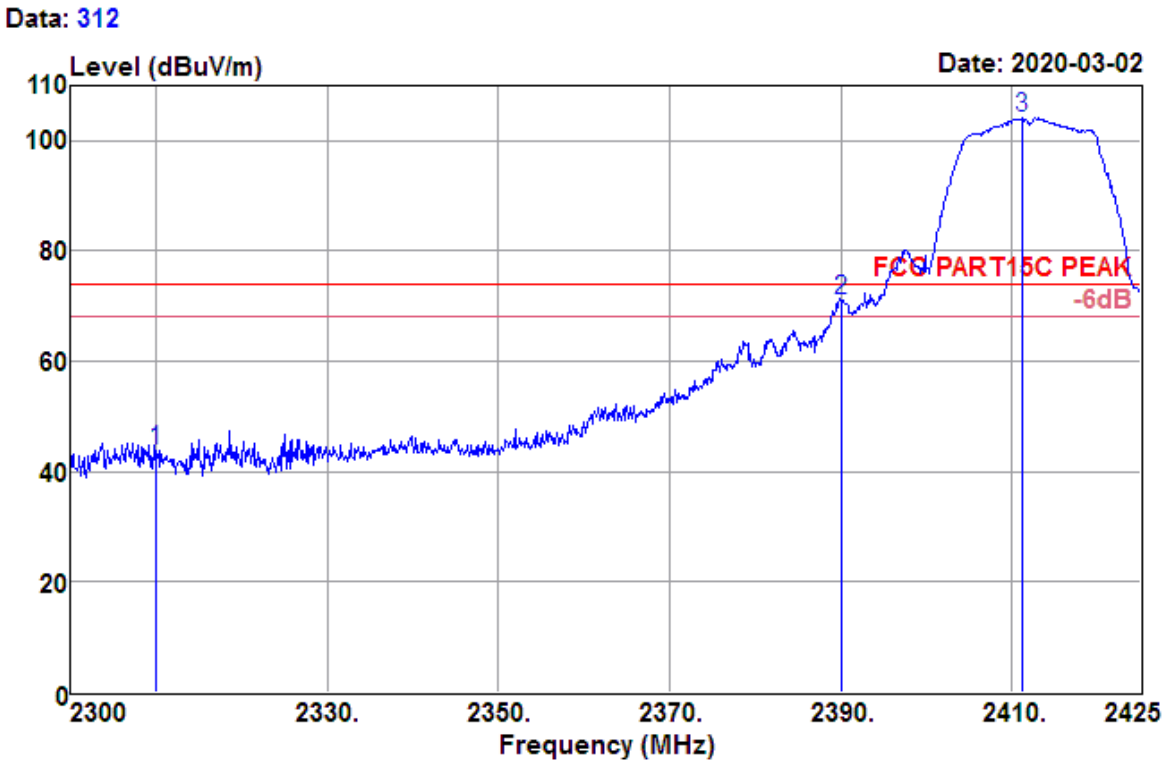
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	50.07	27.38	3.48	35.61	45.32	74.00	-28.68	Peak
2390.000	66.89	27.56	3.53	35.79	62.19	74.00	-11.81	Peak
2412.625	100.75	27.61	3.55	35.84	96.07	74.00	22.07	Peak

Test Mode :	802.11g CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Horizontal



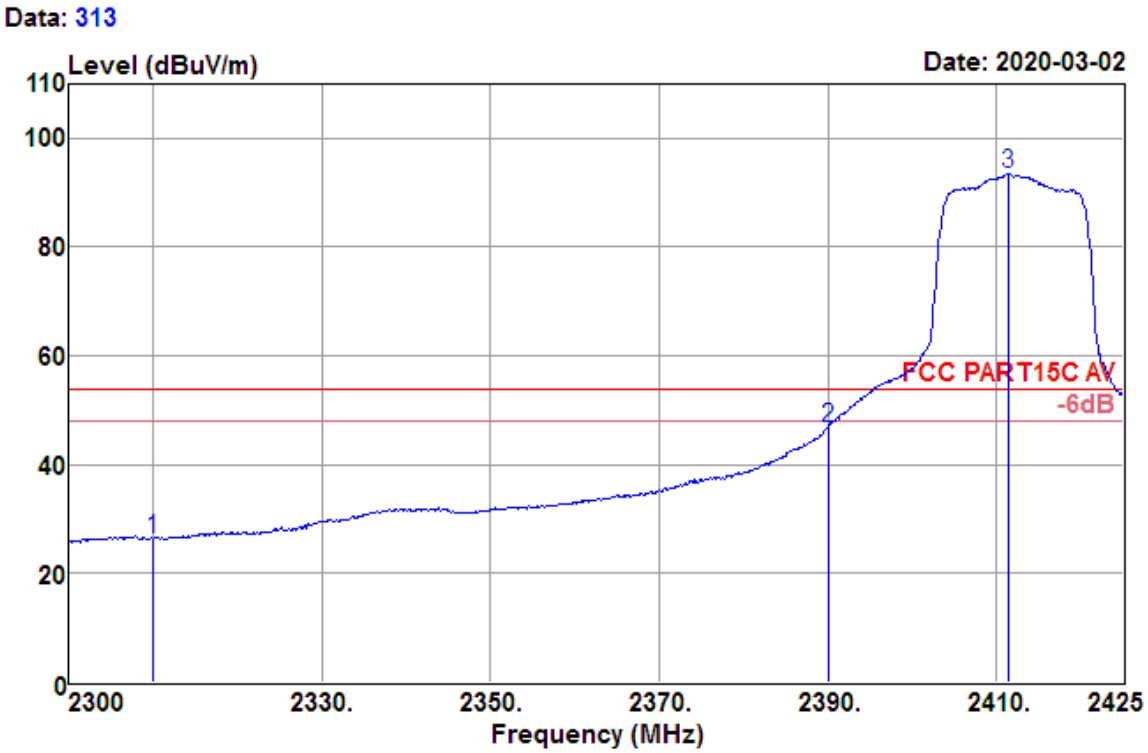
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	30.64	27.38	3.48	35.61	25.89	54.00	-28.11	Average
2390.000	43.32	27.56	3.53	35.79	38.62	54.00	-15.38	Average
2411.250	90.59	27.60	3.55	35.84	85.90	54.00	31.90	Average

Test Mode :	802.11g CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Vertical



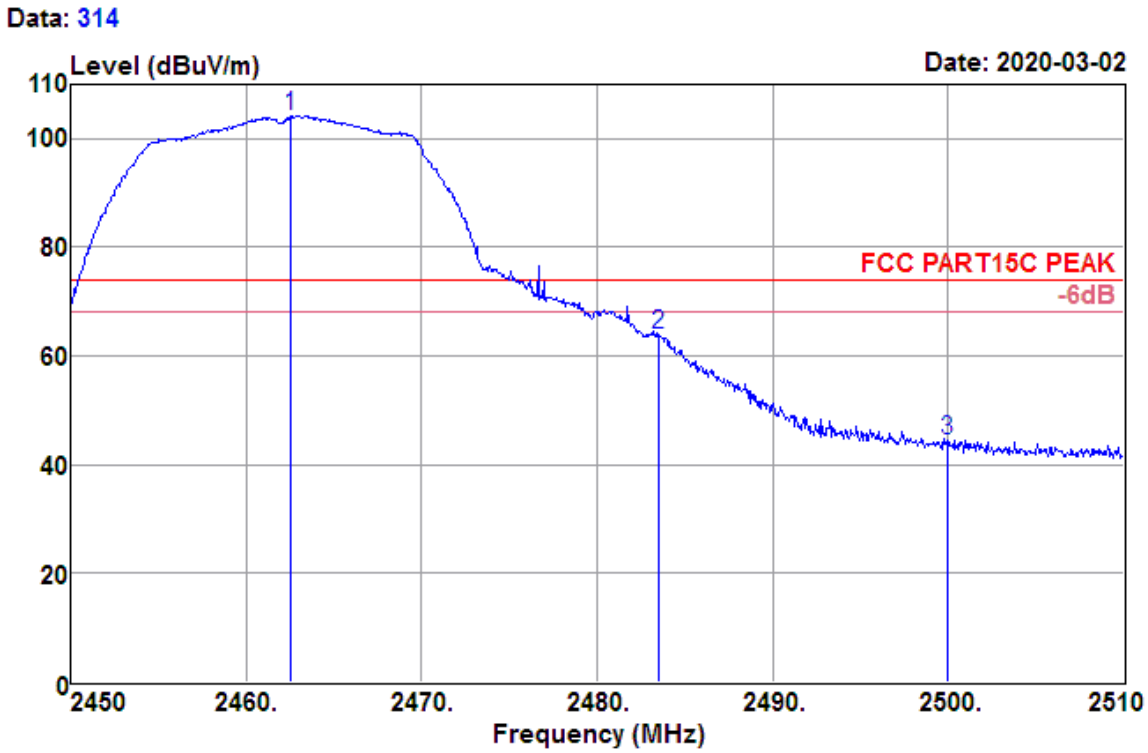
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	48.46	27.38	3.48	35.61	43.71	74.00	-30.29	Peak
2390.000	75.63	27.56	3.53	35.79	70.93	74.00	-3.07	Peak
2411.250	108.94	27.60	3.55	35.84	104.25	74.00	30.25	Peak

Test Mode :	802.11g CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Vertical



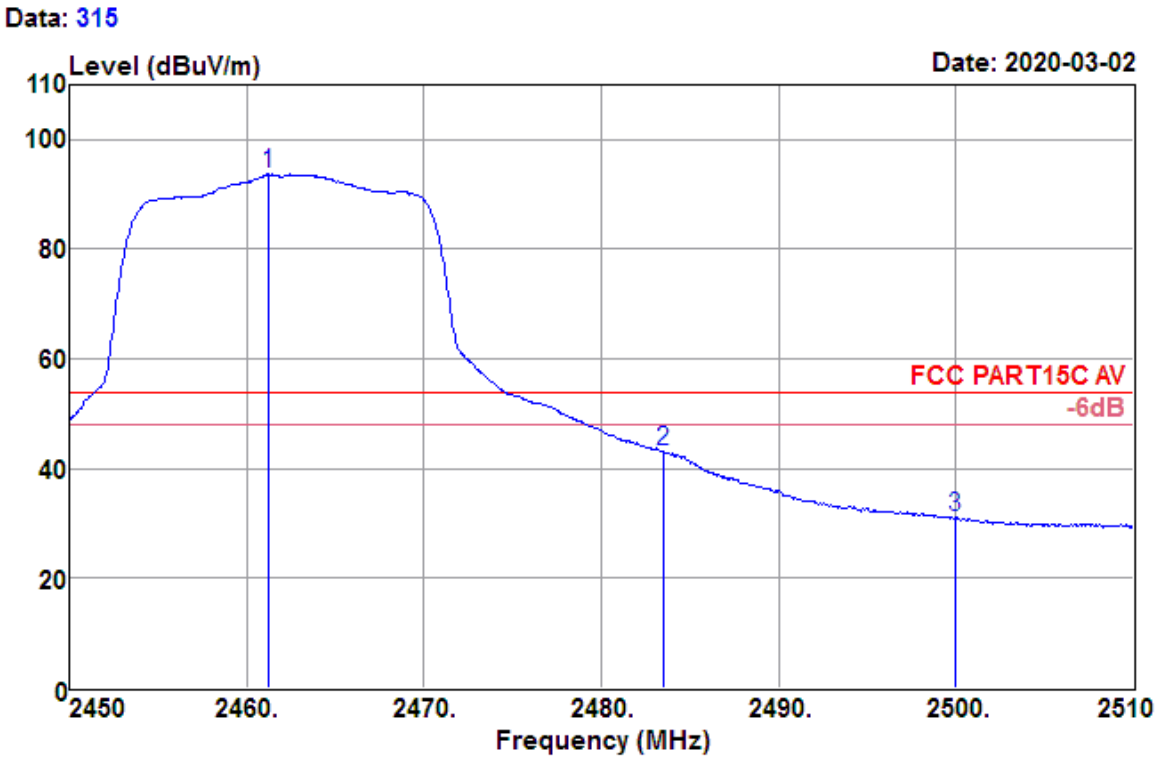
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	31.18	27.38	3.48	35.61	26.43	54.00	-27.57	Average
2390.000	51.60	27.56	3.53	35.79	46.90	54.00	-7.10	Average
2411.375	98.22	27.61	3.55	35.84	93.54	54.00	39.54	Average

Test Mode :	802.11g CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



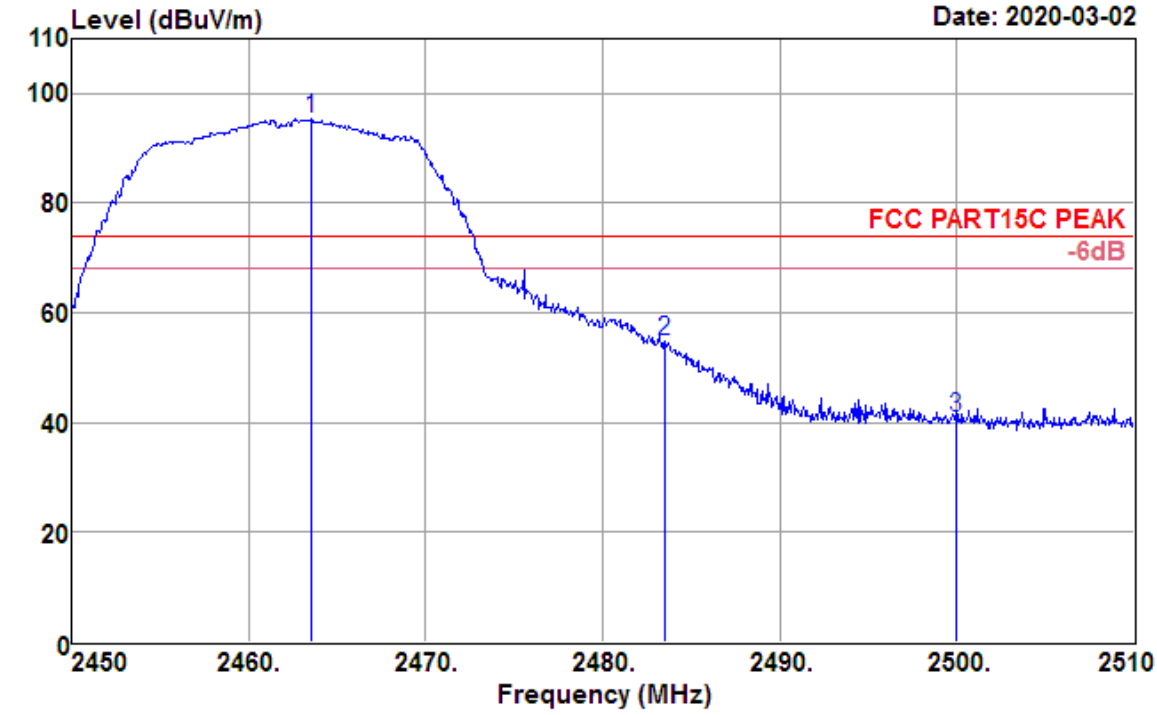
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2462.540	108.88	27.72	3.58	35.95	104.23	74.00	30.23	Peak
2483.500	68.66	27.76	3.59	36.00	64.01	74.00	-9.99	Peak
2500.000	49.24	27.80	3.60	36.04	44.60	74.00	-29.40	Peak

Test Mode :	802.11g CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



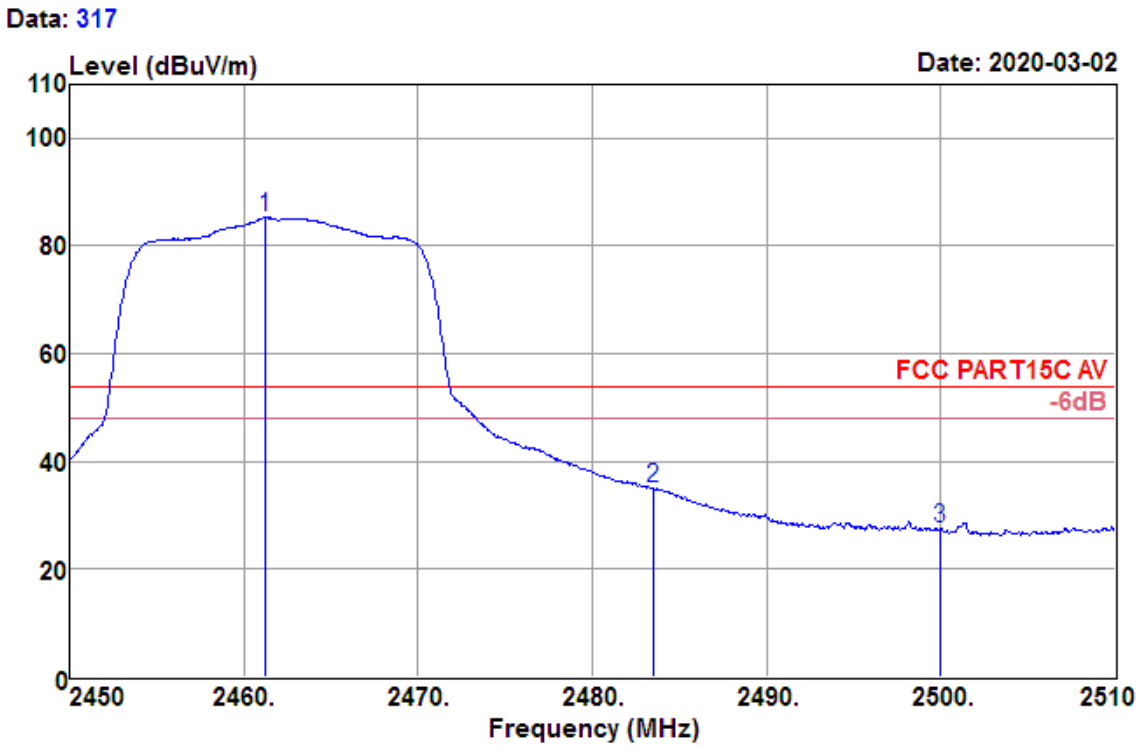
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2461.220	98.40	27.71	3.58	35.95	93.74	54.00	39.74	Average
2483.500	47.78	27.76	3.59	36.00	43.13	54.00	-10.87	Average
2500.000	35.74	27.80	3.60	36.04	31.10	54.00	-22.90	Average

Test Mode :	802.11g CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



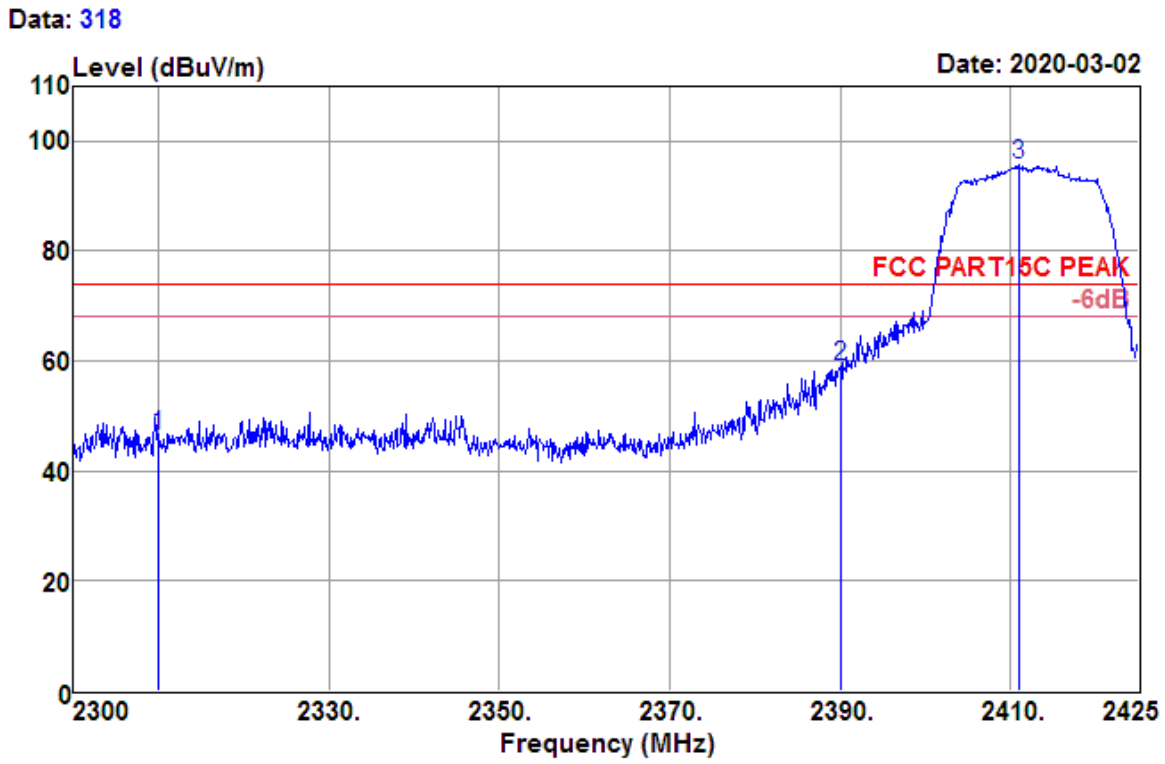
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2463.500	99.97	27.72	3.58	35.96	95.31	74.00	21.31	Peak
2483.500	59.47	27.76	3.59	36.00	54.82	74.00	-19.18	Peak
2500.000	45.64	27.80	3.60	36.04	41.00	74.00	-33.00	Peak

Test Mode :	802.11g CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



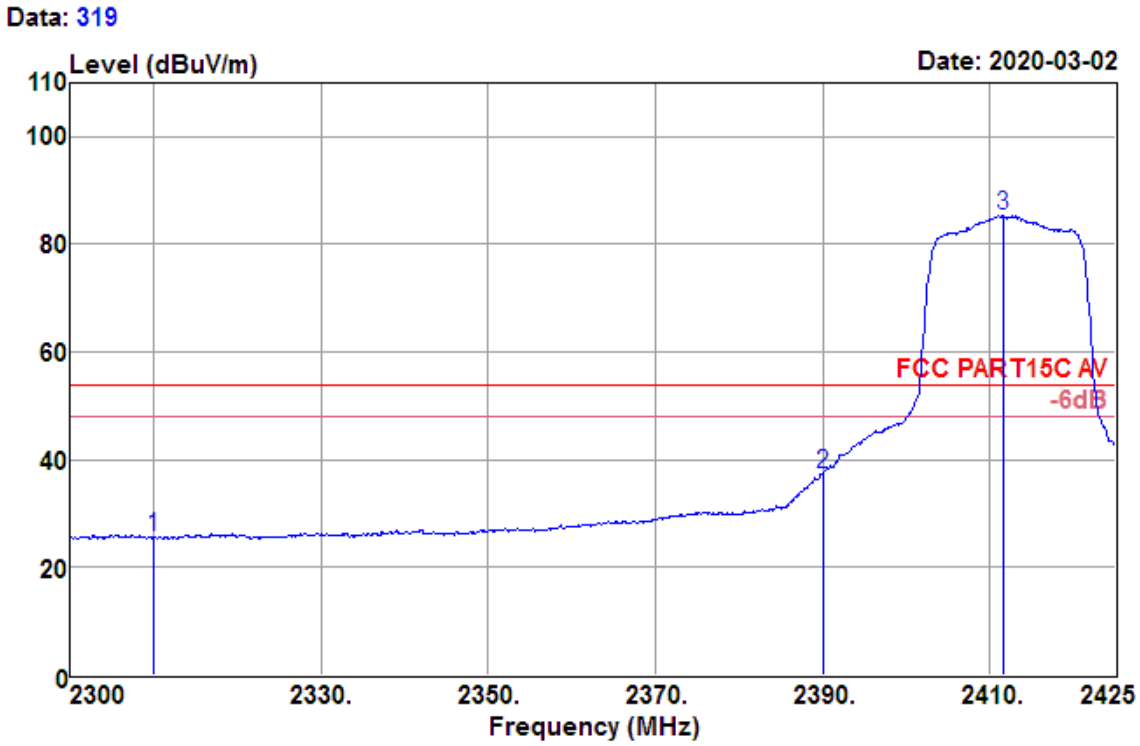
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2461.220	90.03	27.71	3.58	35.95	85.37	54.00	31.37	Average
2483.500	39.66	27.76	3.59	36.00	35.01	54.00	-18.99	Average
2500.000	32.21	27.80	3.60	36.04	27.57	54.00	-26.43	Average

Test Mode :	802.11n HT20 CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Horizontal



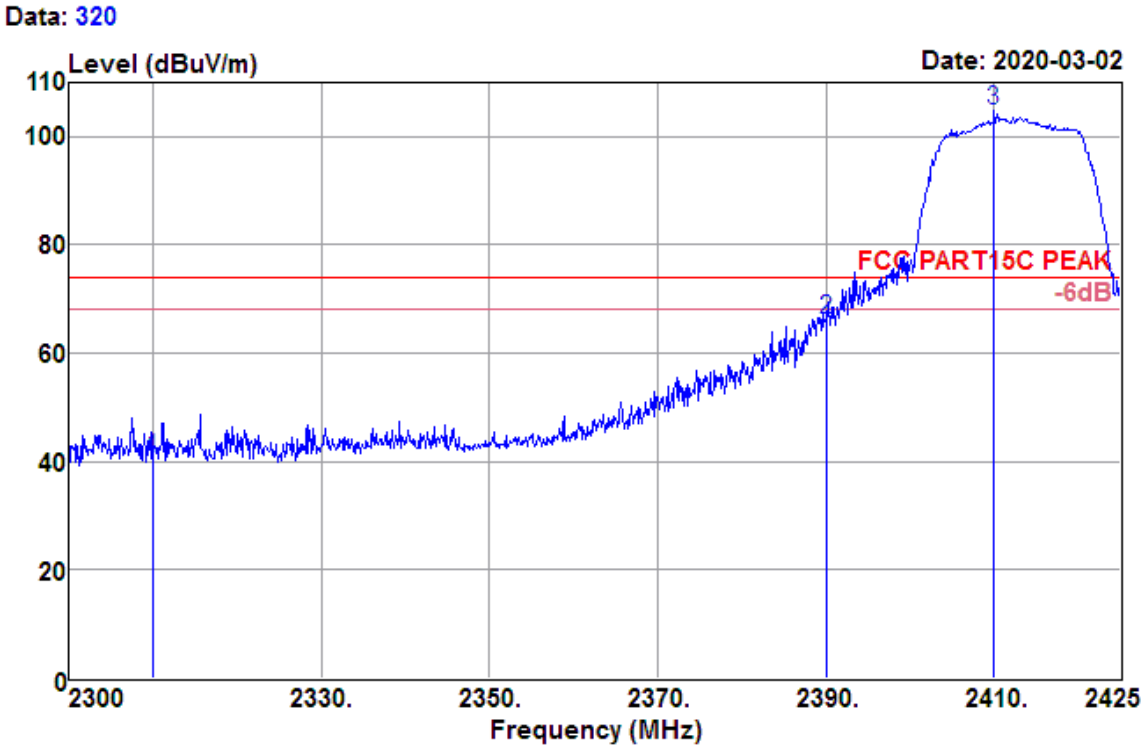
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	51.02	27.38	3.48	35.61	46.27	74.00	-27.73	Peak
2390.000	63.75	27.56	3.53	35.79	59.05	74.00	-14.95	Peak
2411.000	100.29	27.60	3.55	35.84	95.60	74.00	21.60	Peak

Test Mode :	802.11n HT20 CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Horizontal



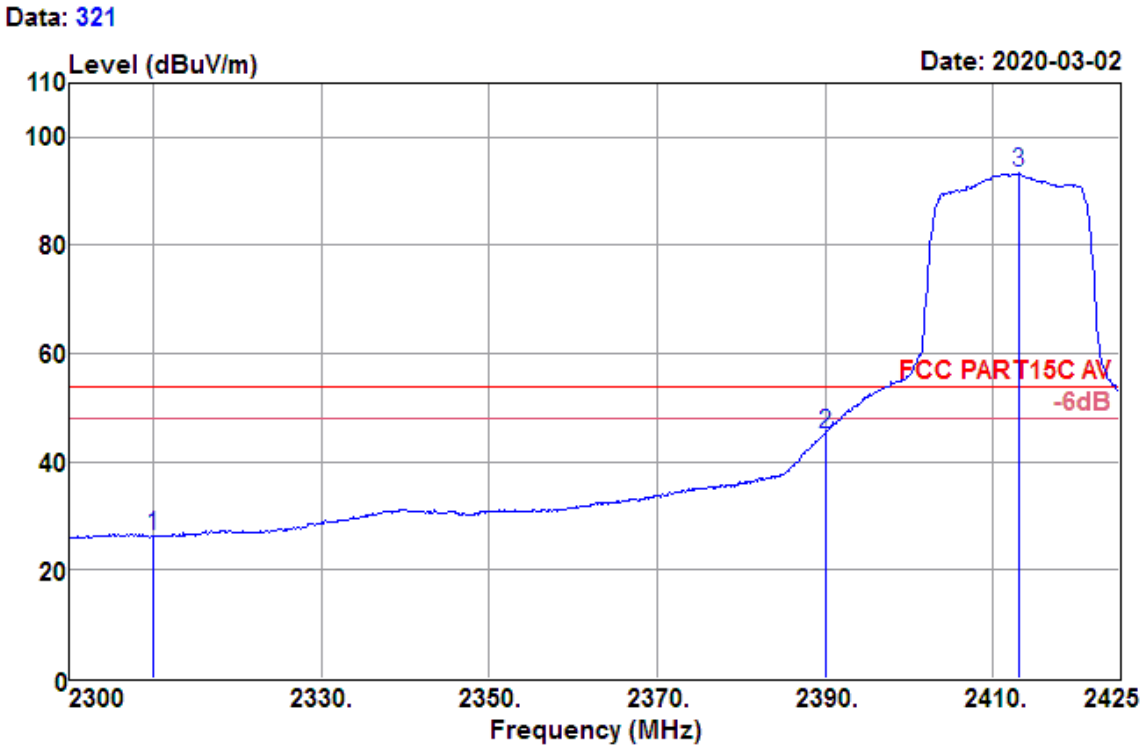
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	30.24	27.38	3.48	35.61	25.49	54.00	-28.51	Average
2390.000	42.04	27.56	3.53	35.79	37.34	54.00	-16.66	Average
2411.625	89.92	27.61	3.55	35.84	85.24	54.00	31.24	Average

Test Mode :	802.11n HT20 CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Vertical



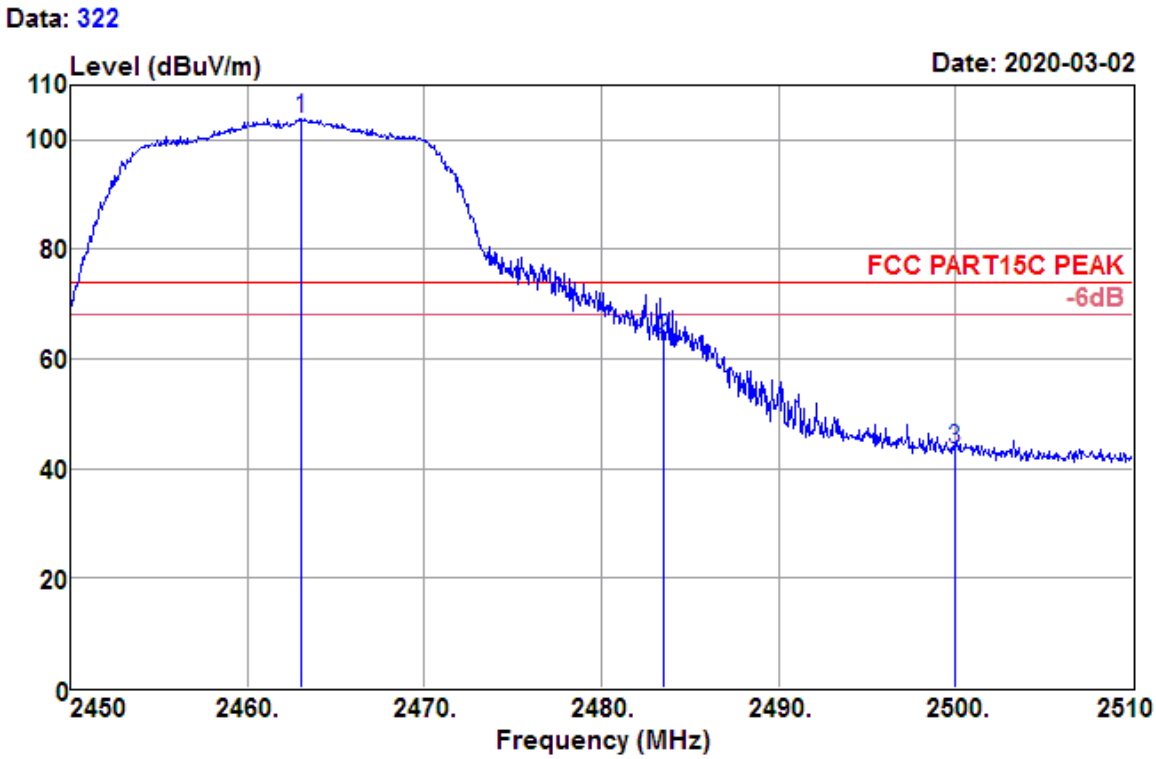
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	45.47	27.38	3.48	35.61	40.72	74.00	-33.28	Peak
2390.000	71.05	27.56	3.53	35.79	66.35	74.00	-7.65	Peak
2410.000	109.38	27.60	3.55	35.83	104.70	74.00	30.70	Peak

Test Mode :	802.11n HT20 CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.3GHz~2.425GHz	Polarization :	Vertical



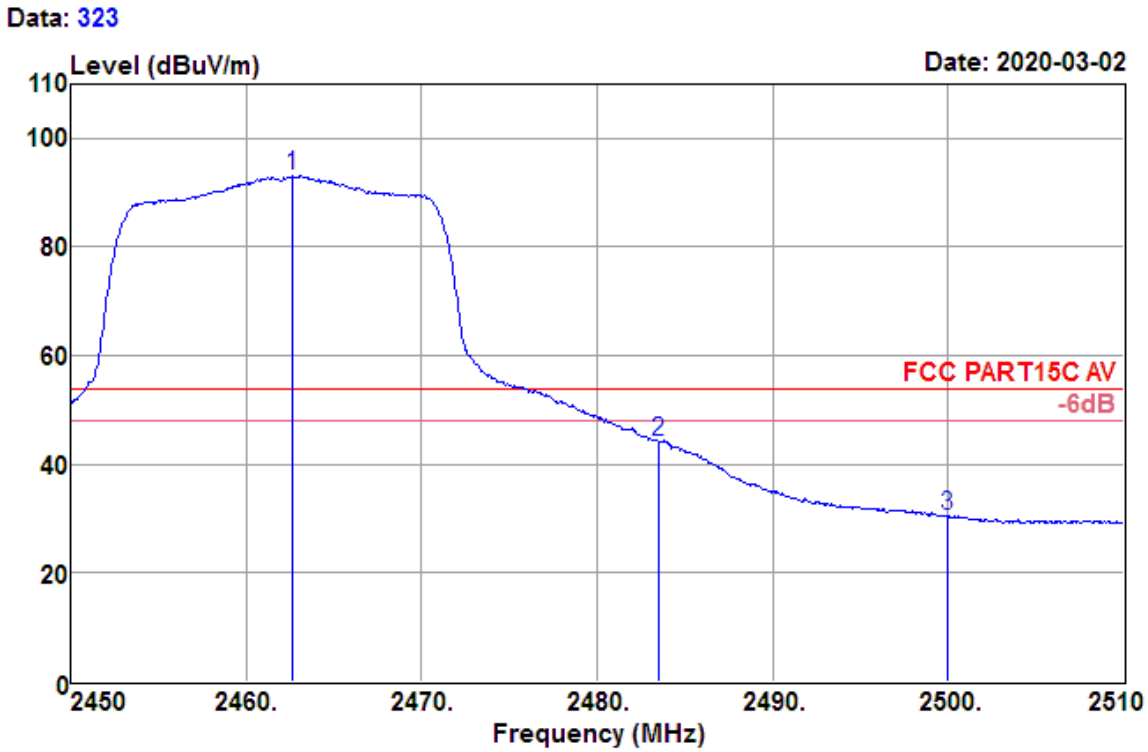
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	31.09	27.38	3.48	35.61	26.34	54.00	-27.66	Average
2390.000	49.79	27.56	3.53	35.79	45.09	54.00	-8.91	Average
2413.000	98.05	27.61	3.55	35.84	93.37	54.00	39.37	Average

Test Mode :	802.11n HT20 CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



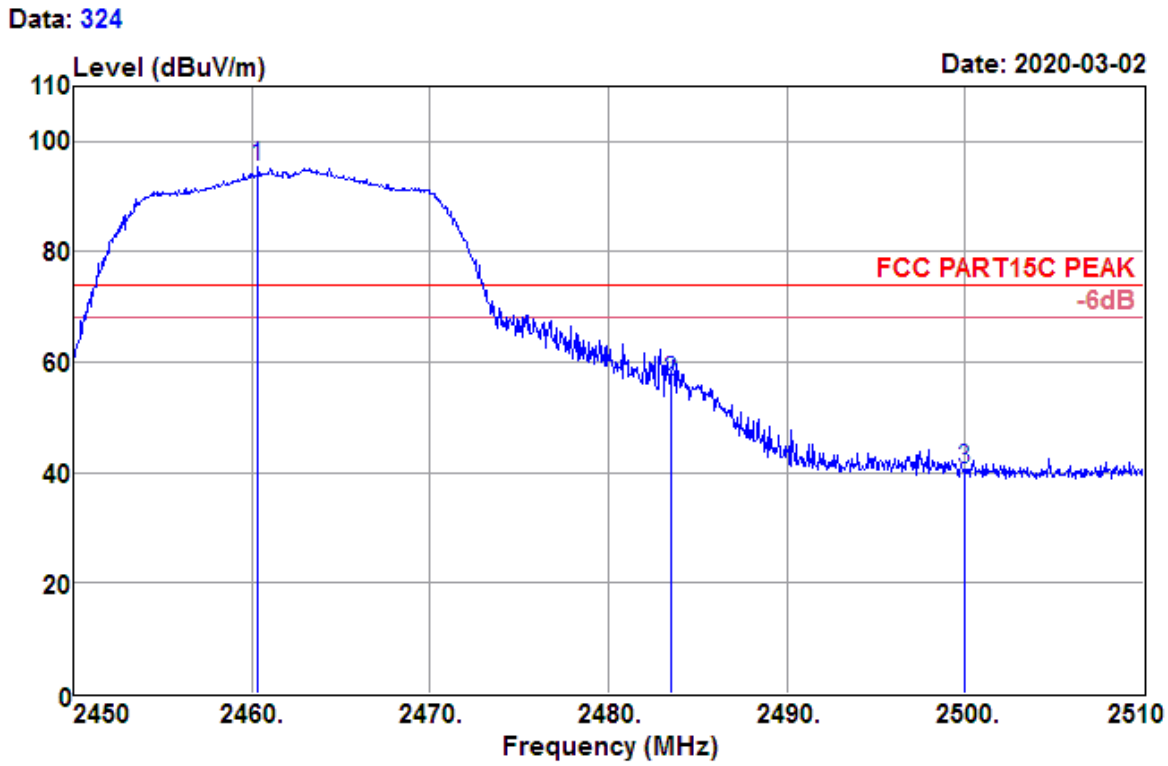
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2463.080	108.43	27.72	3.58	35.96	103.77	74.00	29.77	Peak
2483.500	68.16	27.76	3.59	36.00	63.51	74.00	-10.49	Peak
2500.000	48.14	27.80	3.60	36.04	43.50	74.00	-30.50	Peak

Test Mode :	802.11n HT20 CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



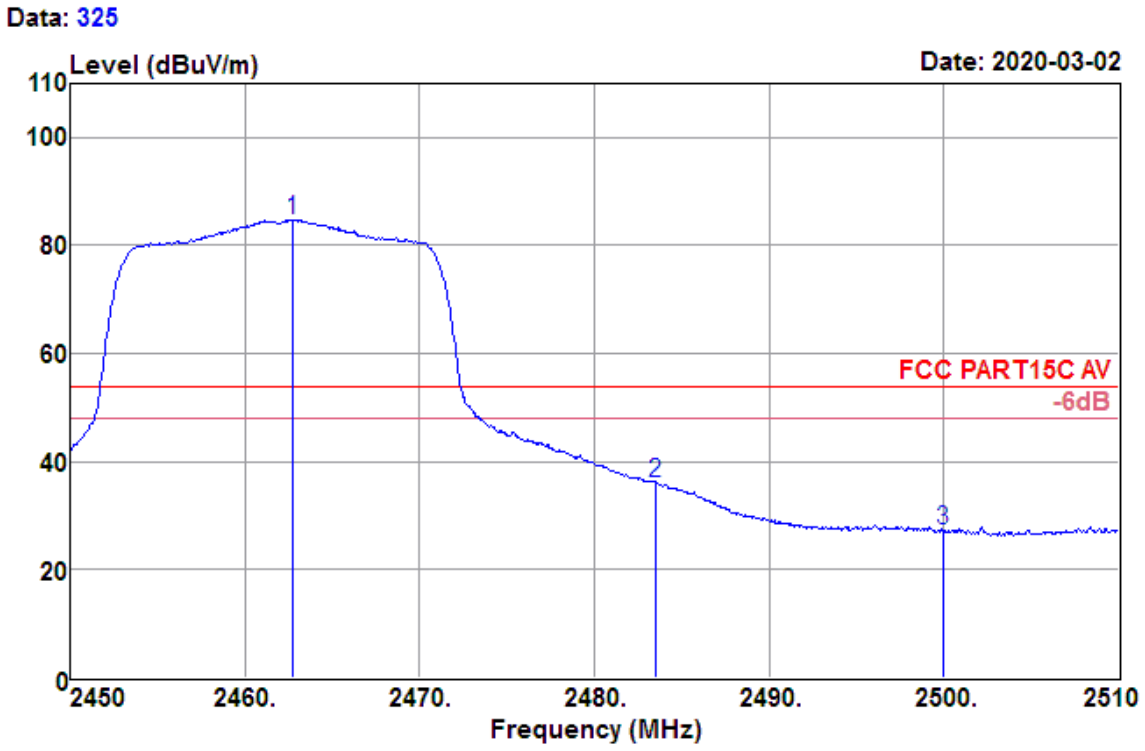
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2462.660	97.73	27.72	3.58	35.95	93.08	54.00	39.08	Average
2483.500	48.95	27.76	3.59	36.00	44.30	54.00	-9.70	Average
2500.000	35.26	27.80	3.60	36.04	30.62	54.00	-23.38	Average

Test Mode :	802.11n HT20 CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2460.380	100.16	27.71	3.58	35.95	95.50	74.00	21.50	Peak
2483.500	61.04	27.76	3.59	36.00	56.39	74.00	-17.61	Peak
2500.000	45.34	27.80	3.60	36.04	40.70	74.00	-33.30	Peak

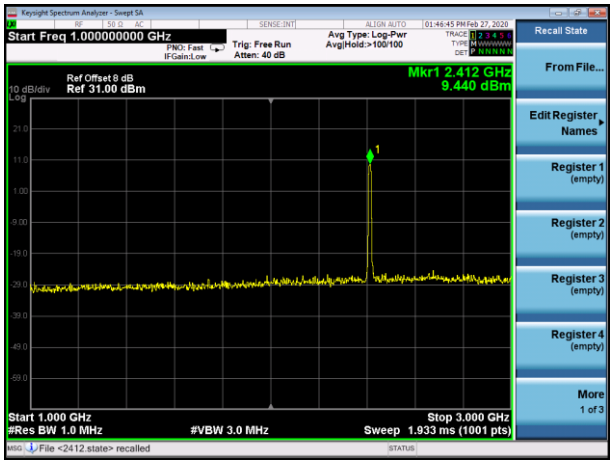
Test Mode :	802.11n HT20 CH11 (2462 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical

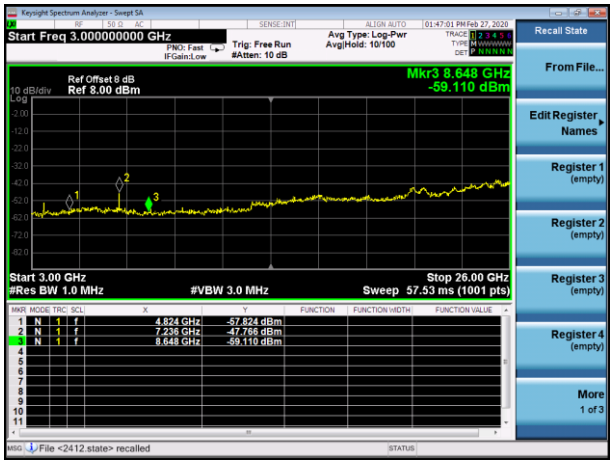


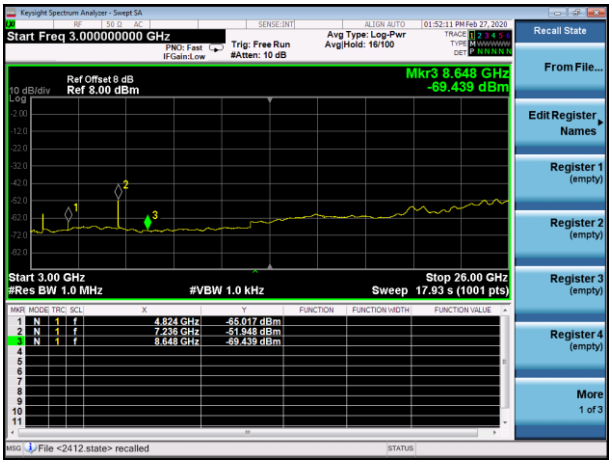
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2462.720	89.40	27.72	3.58	35.96	84.74	54.00	30.74	Average
2483.500	40.68	27.76	3.59	36.00	36.03	54.00	-17.97	Average
2500.000	31.97	27.80	3.60	36.04	27.33	54.00	-26.67	Average

4.5.5 Test Result of Radiated Spurious Emission (1GHz ~ 10th Harmonic)

Test Mode:		802.11b		Test channel:		2412MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4824	-57.82	2.00	-55.82	39.43	74.00	-34.57	Peak
7236	-47.77	2.00	-45.77	49.49	74.00	-24.51	Peak
9648	-59.11	2.00	-57.11	38.15	74.00	-35.85	Peak
4824	-65.02	2.00	-63.02	32.24	54.00	-21.76	Average
7236	-51.95	2.00	-49.95	45.31	54.00	-8.69	Average
9648	-69.44	2.00	-67.44	27.82	54.00	-26.18	Average



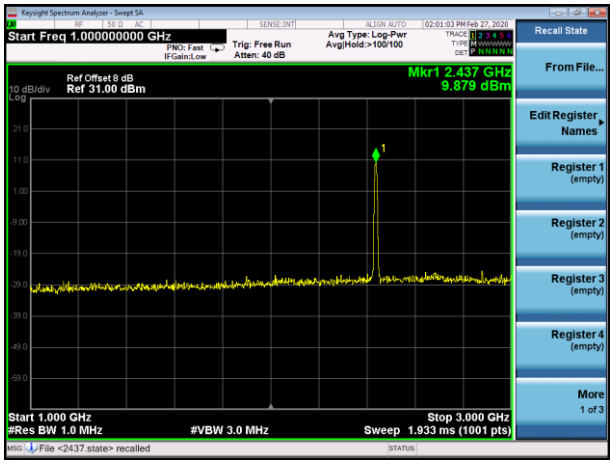


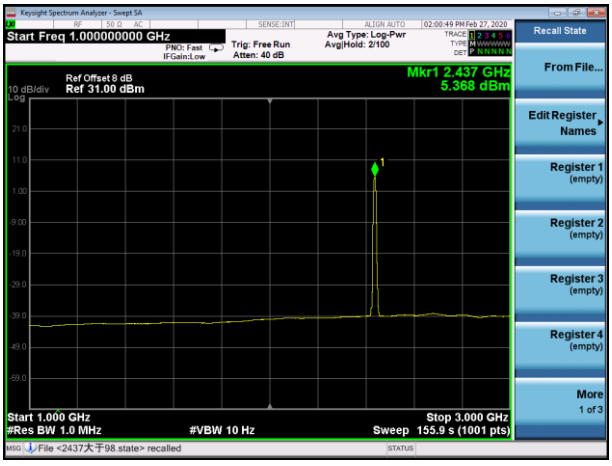


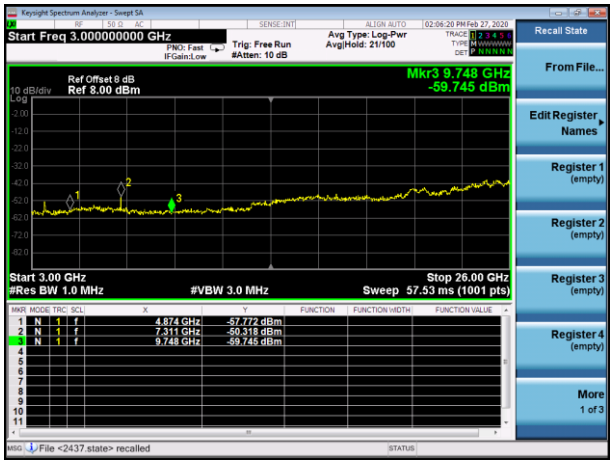
Peak

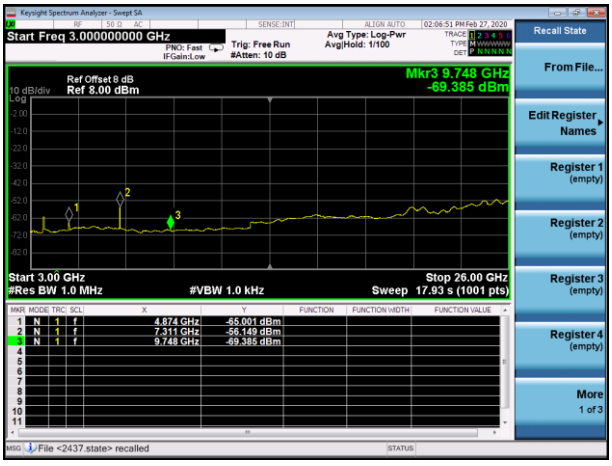
Average

Test Mode:		802.11b		Test channel:		2437MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4874	-57.77	2.00	-55.77	39.49	74.00	-34.51	Peak
7311	-50.32	2.00	-48.32	46.94	74.00	-27.06	Peak
9748	-59.75	2.00	-57.75	37.51	74.00	-36.49	Peak
4874	-65.00	2.00	-63.00	32.26	54.00	-21.74	Average
7311	-56.15	2.00	-54.15	41.11	54.00	-12.89	Average
9748	-69.39	2.00	-67.39	27.87	54.00	-26.13	Average





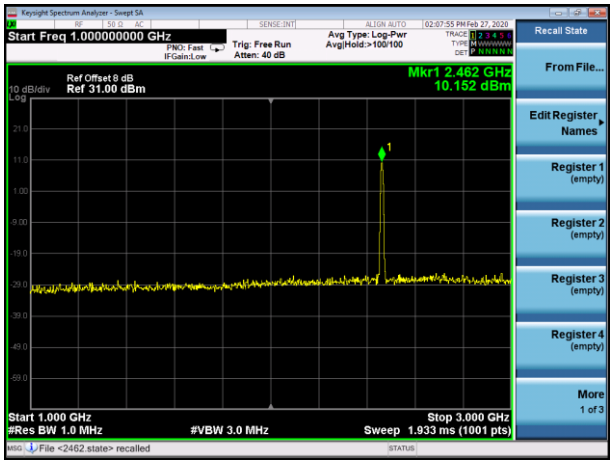


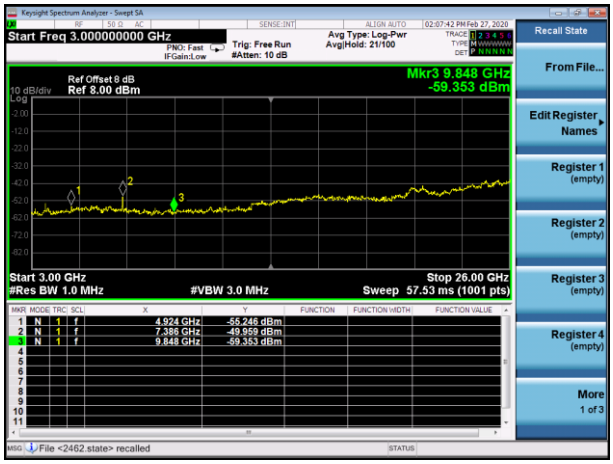


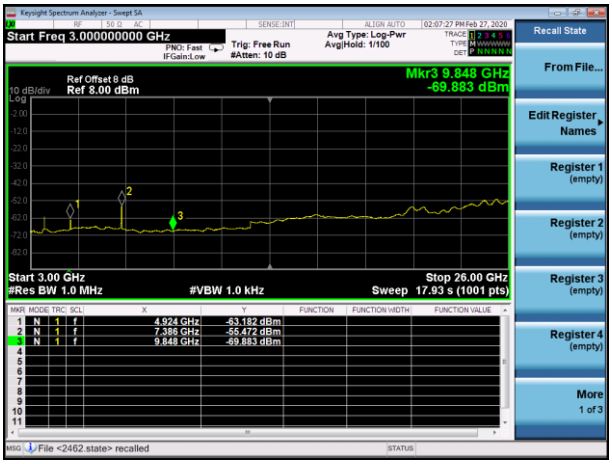
Peak

Average

Test Mode:		802.11b		Test channel:		2462MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4927	-55.25	2.00	-53.25	42.01	74.00	-31.99	Peak
7386	-49.96	2.00	-47.96	47.30	74.00	-26.70	Peak
9848	-59.35	2.00	-57.35	37.90	74.00	-36.10	Peak
4927	-63.18	2.00	-61.18	34.08	54.00	-19.92	Average
7386	-55.42	2.00	-53.42	41.84	54.00	-12.16	Average
9848	-69.88	2.00	-67.88	27.37	54.00	-26.63	Average



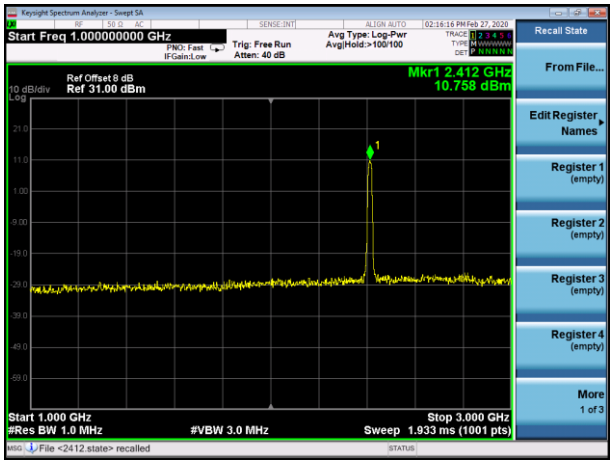


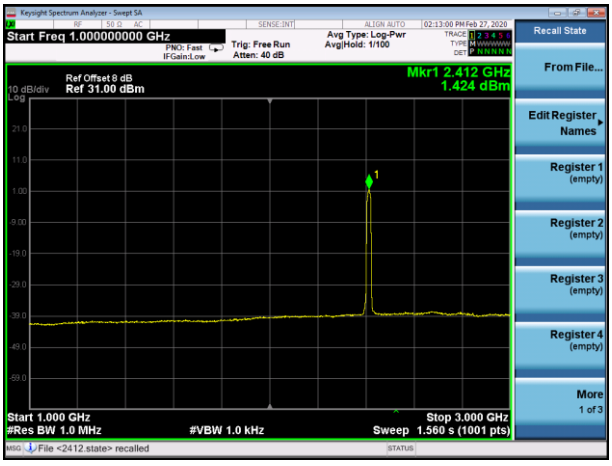


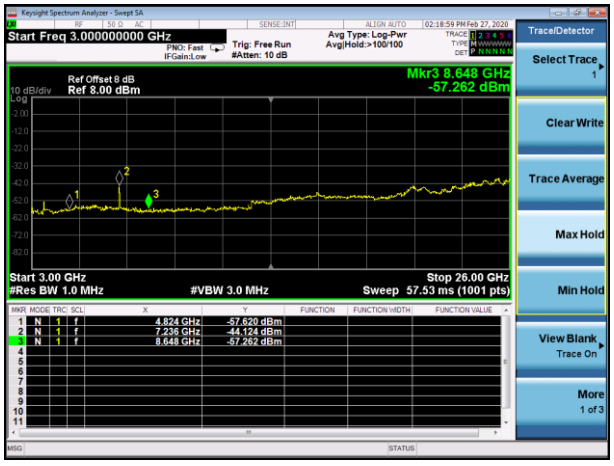
Peak

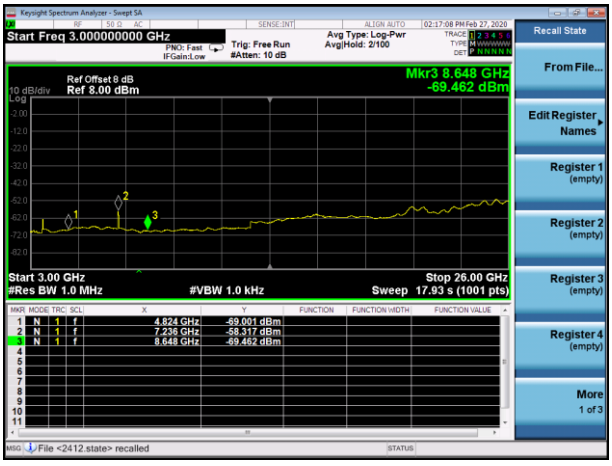
Average

Test Mode:		802.11g		Test channel:		2412MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4824	-57.62	2.00	-55.62	39.64	74.00	-34.36	Peak
7236	-44.12	2.00	-42.12	53.13	74.00	-20.87	Peak
9648	-57.26	2.00	-55.26	40.00	74.00	-34.00	Peak
4824	-69.00	2.00	-67.00	28.26	54.00	-25.74	Average
7236	-58.32	2.00	-56.32	38.94	54.00	-15.06	Average
9648	-69.46	2.00	-67.46	27.80	54.00	-26.20	Average





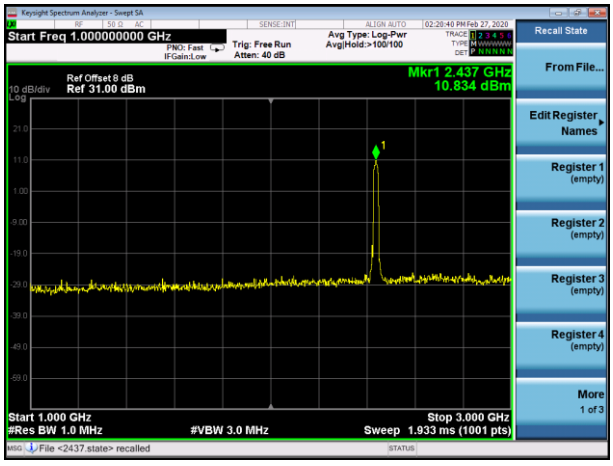


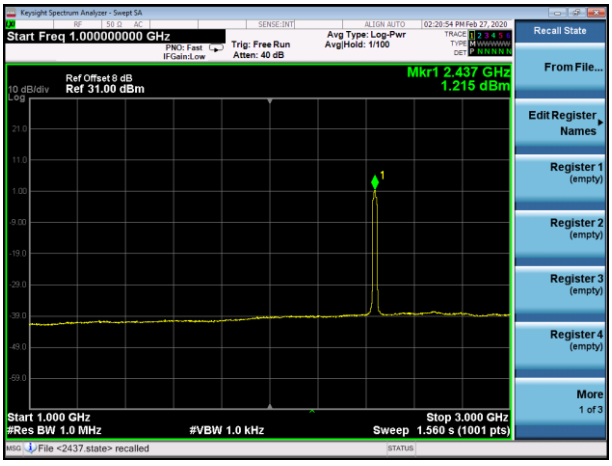


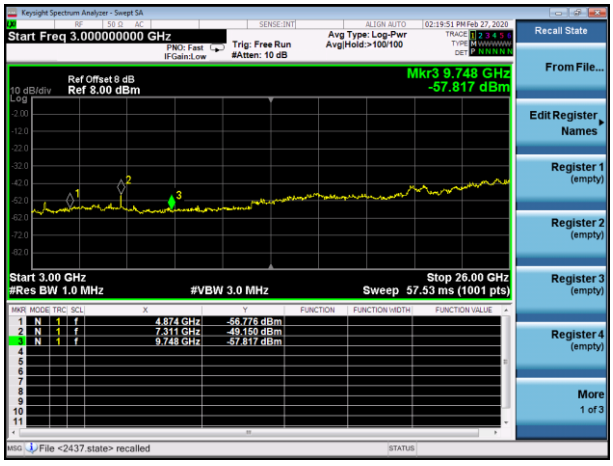
Peak

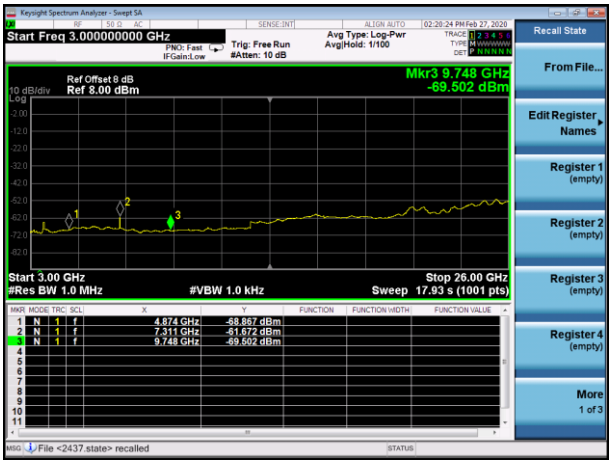
Average

Test Mode:		802.11g		Test channel:		2437MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4874	-56.78	2.00	-54.78	40.48	74.00	-33.52	Peak
7311	-49.15	2.00	-47.15	48.11	74.00	-25.89	Peak
9748	-57.82	2.00	-55.82	39.44	74.00	-34.56	Peak
4874	-68.87	2.00	-66.87	28.39	54.00	-25.61	Average
7311	-61.67	2.00	-59.67	35.59	54.00	-18.41	Average
9748	-69.50	2.00	-67.50	27.76	54.00	-26.24	Average





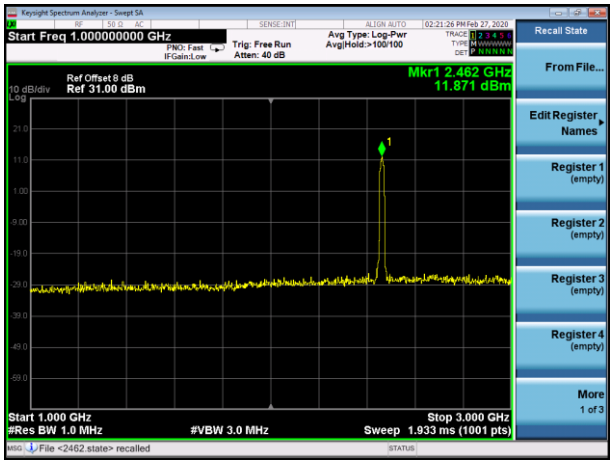


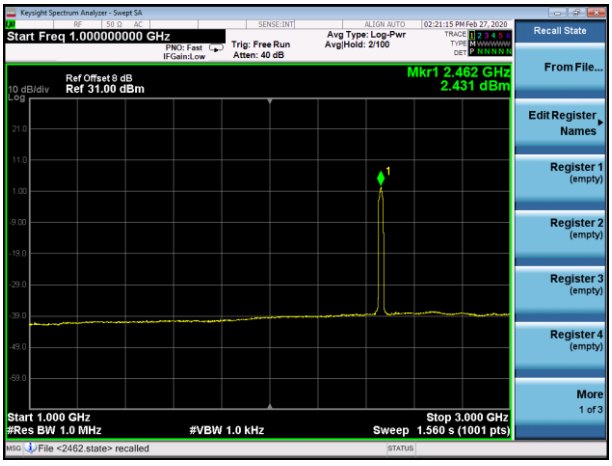


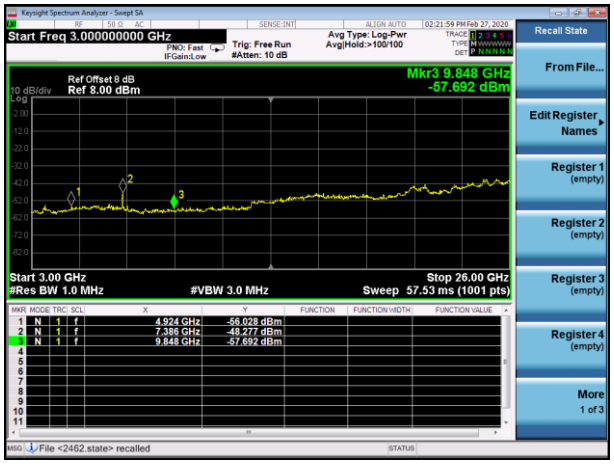
Peak

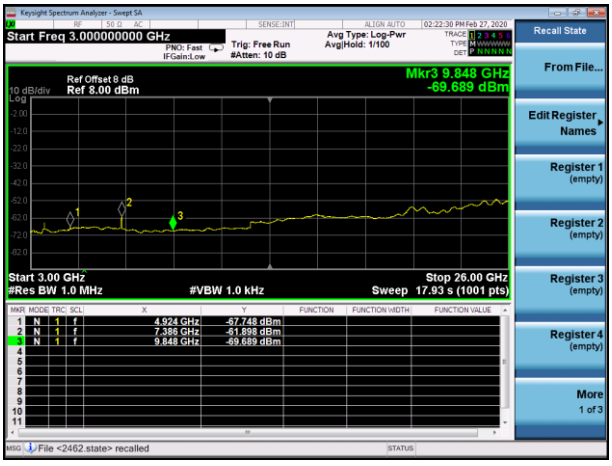
Average

Test Mode:		802.11g		Test channel:		2462MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4927	-56.03	2.00	-54.03	41.23	74.00	-32.77	Peak
7386	-48.28	2.00	-46.28	48.98	74.00	-25.02	Peak
9848	-57.69	2.00	-55.69	39.57	74.00	-34.43	Peak
4927	-67.75	2.00	-65.75	29.51	54.00	-24.49	Average
7386	-61.90	2.00	-59.90	35.36	54.00	-18.64	Average
9848	-69.69	2.00	-67.69	27.57	54.00	-26.43	Average





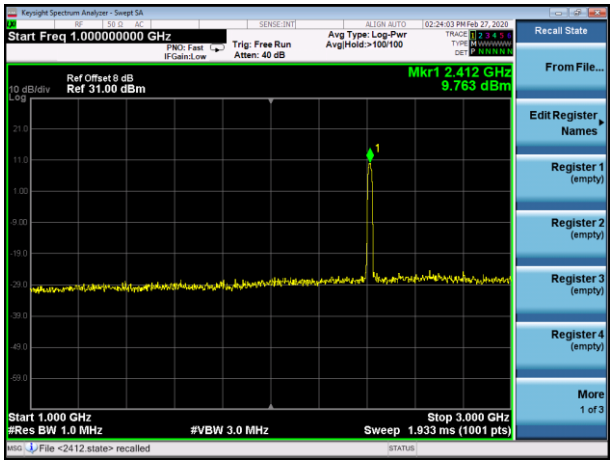


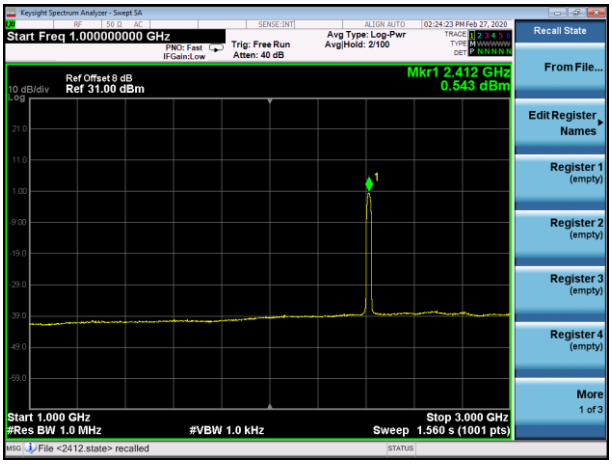


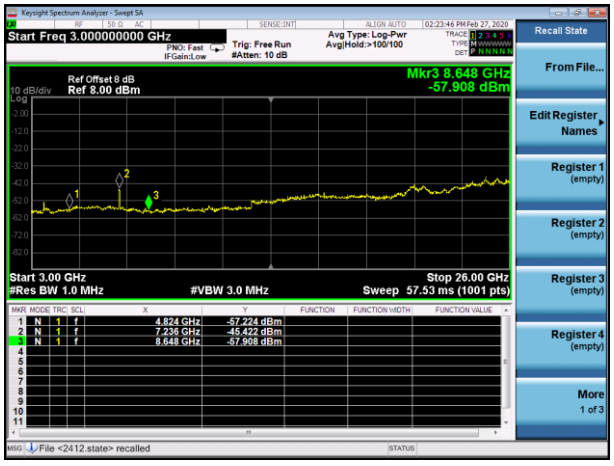
Peak

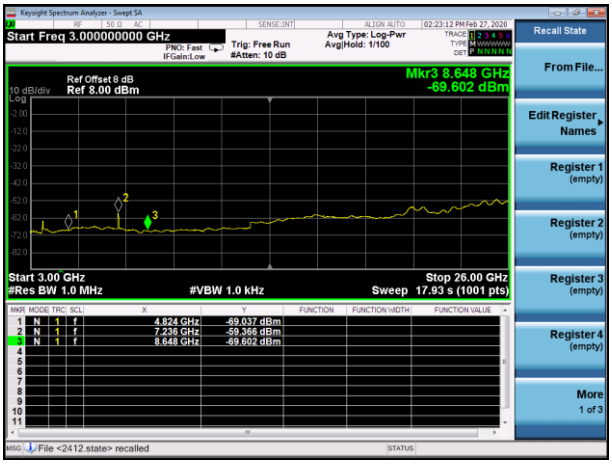
Average

Test Mode:		802.11n HT20		Test channel:		2412MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4824	-57.22	2.00	-55.22	40.03	74.00	-33.97	Peak
7236	-45.42	2.00	-43.42	51.84	74.00	-22.16	Peak
9648	-57.91	2.00	-55.91	39.35	74.00	-34.65	Peak
4824	-69.04	2.00	-67.04	28.22	54.00	-25.78	Average
7236	-59.37	2.00	-57.37	37.89	54.00	-16.11	Average
9648	-69.60	2.00	-67.60	27.66	54.00	-26.34	Average





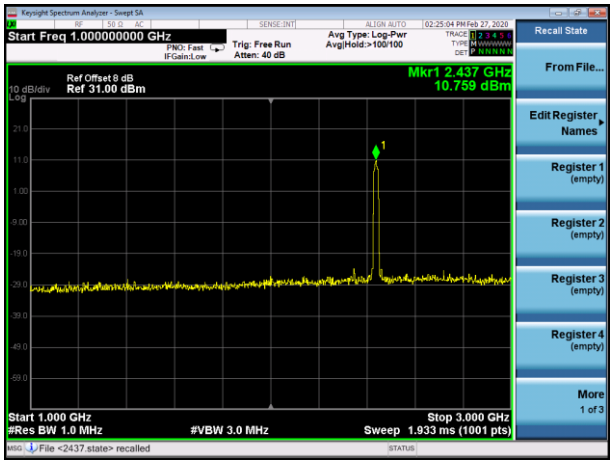


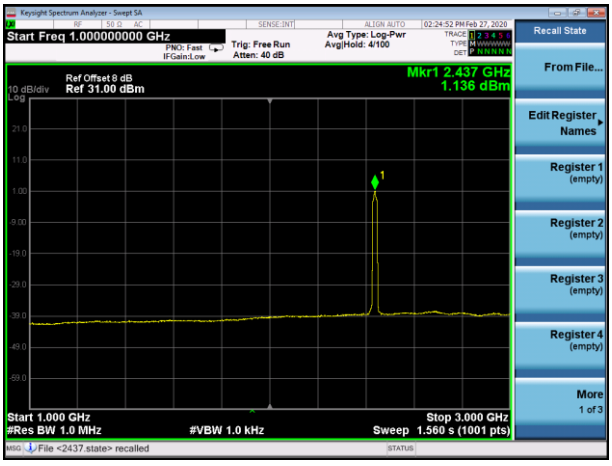


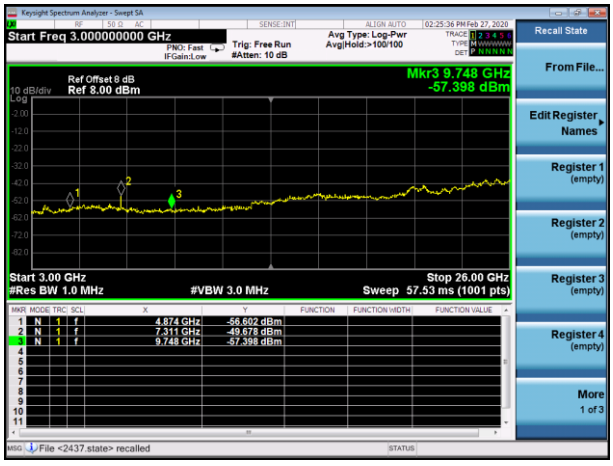
Peak

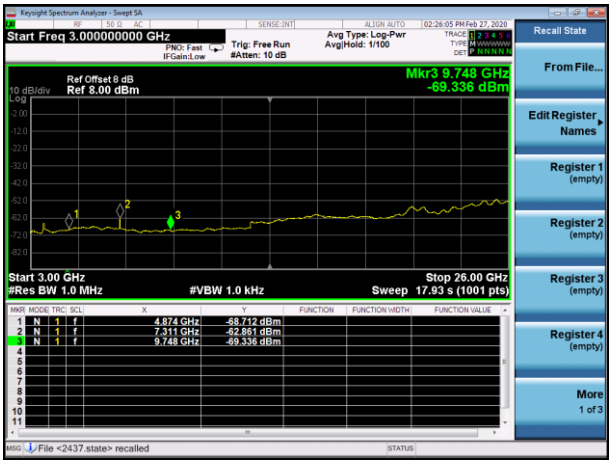
Average

Test Mode:		802.11n HT20		Test channel:		2437MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4874	-56.60	2.00	-54.60	40.66	74.00	-33.34	Peak
7311	-49.68	2.00	-47.68	47.58	74.00	-26.42	Peak
9748	-57.40	2.00	-55.40	39.86	74.00	-34.14	Peak
4874	-68.71	2.00	-66.71	28.55	54.00	-25.45	Average
7311	-62.86	2.00	-60.86	34.40	54.00	-19.60	Average
9748	-69.34	2.00	-67.34	27.92	54.00	-26.08	Average





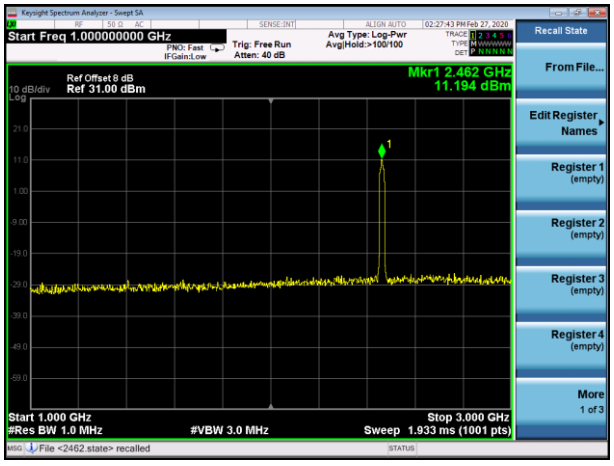


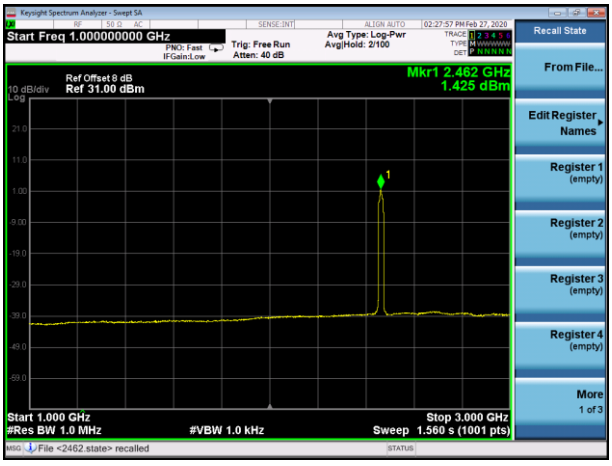


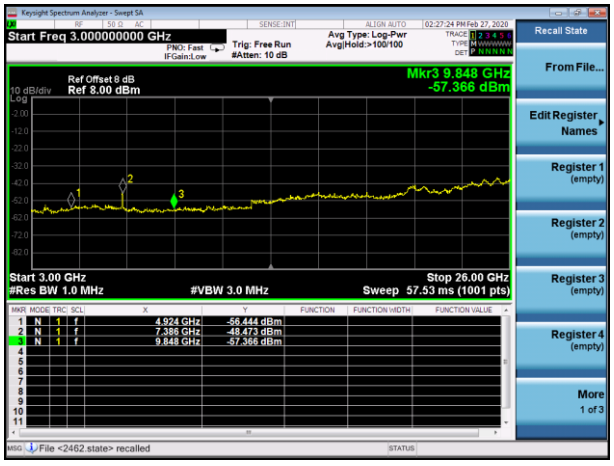
Peak

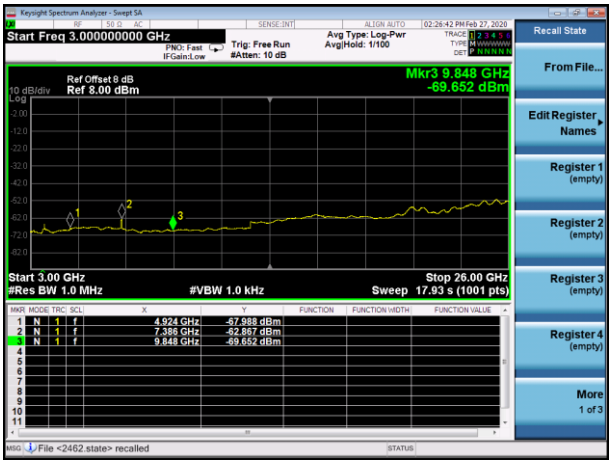
Average

Test Mode:		802.11n HT20		Test channel:		2462MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4927	-56.44	2.00	-54.44	40.81	74.00	-33.19	Peak
7386	-48.47	2.00	-46.47	48.78	74.00	-25.22	Peak
9848	-57.37	2.00	-55.37	39.89	74.00	-34.11	Peak
4927	-67.99	2.00	-65.99	29.27	54.00	-24.73	Average
7386	-62.87	2.00	-60.87	34.39	54.00	-19.61	Average
9848	-69.65	2.00	-67.65	27.61	54.00	-26.39	Average







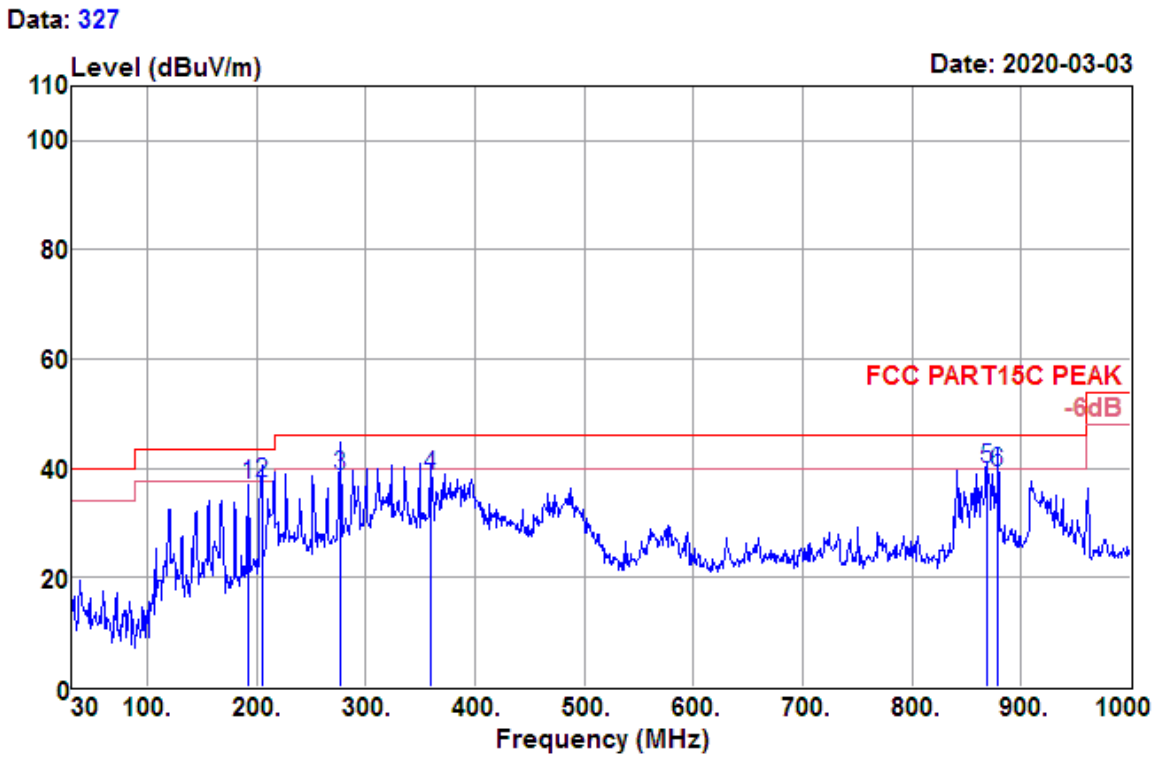


Peak

Average

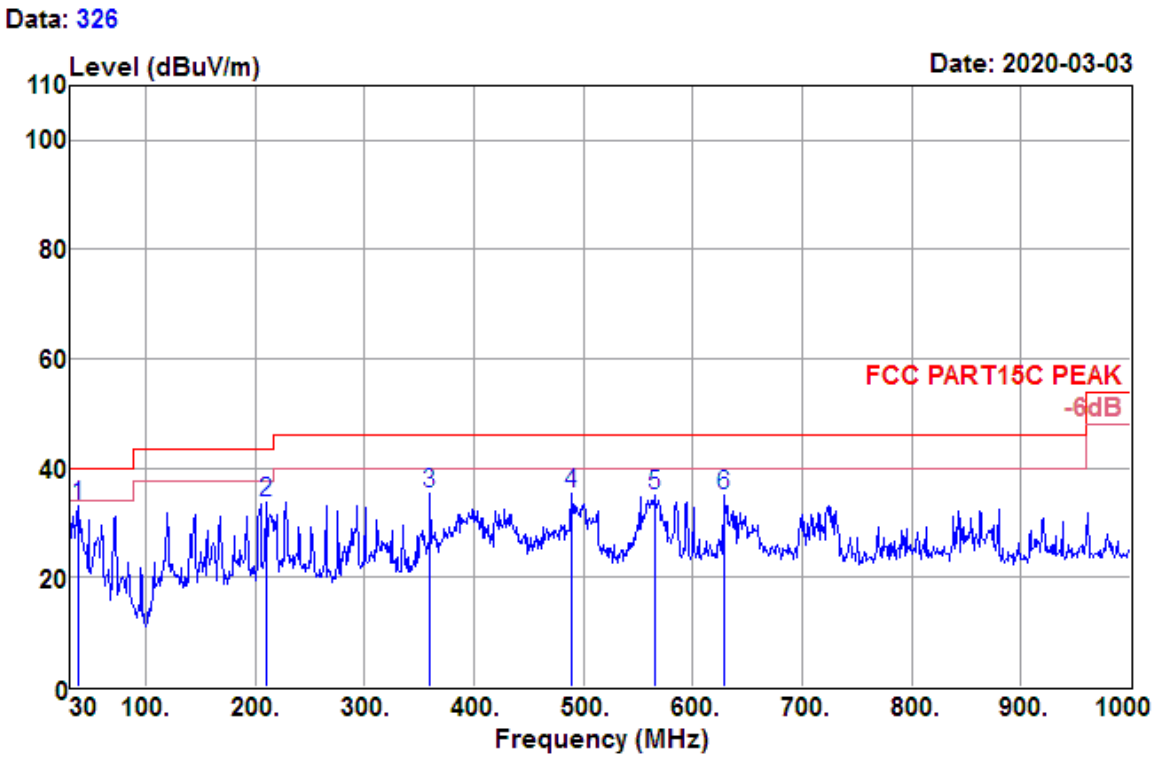
4.5.6 Test Result of Radiated Spurious Emission (30MHz ~ 1GHz)

Test Mode :	802.11b CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	30MHz~1GHz	Polarization :	Horizontal



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
191.990	56.31	11.00	2.31	32.47	37.15	43.50	-6.35	Peak
204.600	56.53	10.83	2.39	32.47	37.28	43.50	-6.22	QP
276.380	54.90	13.68	2.69	32.49	38.78	46.00	-7.22	QP
358.830	53.16	14.98	3.09	32.53	38.70	46.00	-7.30	QP
868.080	44.13	23.05	4.84	32.23	39.79	46.00	-6.21	QP
878.750	43.49	23.20	4.89	32.22	39.36	46.00	-6.64	QP

Test Mode :	802.11b CH01 (2412 MHz)	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	30MHz~1GHz	Polarization :	Vertical



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
38.730	51.50	12.53	1.51	32.47	33.07	40.00	-6.93	Peak
209.450	52.82	11.07	2.40	32.47	33.82	43.50	-9.68	Peak
359.800	49.78	15.00	3.09	32.53	35.34	46.00	-10.66	Peak
489.780	46.71	17.78	3.58	32.62	35.45	46.00	-10.55	Peak
564.470	44.64	19.36	3.82	32.67	35.15	46.00	-10.85	Peak
628.490	43.34	20.40	4.01	32.68	35.07	46.00	-10.93	Peak

4.6 AC Conducted Emission Measurement

4.6.1 Limit of AC Conducted Emission

FCC §15.207

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

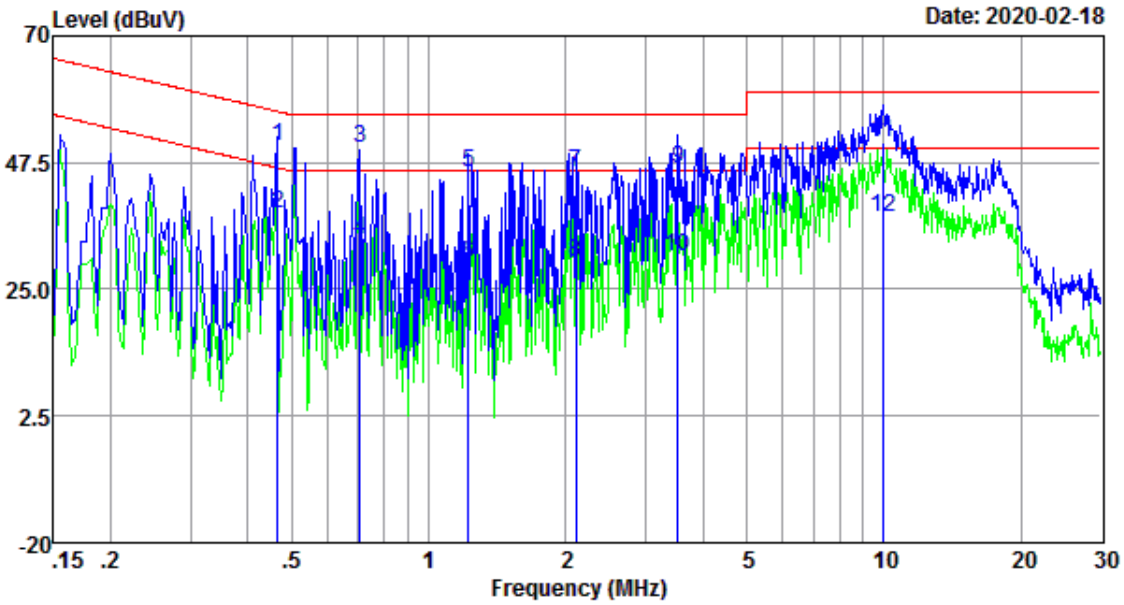
*Decreases with the logarithm of the frequency.

4.6.2 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

4.6.3 Test Result of AC Conducted Emission

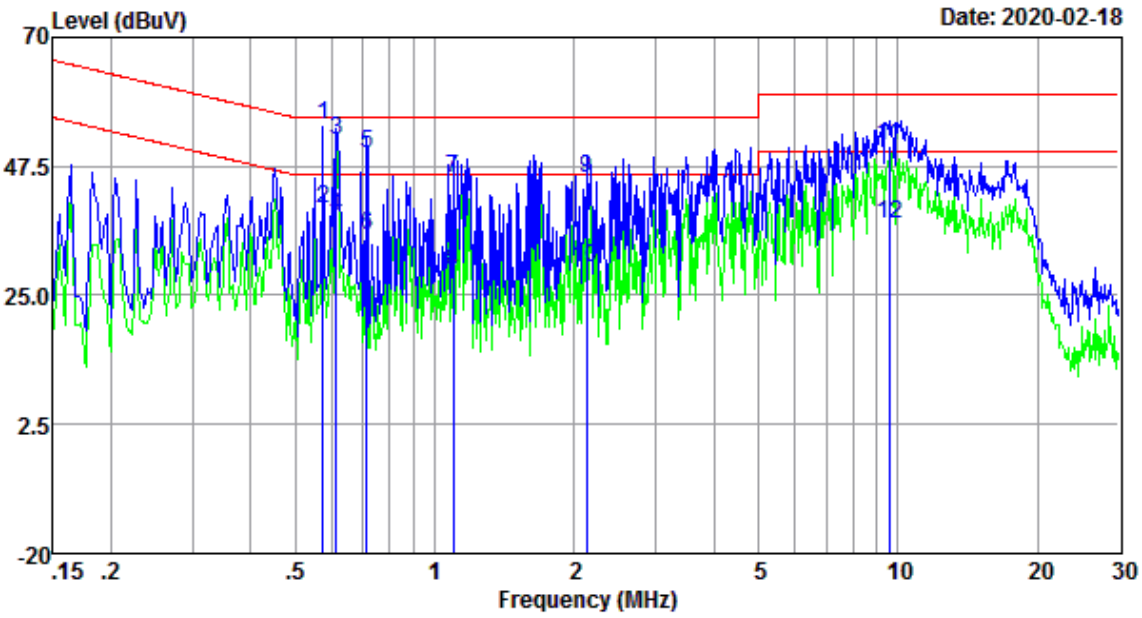
Test Mode :	Mode 1	Temperature :	20℃
Test Engineer :	Jerry.Wang	Relative Humidity :	64%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	2.4G WLAN Linking + HDMI + TF Card Upload + USB playing		



Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	Result level dBuV	Limit level dBuV	Over limit dB	Remark
0.466	40.70	9.56	0.04	50.30	56.58	-6.28	QP
0.466	28.70	9.56	0.04	38.30	46.58	-8.28	Average
0.705	40.30	9.57	0.04	49.91	56.00	-6.09	QP
0.705	24.10	9.57	0.04	33.71	46.00	-12.29	Average
1.223	36.00	9.57	0.05	45.62	56.00	-10.38	QP
1.223	19.90	9.57	0.05	29.52	46.00	-16.48	Average
2.110	36.00	9.57	0.06	45.63	56.00	-10.37	QP
2.110	20.10	9.57	0.06	29.73	46.00	-16.27	Average
3.528	36.80	9.62	0.07	46.49	56.00	-9.51	QP
3.528	21.00	9.62	0.07	30.69	46.00	-15.31	Average
9.966	41.20	9.86	0.10	51.16	60.00	-8.84	QP
9.966	27.70	9.86	0.10	37.66	50.00	-12.34	Average

Result Level= Reading Level + LISN Factor + Cable Loss

Test Mode :	Mode 1	Temperature :	20℃
Test Engineer :	Jerry.Wang	Relative Humidity :	64%
Test Voltage :	120Vac / 60Hz	Phase :	NEUTRAL
Function Type :	2.4G WLAN Linking + HDMI + TF Card Upload + USB playing		



Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	Result level dBuV	Limit level dBuV	Over limit dB	Remark
0.573	45.00	9.59	0.04	54.63	56.00	-1.37	QP
0.573	30.40	9.59	0.04	40.03	46.00	-5.97	Average
0.614	42.50	9.59	0.04	52.13	56.00	-3.87	QP
0.614	29.00	9.59	0.04	38.63	46.00	-7.37	Average
0.712	40.00	9.59	0.04	49.63	56.00	-6.37	QP
0.712	25.70	9.59	0.04	35.33	46.00	-10.67	Average
1.094	35.90	9.60	0.05	45.55	56.00	-10.45	QP
1.094	19.60	9.60	0.05	29.25	46.00	-16.75	Average
2.121	35.71	9.61	0.06	45.38	56.00	-10.62	QP
2.121	20.31	9.61	0.06	29.98	46.00	-16.02	Average
9.552	40.90	9.91	0.10	50.91	60.00	-9.09	QP
9.552	27.50	9.91	0.10	37.51	50.00	-12.49	Average

Result Level= Reading Level + LISN Factor + Cable Loss

4.7 Antenna Requirements

4.7.1 Standard Applicable

According to antenna requirement of §15.203.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded..

And according to §15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 Antenna Connected Construction

An PIFA antenna design is used.

4.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	Keysight	N9010A	MY56070788	2020-01-15	2021-01-14	Conducted
Power Sensor	Keysight	U2021XA	MY56510025	2020-01-16	2021-01-15	Conducted
Power Sensor	Keysight	U2021XA	MY57030005	2020-01-16	2021-01-15	Conducted
Power Sensor	Keysight	U2021XA	MY56510018	2020-01-16	2021-01-15	Conducted
Power Sensor	Keysight	U2021XA	MY56480002	2020-01-16	2021-01-15	Conducted
Thermal Chamber	Sanmtest	SMC-408-CD	2435	2019-05-09	2020-05-08	Conducted
Base Station	R&S	CMW 270	101231	2020-01-16	2021-01-15	Conducted
Signal Generator (Interferer)	Keysight	N5182B	MY56200384	2020-02-21	2021-02-20	Conducted
Signal Generator (Blocker)	Keysight	N5171B	MY56200661	2020-01-15	2021-01-14	Conducted

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV 40	101433	2020-01-16	2021-01-15	Radiation
Amplifier	Sonoma	310	363917	2020-01-15	2021-01-14	Radiation
Amplifier	Schwarzbeck	BBV 9718	327	2020-01-15	2021-01-14	Radiation
Amplifier	Narda	TTA1840-35-HG	2034380	2019-05-15	2020-05-14	Radiation
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-051	2020-02-14	2023-02-13	Radiation
Broadband Antenna	Schwarzbeck	VULB 9168	9168-757	2018-08-31	2021-08-30	Radiation
Horn Antenna	Schwarzbeck	BBHA 9120 D	1677	2020-02-14	2023-02-13	Radiation
Horn Antenna	COM-POWER	AH-1840	101117	2018-06-20	2021-06-19	Radiation
Test Software	Auidx	E3	6.111221a	N/A	N/A	Radiation
Filter	Micro-Tronics	BRM 50702	G266	N/A	N/A	Radiation

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
LISN	R&S	ENV216	102125	2020-01-08	2021-01-07	Conducted
LISN	R&S	ENV432	101327	2020-01-08	2021-01-07	Conducted
EMI Test Receiver	R&S	ESR3	102143	2020-01-16	2021-01-15	Conducted
EMI Test Software	Audix	E3	N/A	N/A	N/A	Conducted

N/A: No Calibration Required

6 Uncertainty of Evaluation

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	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.60dB
Radiated emissions	30MHz ~ 1GMHz	5.05dB
	1GHz ~ 18GHz	5.06 dB
	18GHz ~ 40GHz	3.65dB

MEASUREMENT	UNCERTAINTY
Occupied Channel Bandwidth	±0.1%
RF output power, conducted	±1.2dB
Power density, conducted	±1.2dB

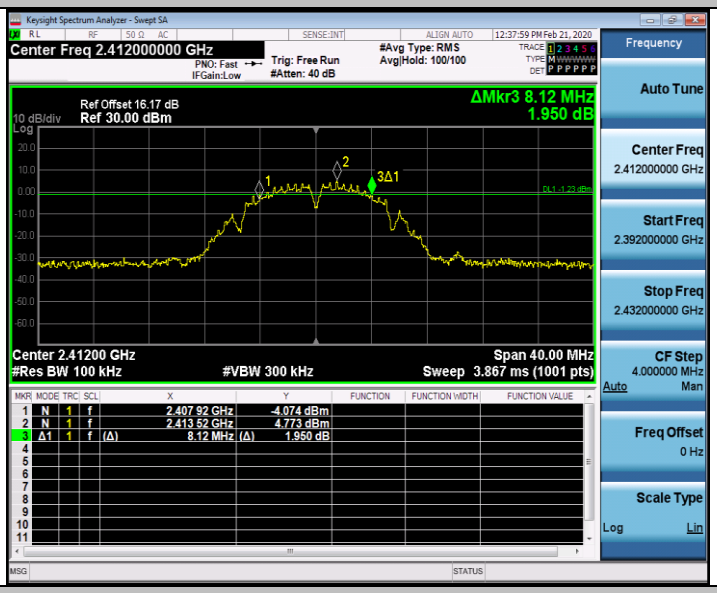
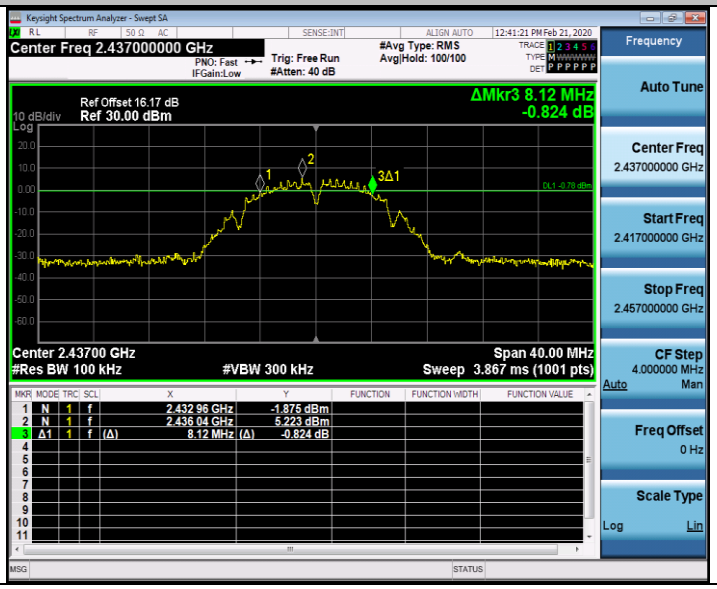
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

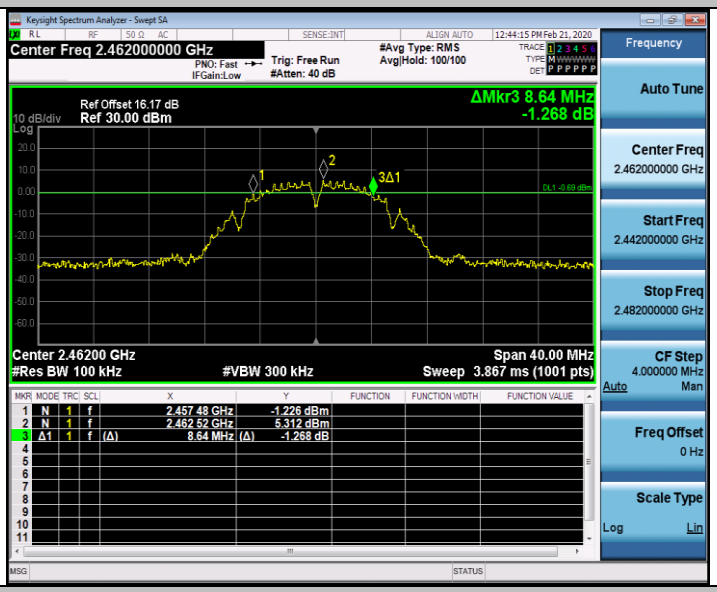
Appendix A: DTS Bandwidth

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.120	2407.920	2416.040	>=0.5	PASS
		2437	8.120	2432.960	2441.080	>=0.5	PASS
		2462	8.640	2457.480	2466.120	>=0.5	PASS
11G	Ant1	2412	16.000	2404.240	2420.240	>=0.5	PASS
		2437	16.360	2428.840	2445.200	>=0.5	PASS
		2462	16.360	2453.840	2470.200	>=0.5	PASS
11N20SISO	Ant1	2412	17.240	2403.600	2420.840	>=0.5	PASS
		2437	16.760	2429.080	2445.840	>=0.5	PASS
		2462	16.320	2453.480	2469.800	>=0.5	PASS

Test Graphs

11B_Ant1_2412

11B_Ant1_2437


11B_Ant1_2462

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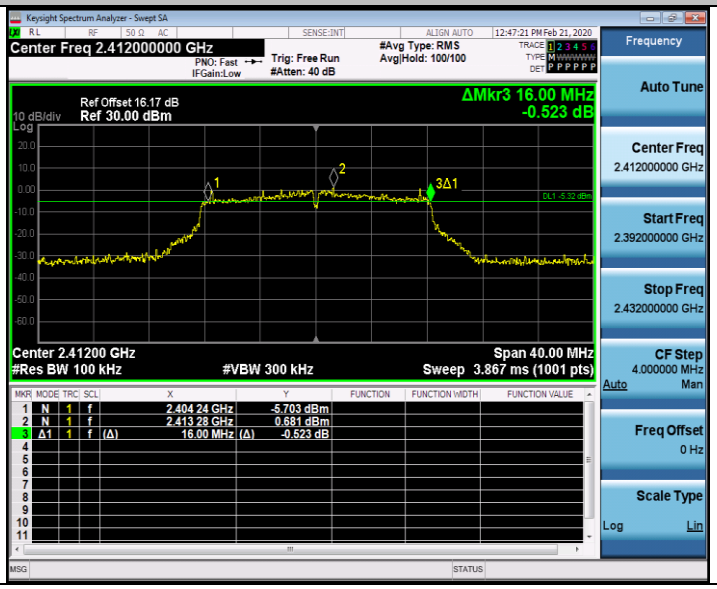
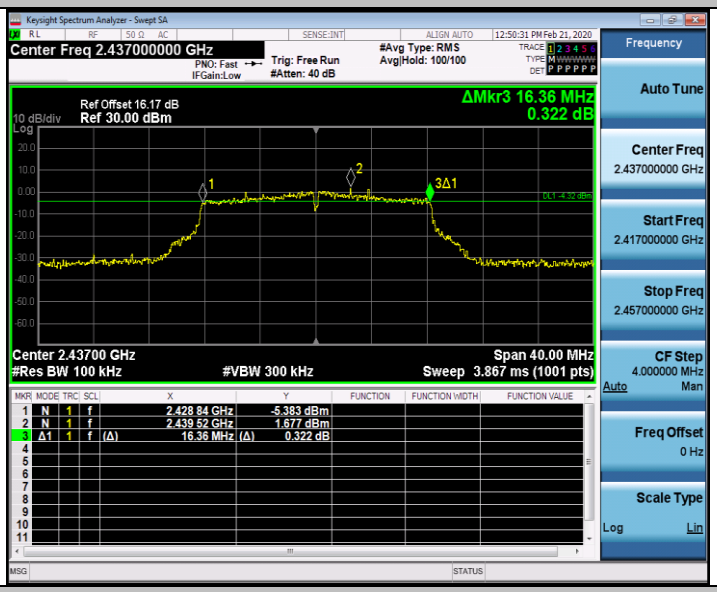


11G_Ant1_2437

11G_Ant1_2462