FCC RF Test Report

For

SHENZHEN ELEBAO TECHNOLOGY CO., LTD

Test Standards:	Part 15 Subpart E §15. 407
Product Description:	TV Dongle
Tested Model:	ST4000
Additional Model No.	Y2, Y2S, Y2 LITE, Y2 PRO
Brand Name.:	Gocast
FCC ID:	2AP2G-EBY2S
Classification	(NII)Unlicensed National Information Infrastructure
Report No.:	EC2002004RF04
Tested Date:	2020-02-17 to 2020-03-03
Issued Date:	2020-03-03
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Note: The test results in this report apply exclusively to the tested model / sample. Without written approval of Hunan Ecloud Testing Technology Co., Ltd., the test report shall not be reproduced except in full.

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
2.1049 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
15.407(a)	Maximum Conducted Output Power	FCC≤24dBm	Pass	
15.407(a)	Power Spectral Density	FCC≤11dBm	Pass	
15.407(b)	Unwanted Emissions	15.407(b) 15.209(a)	Pass	Under limit 1.49 dB at 5150 MHz
15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 2.30 dB at 0.558 MHz
15.407(g)	Frequency Stability	Within Operation Band	Pass	
15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	
15.203 & 15.407(a)	Antenna Requirement	N/A	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	256QAM,64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TYPE	802.11a/n/ac : OFDM
OPERATING FREQUENCY	U-NII-1:5150~5250MHz
MAX. OUTPUT POWER	802.11a : 13.96 dBm (0.0249 W) 802.11n HT20 : 13.70 dBm (0.0234 W) 802.11n HT40 : 13.24 dBm (0.0211 W) 802.11ac VHT20 : 13.69 dBm (0.0234 W) 802.11ac VHT40 : 13.16 dBm (0.0207 W) 802.11ac VHT80 : 13.88 dBm (0.0244 W)
ANTENNA TYPE	PIFA Antenna type with 2dBi gain at U-NII-1
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 E §15.407
- ANSI C63.10-2013
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04

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 Carrier Frequency and Channel

U-NII-1

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	40	5200 MHz
38	5190 MHz	46	5230 MHz
40	5200 MHz	48	5240 MHz
42	5210 MHz		

3.2 Test Mode

Based on the baseline scan, the worst - case data rates were:

MODULATION	DATA RATE
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

3.2.1 Antenna Port Conducted Measurement

Summary table of Test Cases				
Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20	802.11n HT40/ 802.11ac VHT40	802.11ac VHT80
U-NII-1	Mode 1: CH36 Mode 2: CH40 Mode 3: CH48	Mode 4: CH36 Mode 5: CH40 Mode 6: CH48	Mode 7: CH38 Mode 8: CH46	Mode 9: CH42

3.2.2 Radiated Emission Test (Below 1GHz)

Radiated Test Cases	802.11ac VHT80
	Mode 9: CH42

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. 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

3.2.3 Radiated Bandedge and Radiated Emission Test (Above 1GHz)

Summary table of Test Cases				
Test Item	**Modulation**			
	802.11 a	**802.11n HT20/ 802.11ac VHT20**	**802.11n HT40/ 802.11ac VHT40**	**802.11ac VHT80**
U-NII-1	Mode 1: CH36 Mode 2: CH40 Mode 3: CH48	Mode 4: CH36 Mode 5: CH40 Mode 6: CH48	Mode 7: CH38 Mode 8: CH46	Mode 9: CH42

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. 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

3.2.4 Power Line Conducted Emission Test:

AC Conducted Emission	Mode 1 : 5G WLAN Link + HDMI + TF Card Upload + USB playing

3.3 Support Equipment

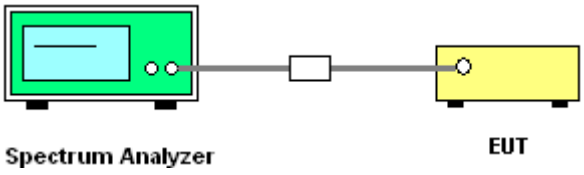
Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	NETGARE	R7800	PY315100319	N/A	unshielded AC I/P cable1.2 m
2.	Notebook	Lenovo	E470C	FCC DoC	N/A	shielded cable DC O/P 1.8 m unshielded AC I/P cable1.2 m
3.	Flat Panel Monitor	Dell	P2317H	FCC DoC	N/A	Unshielded, 1.5 m
4.	Bluetooth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

3.4 Test Setup

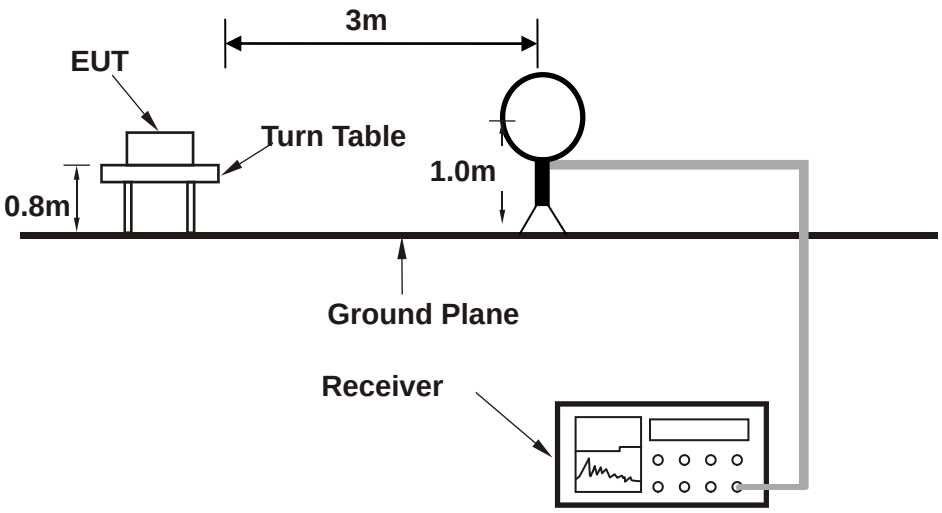
The EUT is continuously communicating to the WIFI tester during the tests.

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

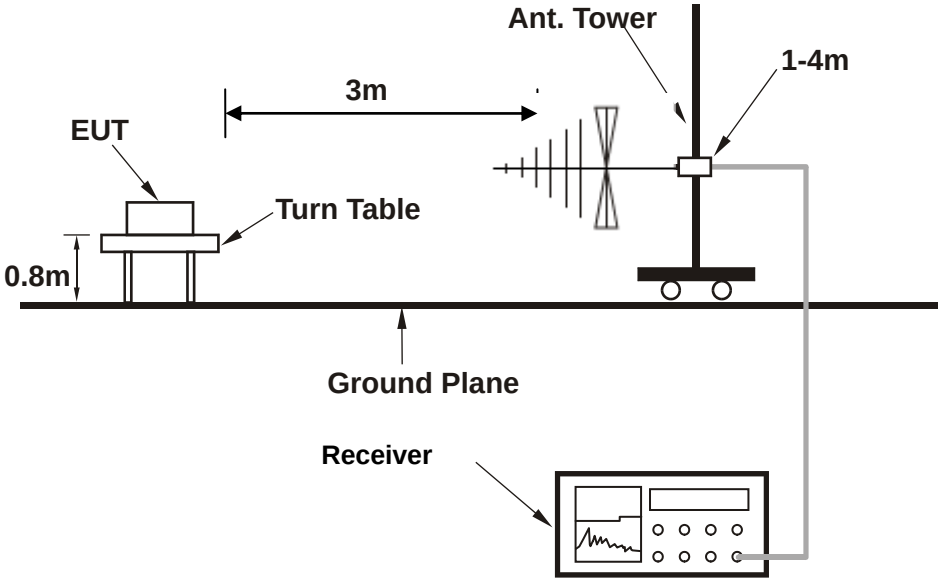
Setup diagram for Conducted Test



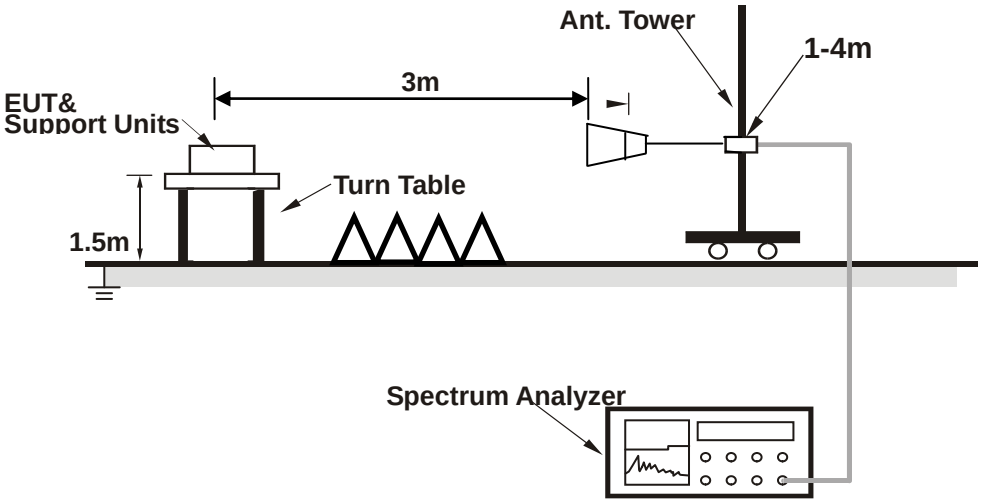
Setup diagram for Raidation(9KHz~30MHz) Test



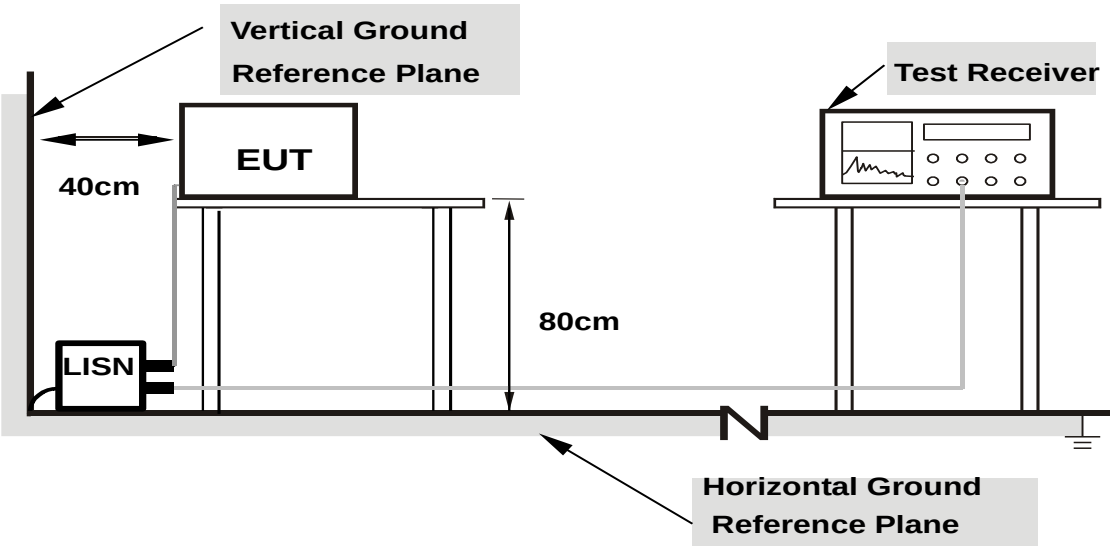
Setup diagram for Raidation(Below 1G) Test



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 26dB and 99% Occupied Bandwidth Measurement

4.1.1 Limit of 26dB and 99% Bandwidth

There is no limit bandwidth for U-NII-1

4.1.2 Test Procedures

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
4. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto,Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
5. Mark the peak frequency and –26dB (upper and lower) frequency.
6. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
7. Measure and record the results in the test report.

4.1.3 Test Result of 26dB Bandwidth

Refer to Appendix A1 of this test report.

4.1.4 Test Result of 99% Bandwidth

Refer to Appendix A2 of this test report.

4.2 Maximum Conducted Output Power Measurement

4.2.1 Limit of Output Power

Operation Band	EUT Category		Limit
U-NII-1		Access Point(Mater Device)	1 Watt(30dBm)
		Fixed point-to-point Acess Ponit	1 Watt(30dBm)
	√	Mobile and portable clinet device	250mW(23.98dBm)
U-NII-2A			250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C			250mW(23.98dBm) or 11dBm+10 log B

4.2.2 Test Procedures

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.
4. Spectrum Analyzer is used as the auxiliary test equipment to conduct the output power measurement.
5. Set span to encompass the entire emission bandwidth (EBW) of the signal. Set sweep trigger to “free run.”, RBW = 1 MHz, Set VBW ≥ 1/T, where T refers to 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, Sweep time = auto, Detector = peak..
6. Video filtering shall be applied to power signal (rms), it shall be set to operate on a linear voltage signal.
7. Trace mode = max hold. Allow max hold to run for at least 60 seconds
8. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

4.2.3 Test Result of Output Power

Refer to Appendix B of this test report.

4.3 Power Spectral Density Measurement

4.3.1 Limits of Power Spectral Density

Operztion Band	EUT Category		Limit
U-NII-1		Access Point(Mater Device)	17dBm/MHz
		Fixed point-to-point Acess Ponit	
	√	Mobile and portable clinet device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz

4.3.2 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging(SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. User the cursor on spectrum to peak search the highest level of trace.
6. Record the max. reading and add 10 log(1/duty cycle).
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

4.3.3 Test Result of Power Spectral Density

Refer to Appendix C of this test report.

4.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

4.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table

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

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.2
-27	68.2

4.4.2 Test Procedures

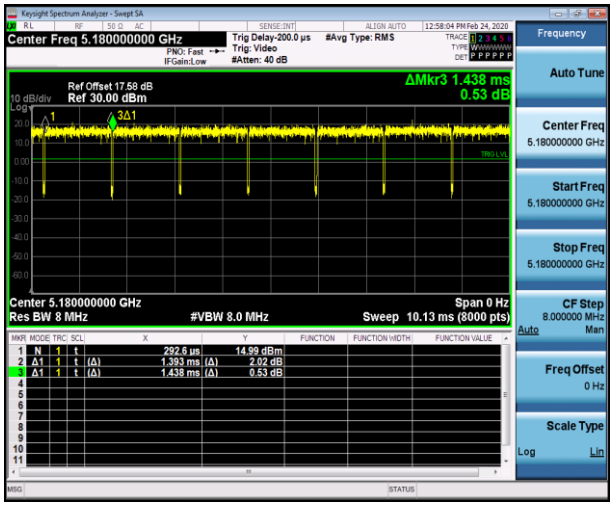
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum 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:

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

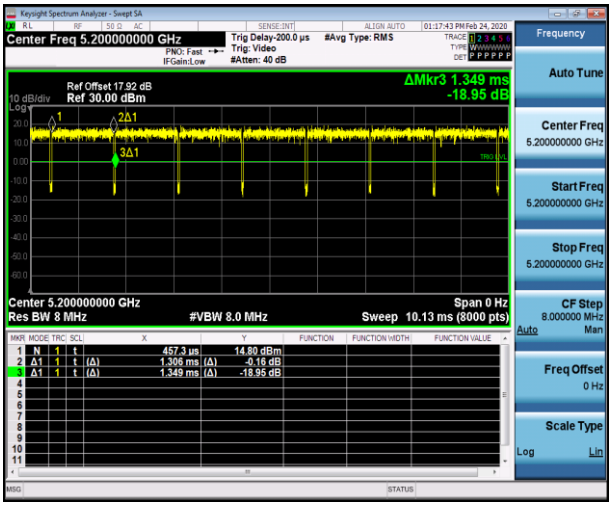
   Where:

   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.

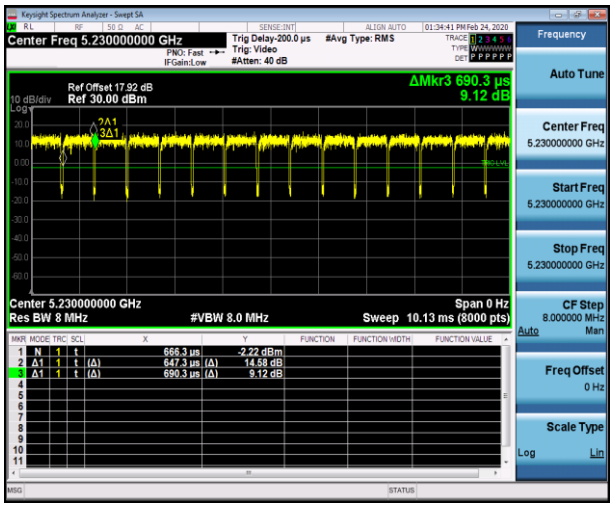
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	96.92	1.39	0.72	1kHz
802.11n HT20	96.81	1.31	0.76	1kHz
802.11n HT40	93.76	0.65	1.54	3kHz
802.11ac HT20	96.74	1.31	0.76	1kHz
802.11ac HT40	93.65	0.65	1.54	3kHz
802.11ac HT80	98.44	0.32	3.13	10kHz



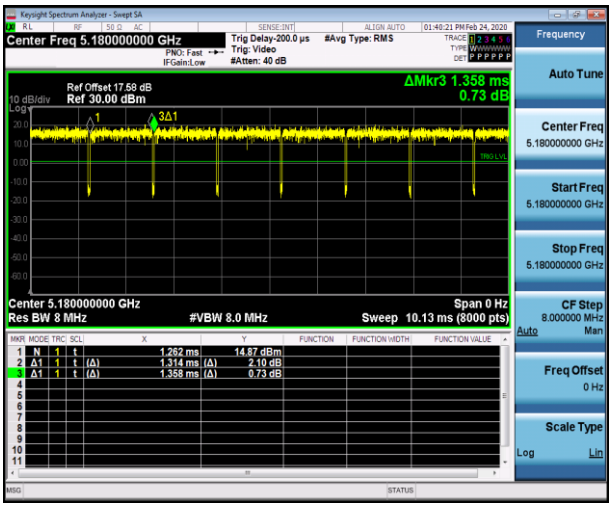
802.11a



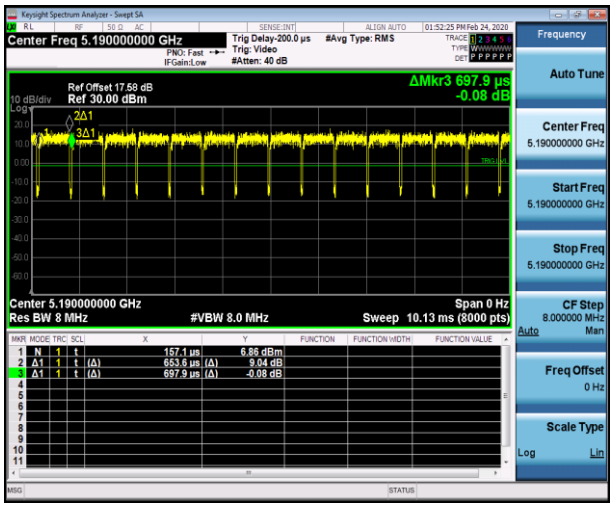
802.11n HT20



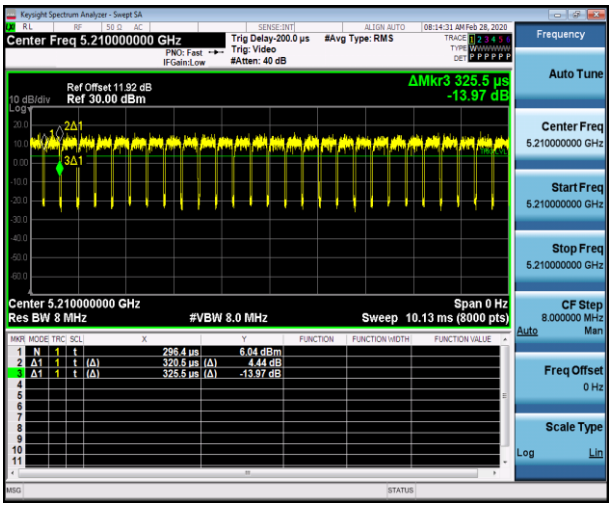
802.11n HT40



802.11ac HT20



802.11ac HT40



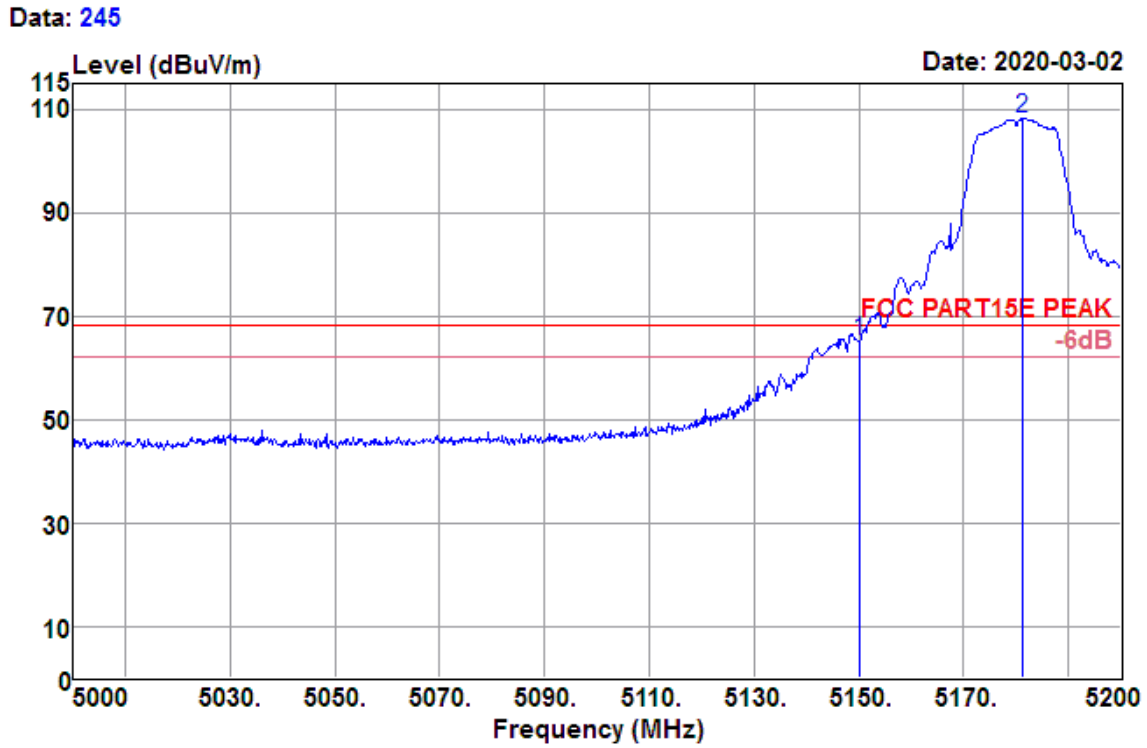
802.11ac HT80

4.4.3 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.

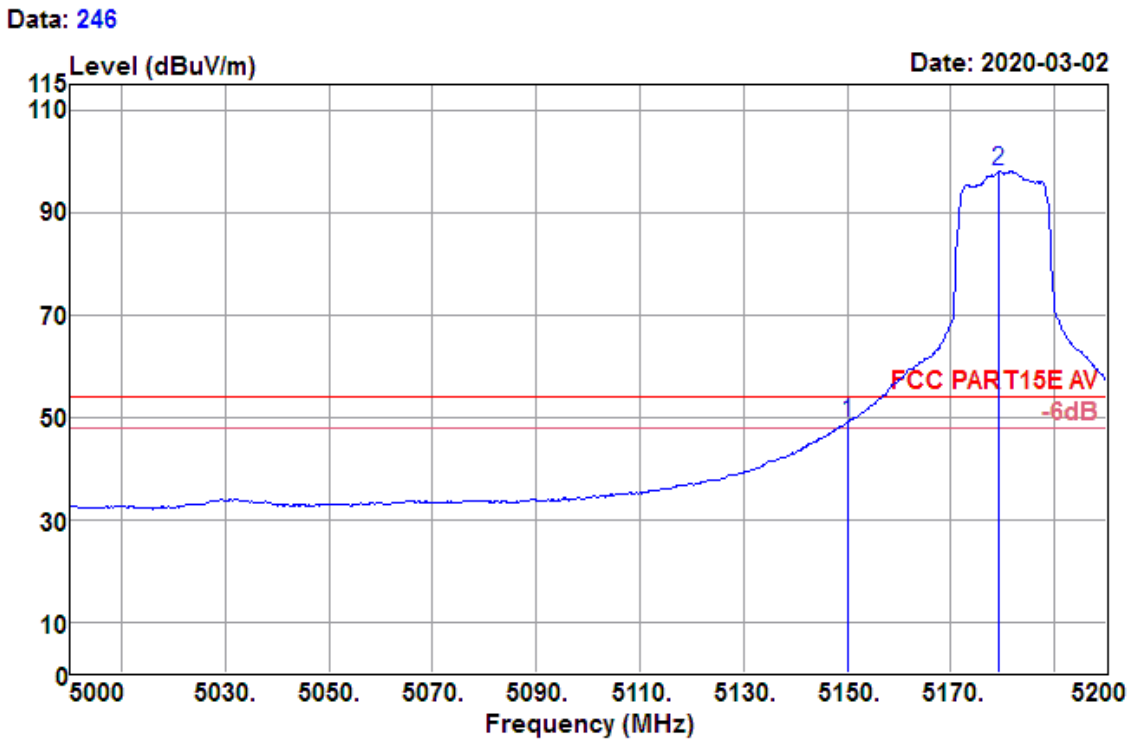
4.4.4 Test Result of Radiated Spurious at Band Edges

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Horizontal



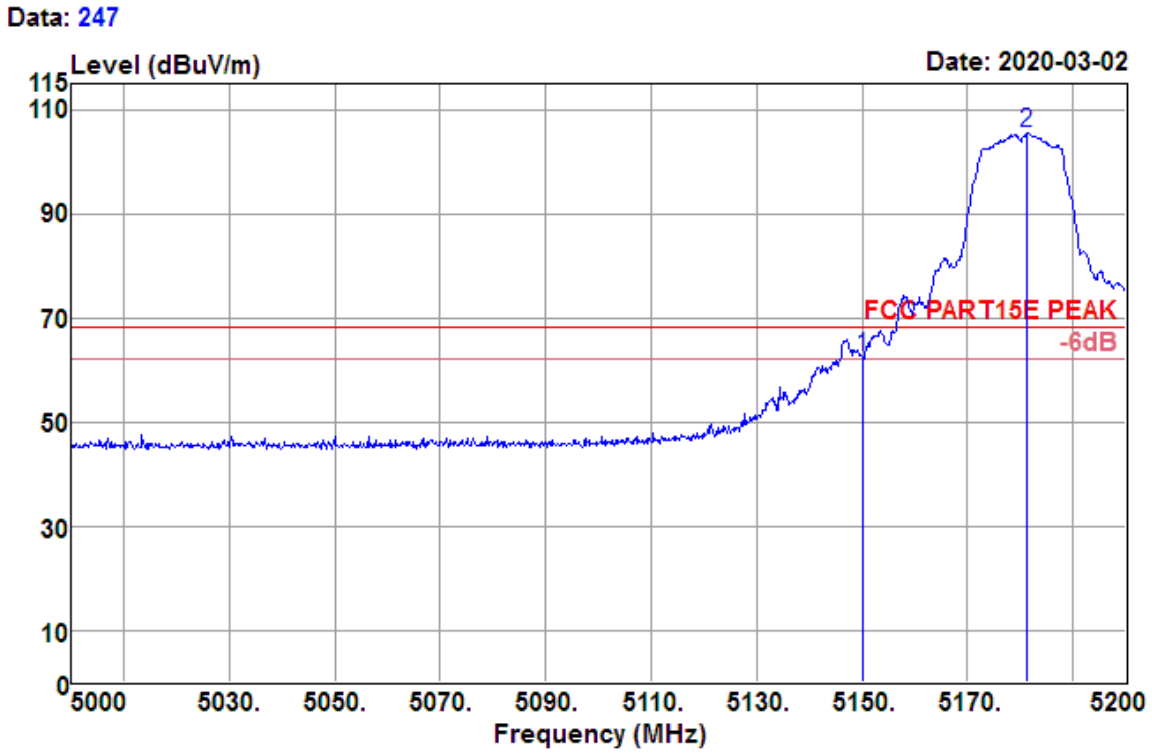
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	63.85	31.32	5.65	35.70	65.12	68.20	-3.08	Peak
5181.400	107.03	31.35	5.68	35.66	108.40	68.20	40.20	Peak

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Horizontal



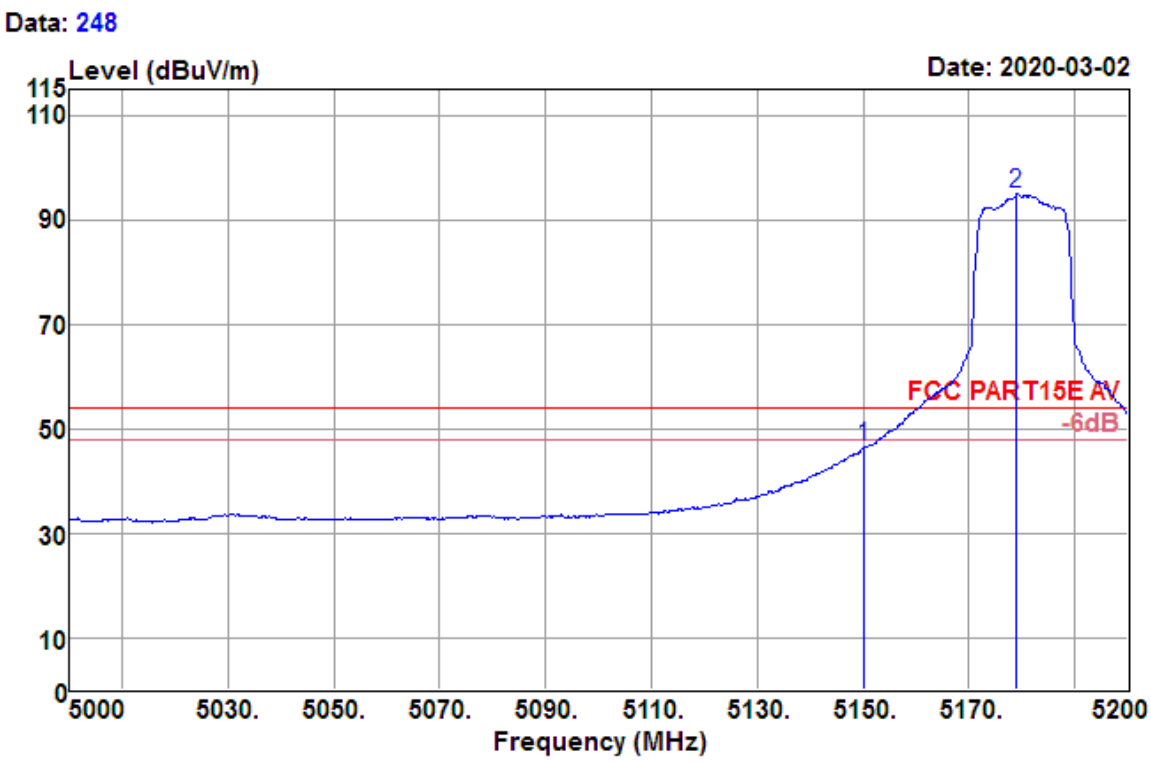
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	47.72	31.32	5.65	35.70	48.99	54.00	-5.01	Average
5179.200	96.66	31.34	5.68	35.66	98.02	54.00	44.02	Average

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Vertical



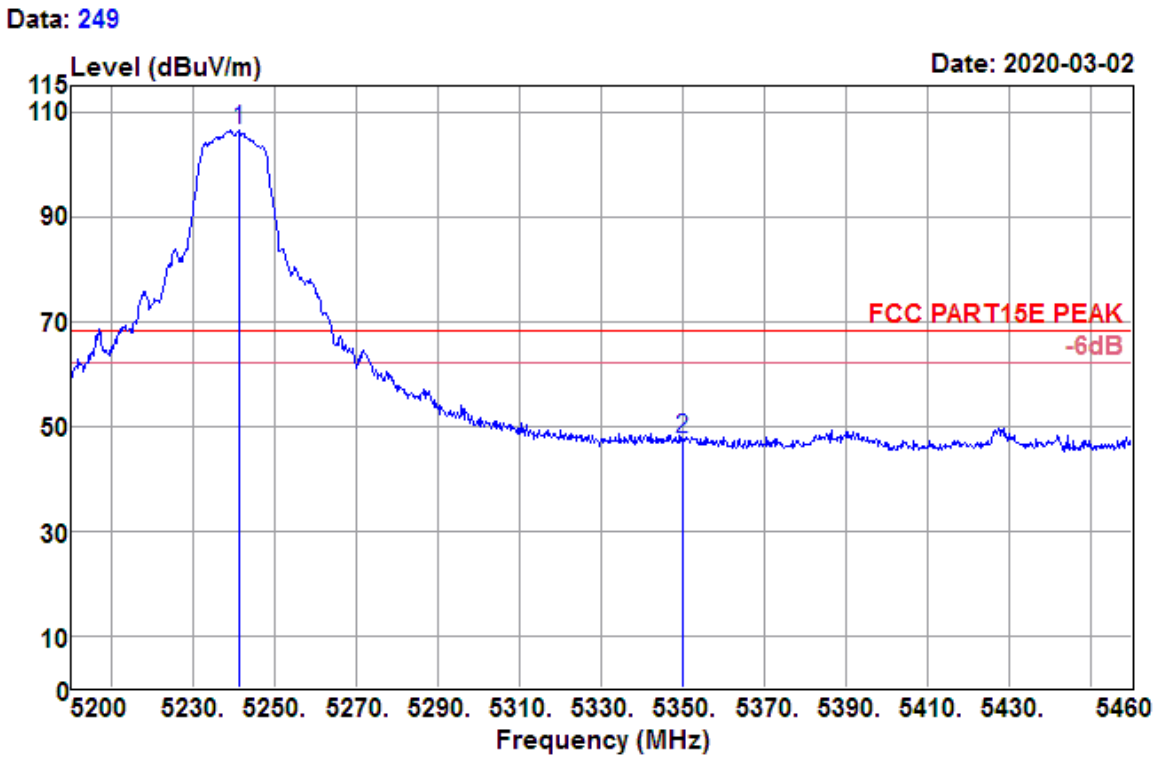
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	61.06	31.32	5.65	35.70	62.33	68.20	-5.87	Peak
5181.400	104.08	31.35	5.68	35.66	105.45	68.20	37.25	Peak

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Vertical



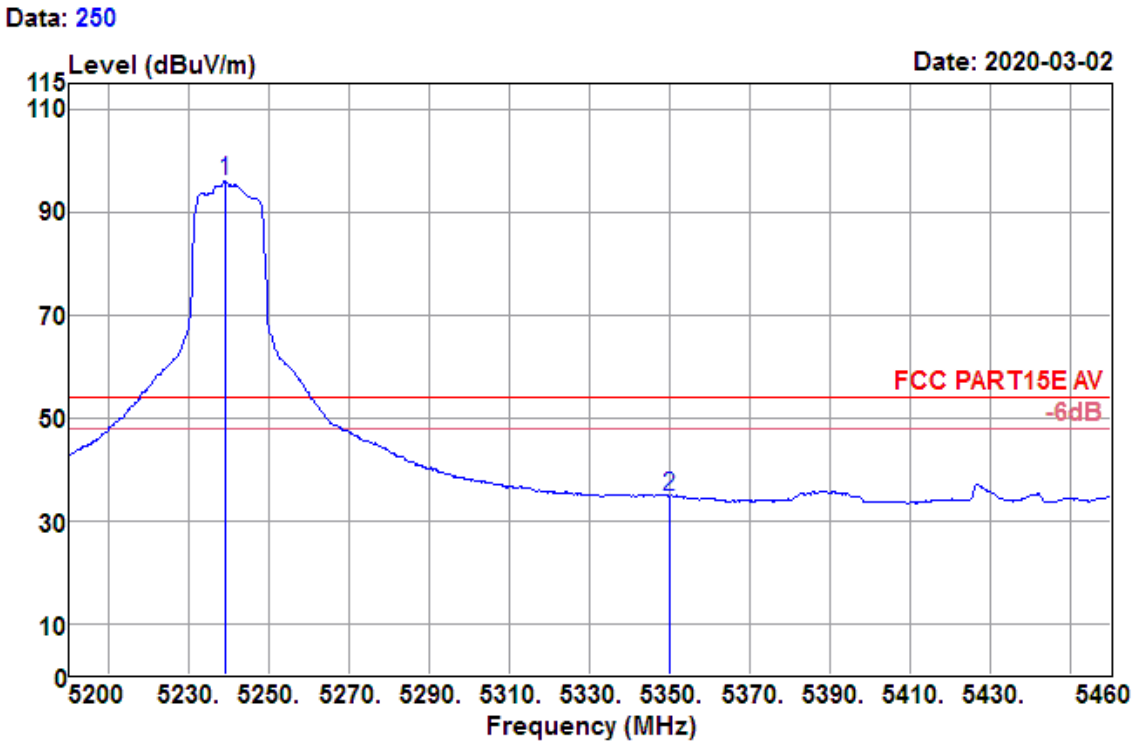
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	45.06	31.32	5.65	35.70	46.33	54.00	-7.67	Average
5179.000	93.66	31.34	5.68	35.66	95.02	54.00	41.02	Average

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal



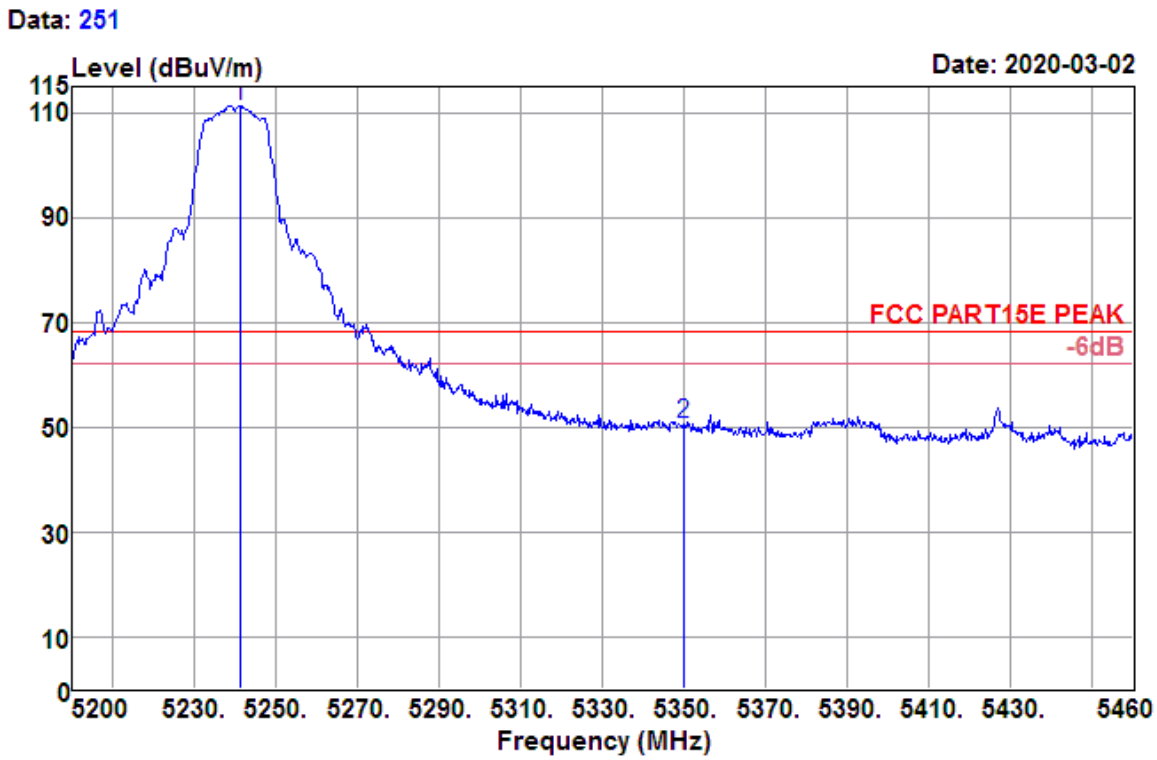
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5241.340	105.12	31.39	5.70	35.58	106.63	68.20	38.43	Peak
5350.000	45.85	31.48	5.71	35.43	47.61	68.20	-20.59	Peak

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal



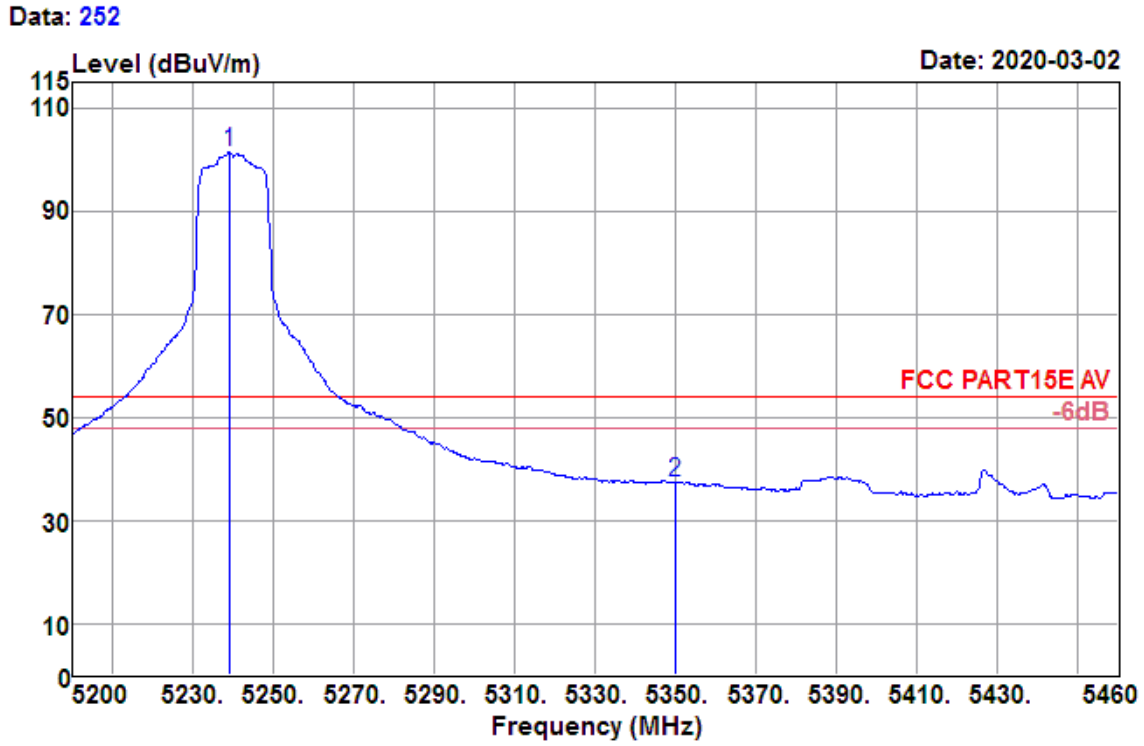
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5239.000	94.40	31.39	5.70	35.58	95.91	54.00	41.91	Average
5350.000	32.91	31.48	5.71	35.43	34.67	54.00	-19.33	Average

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical



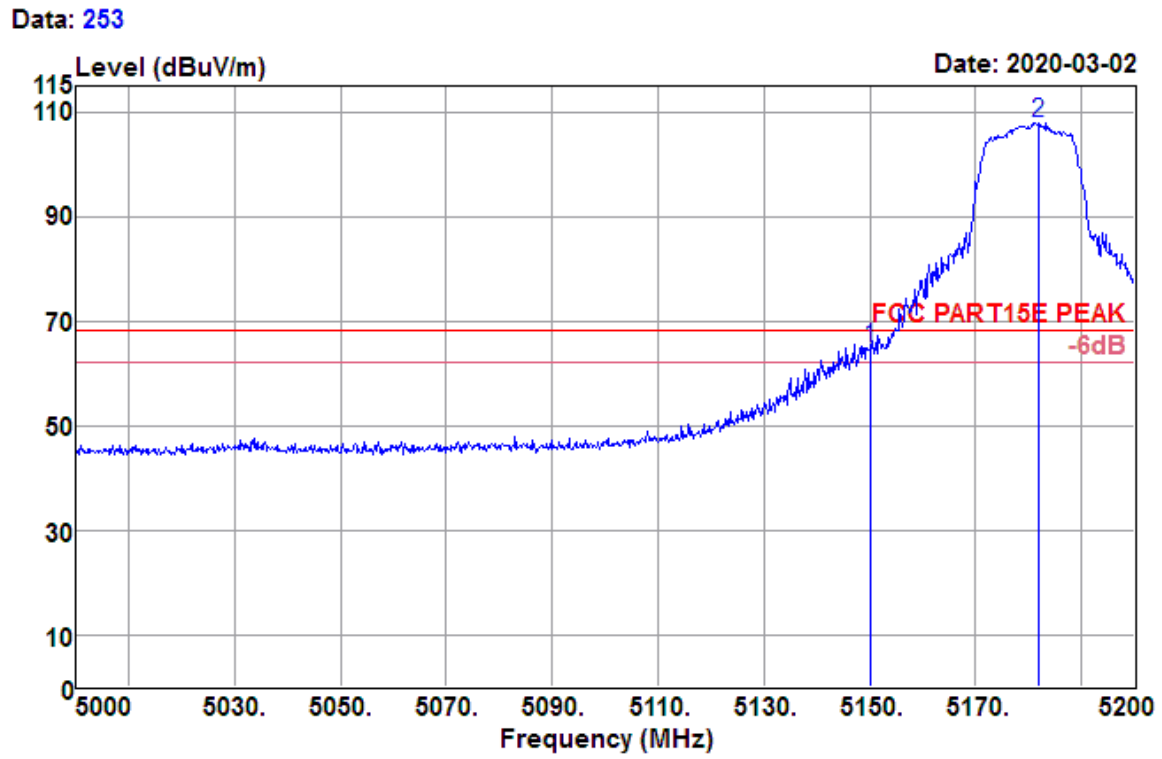
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5241.340	109.90	31.39	5.70	35.58	111.41	68.20	43.21	Peak
5350.000	48.88	31.48	5.71	35.43	50.64	68.20	-17.56	Peak

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical



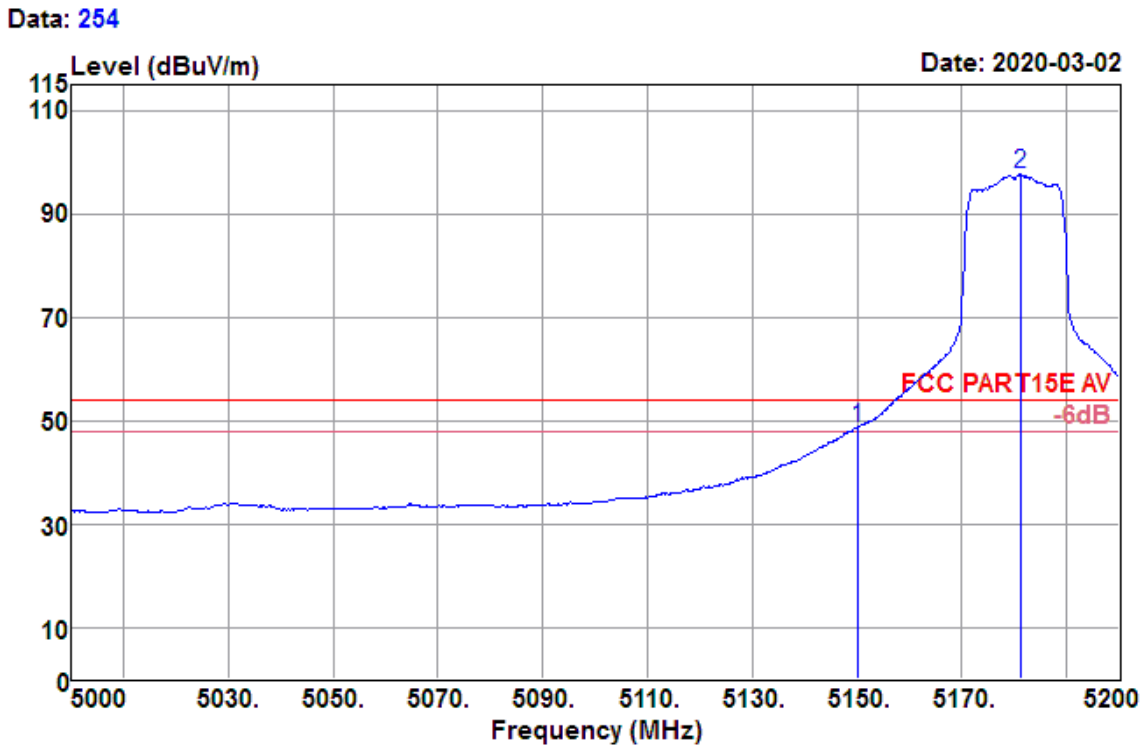
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5239.260	100.02	31.39	5.70	35.58	101.53	54.00	47.53	Average
5350.000	35.51	31.48	5.71	35.43	37.27	54.00	-16.73	Average

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Horizontal



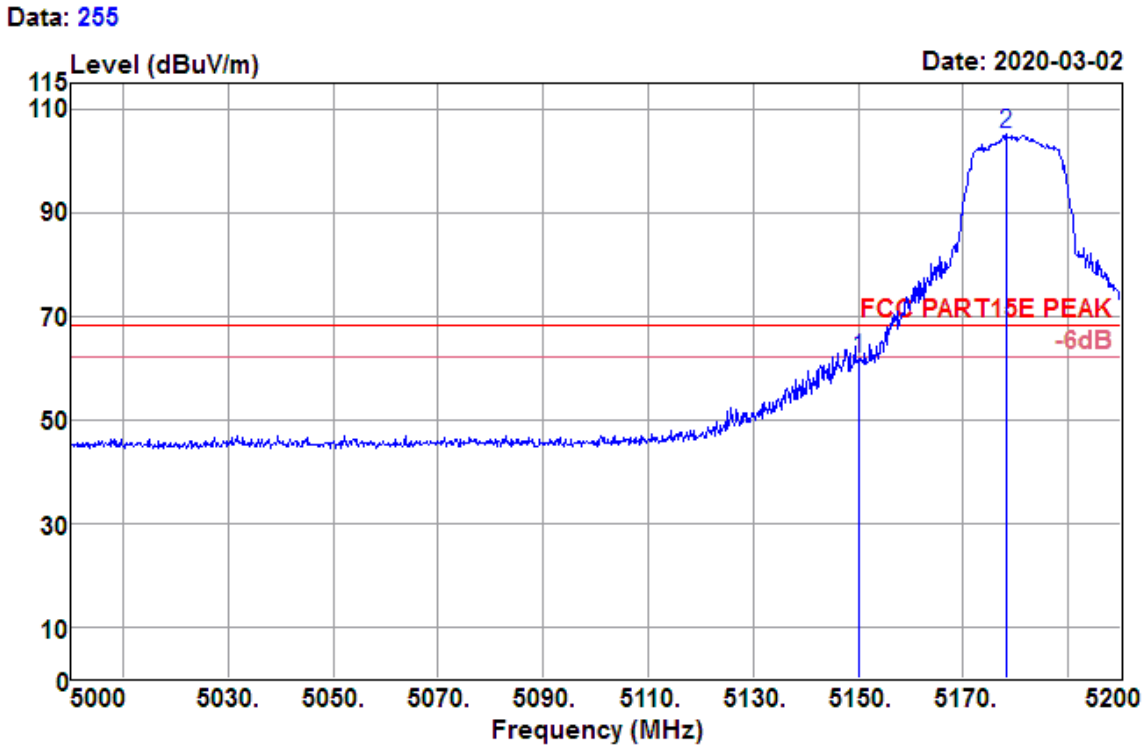
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	63.55	31.32	5.65	35.70	64.82	68.20	-3.38	Peak
5182.000	106.65	31.35	5.68	35.66	108.02	68.20	39.82	Peak

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Horizontal



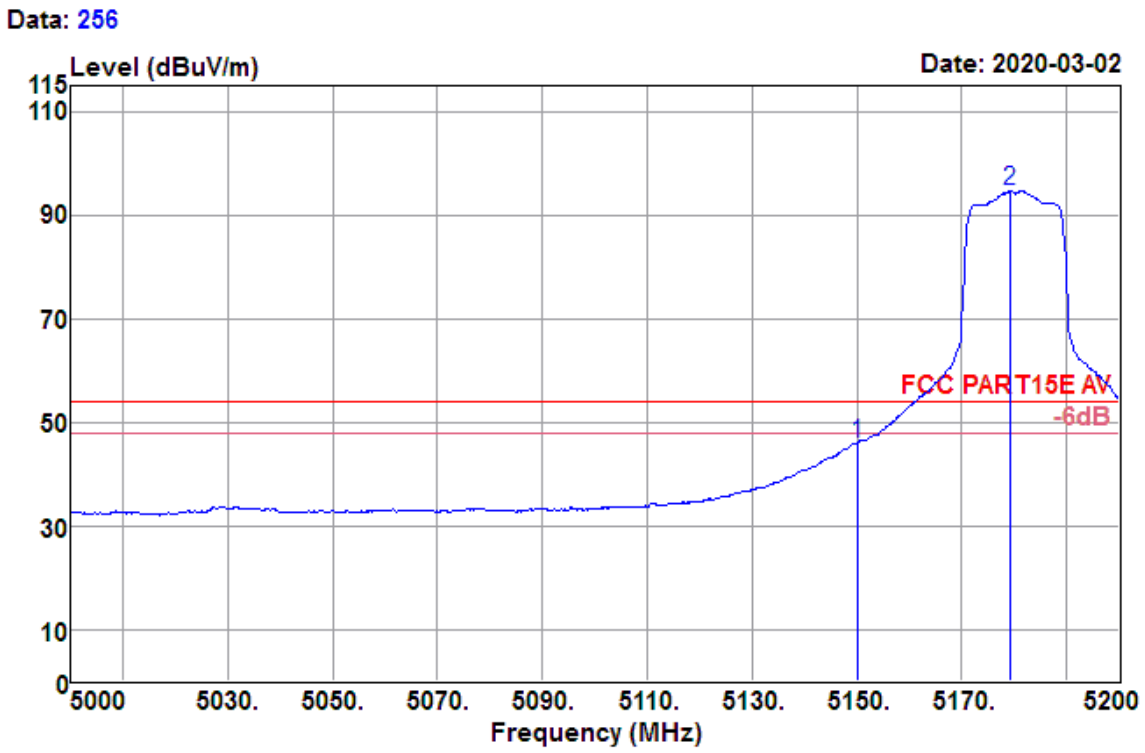
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	47.42	31.32	5.65	35.70	48.69	54.00	-5.31	Average
5181.200	96.20	31.34	5.68	35.66	97.56	54.00	43.56	Average

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Vertical



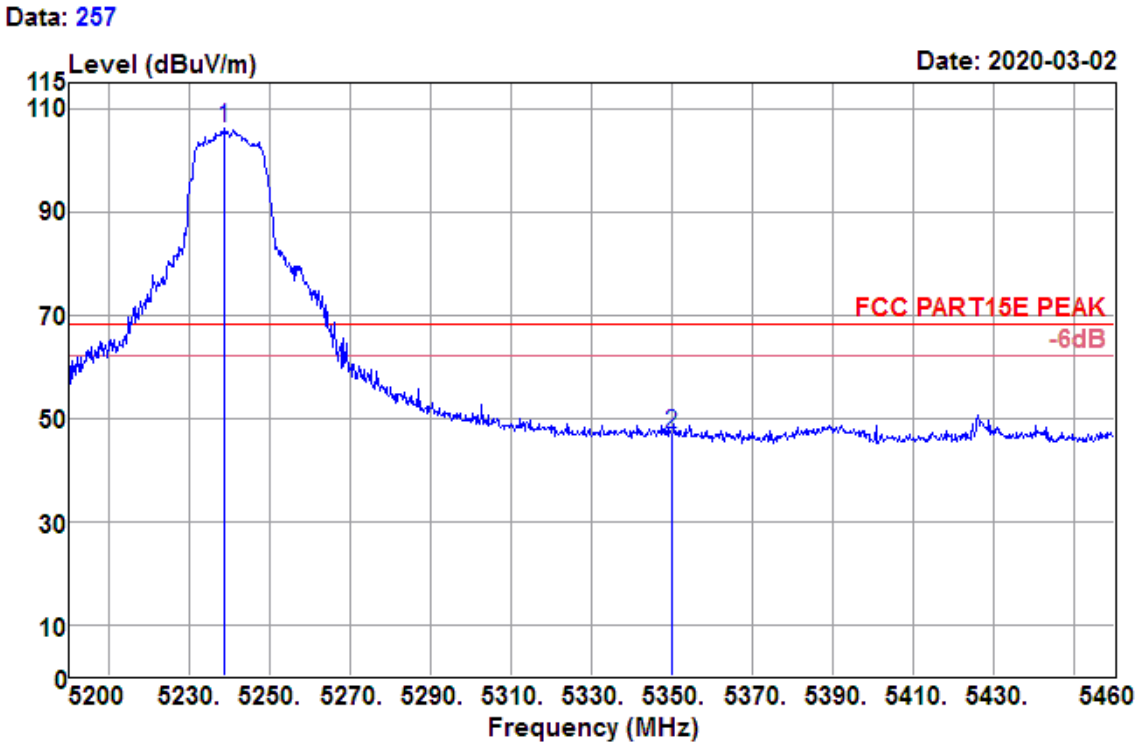
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	60.58	31.32	5.65	35.70	61.85	68.20	-6.35	Peak
5178.400	103.95	31.34	5.68	35.66	105.31	68.20	37.11	Peak

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Vertical



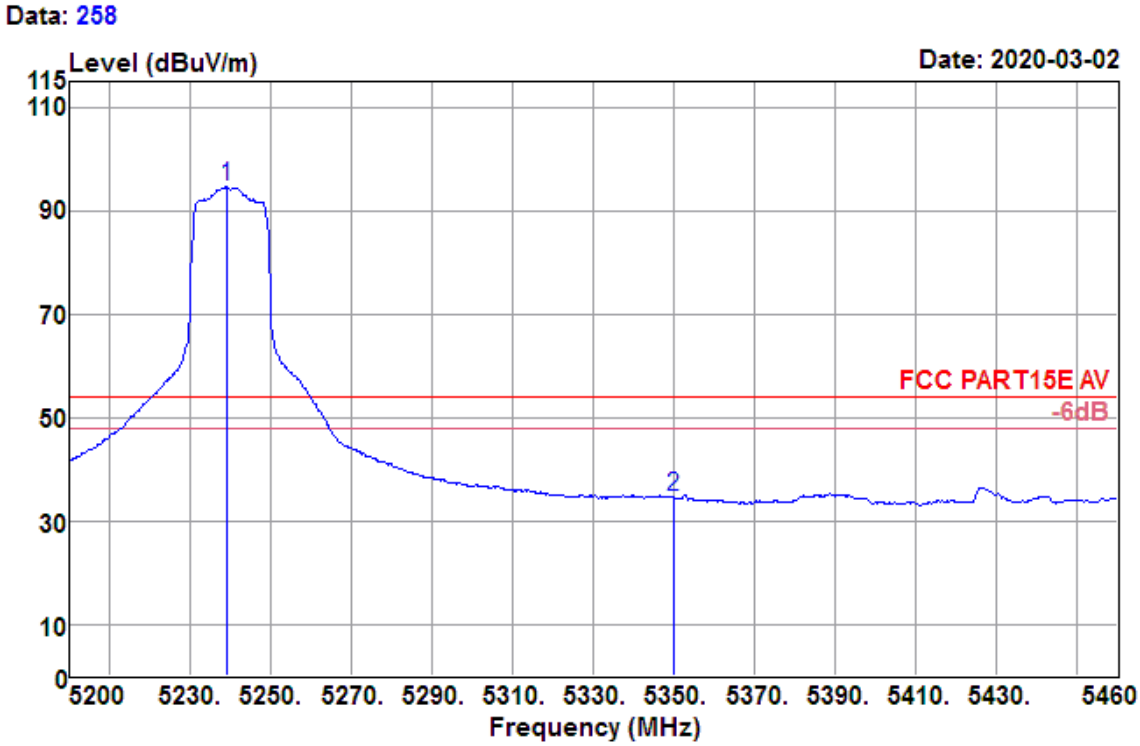
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	44.65	31.32	5.65	35.70	45.92	54.00	-8.08	Average
5179.200	93.40	31.34	5.68	35.66	94.76	54.00	40.76	Average

Test Mode :	802.11n HT20 CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal



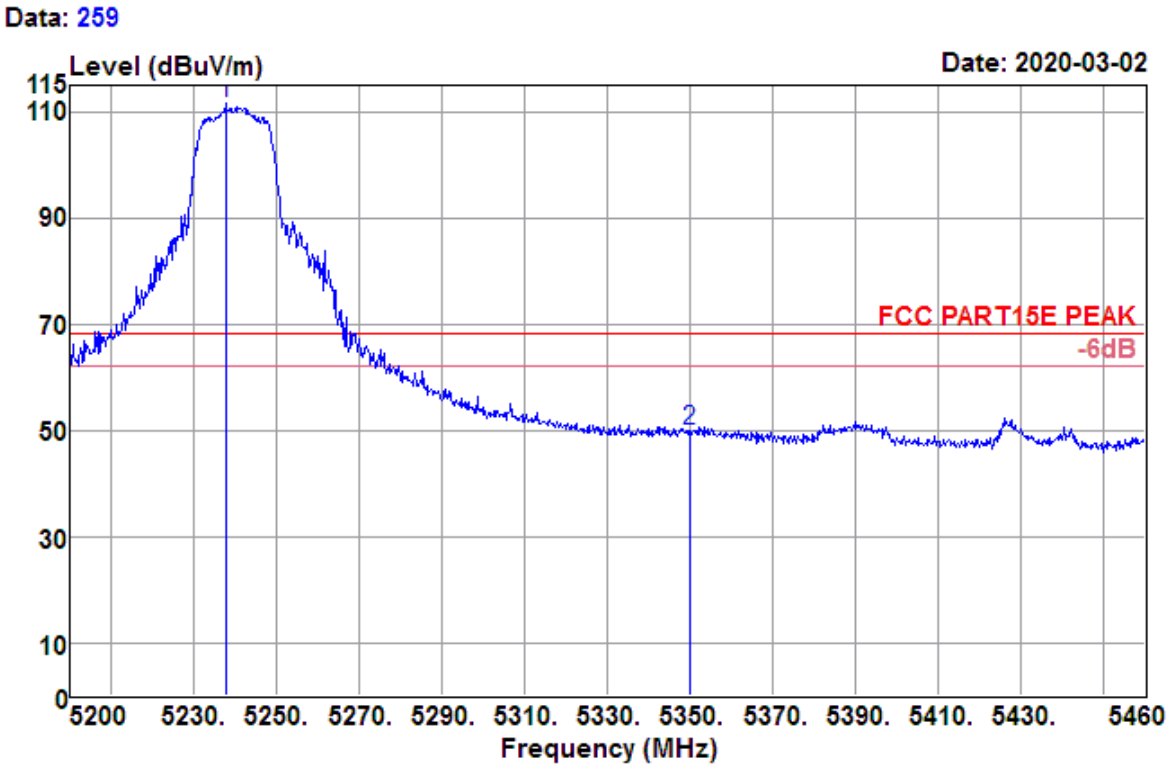
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5238.480	104.80	31.39	5.70	35.58	106.31	68.20	38.11	Peak
5350.000	45.12	31.48	5.71	35.43	46.88	68.20	-21.32	Peak

Test Mode :	802.11n HT20 CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal



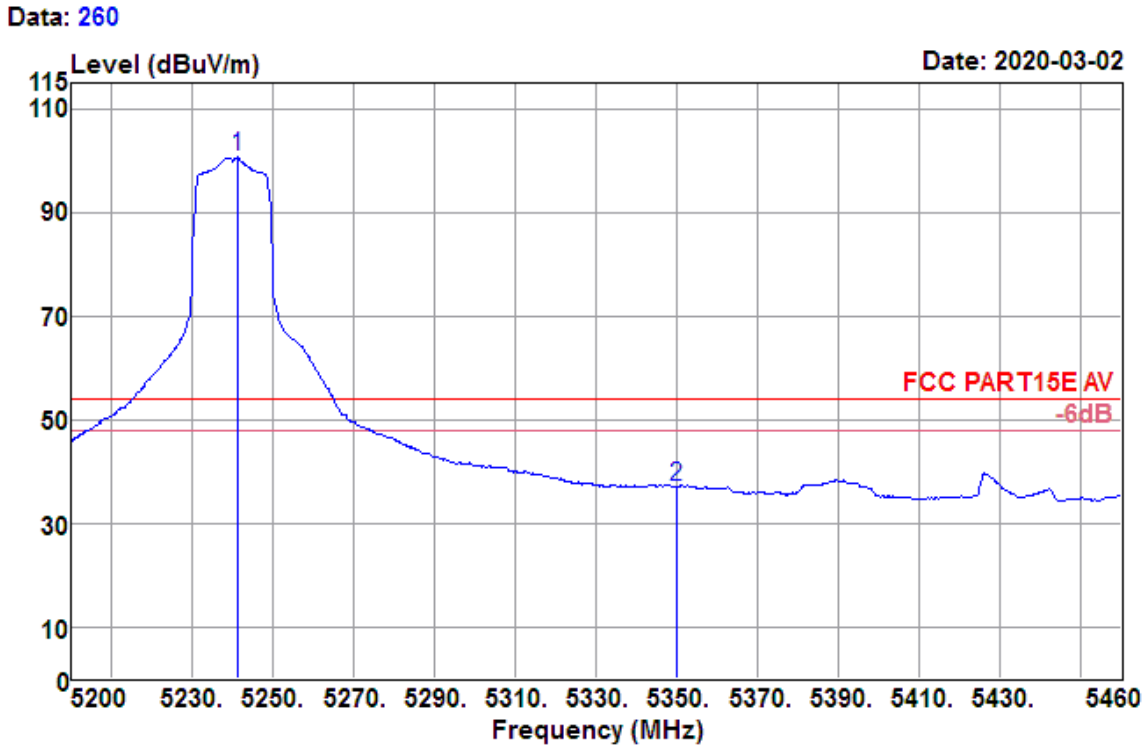
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5239.000	93.26	31.39	5.70	35.58	94.77	54.00	40.77	Average
5350.000	32.86	31.48	5.71	35.43	34.62	54.00	-19.38	Average

Test Mode :	802.11n HT20 CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical



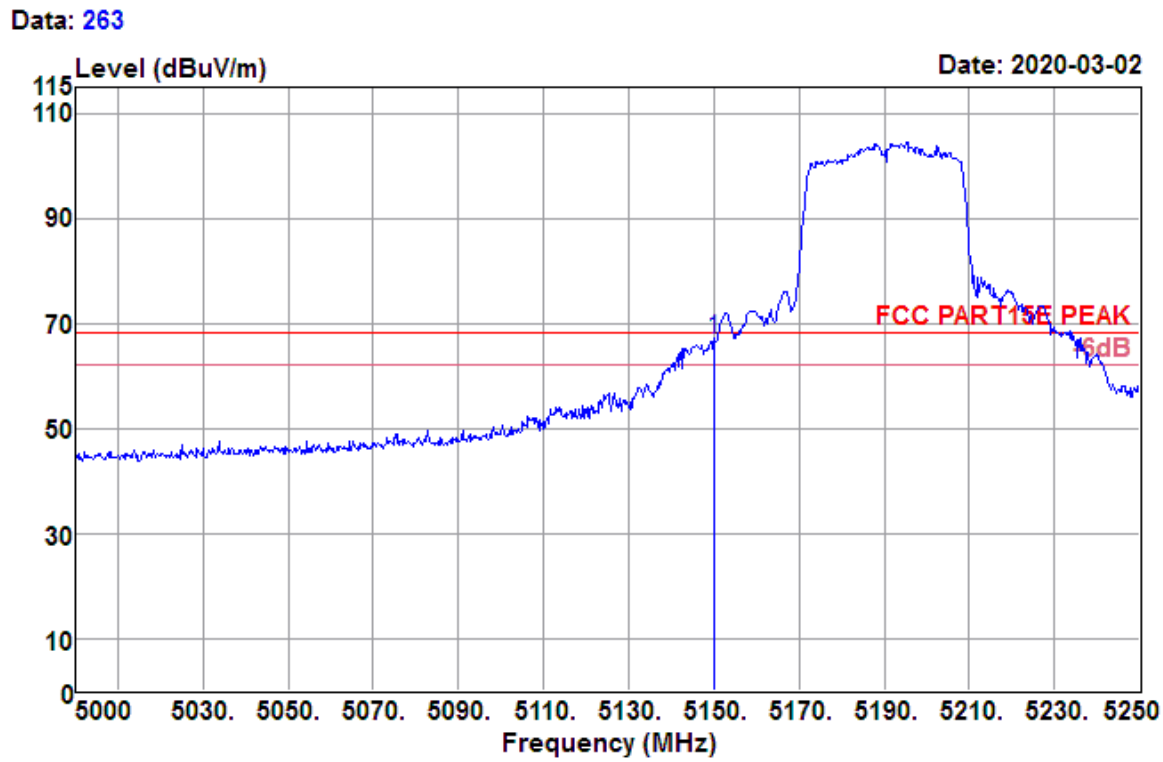
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5237.700	110.11	31.39	5.70	35.58	111.62	68.20	43.42	Peak
5350.000	48.28	31.48	5.71	35.43	50.04	68.20	-18.16	Peak

Test Mode :	802.11n HT20 CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical



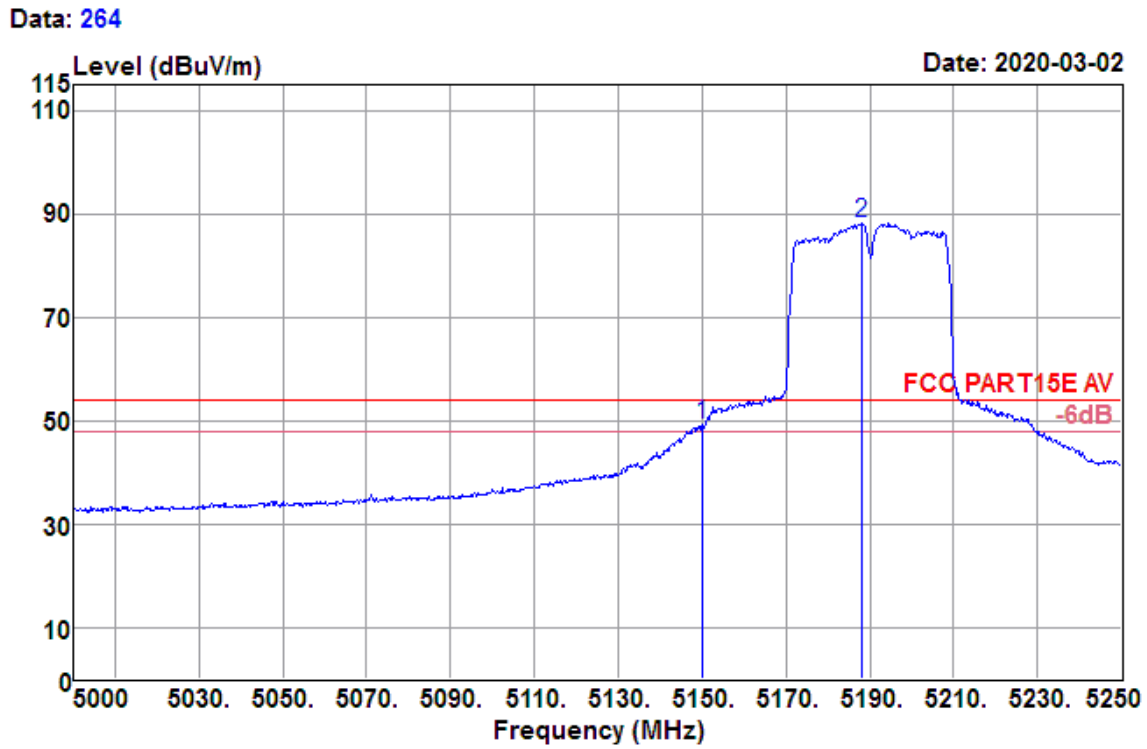
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5241.340	99.21	31.39	5.70	35.58	100.72	54.00	46.72	Average
5350.000	35.28	31.48	5.71	35.43	37.04	54.00	-16.96	Average

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.25GHz	**Polarization :**	Horizontal



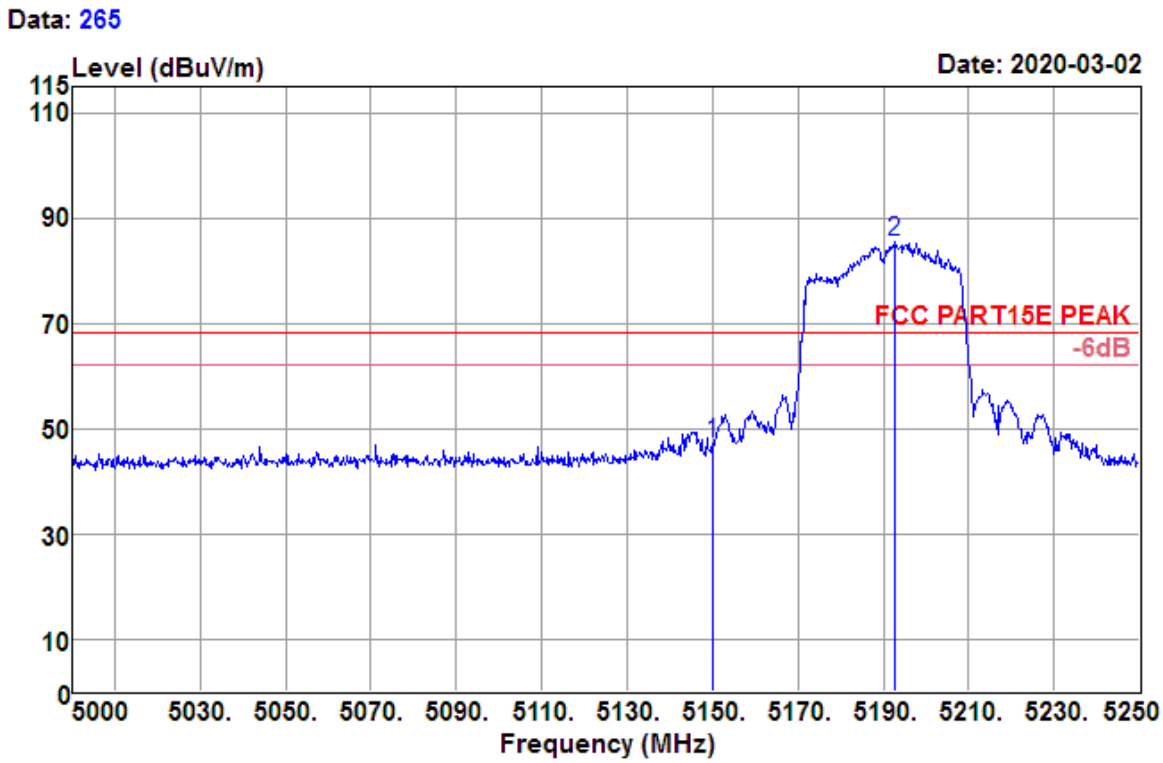
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	65.44	31.32	5.65	35.70	66.71	68.20	-1.49	Peak

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.25GHz	**Polarization :**	Horizontal



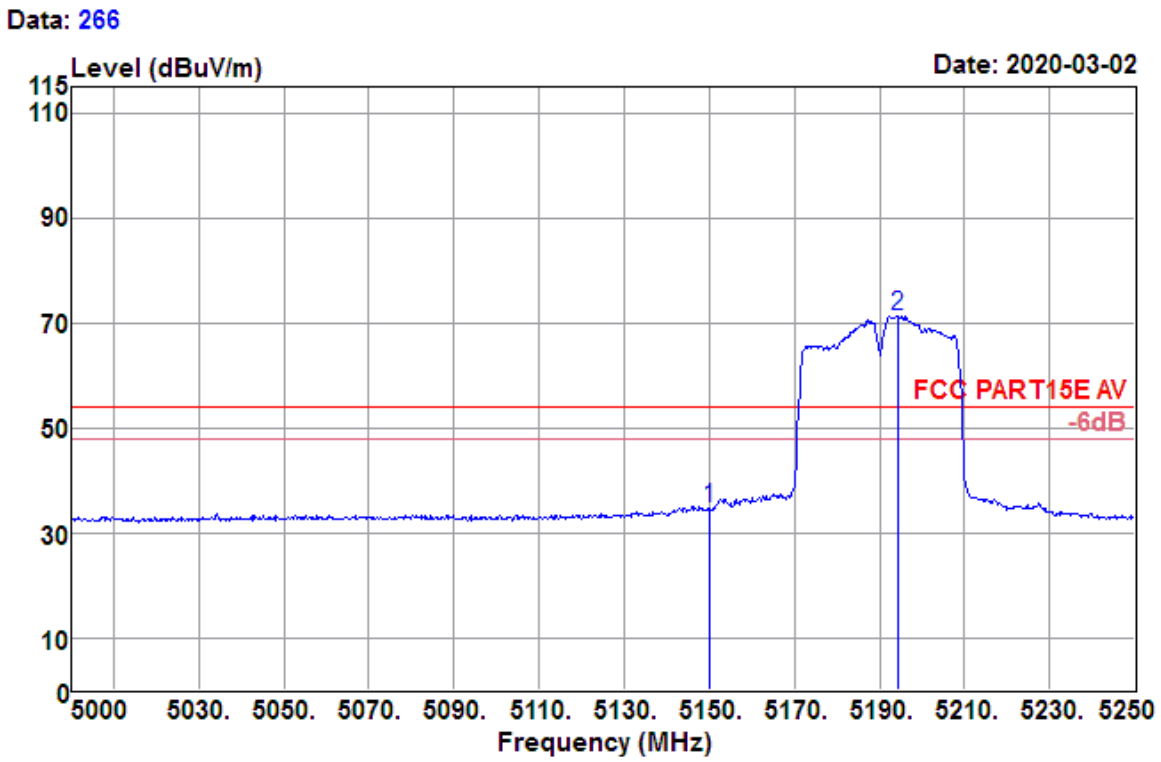
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	47.76	31.32	5.65	35.70	49.03	54.00	-4.97	Average
5188.000	86.94	31.35	5.69	35.65	88.33	54.00	34.33	Average

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.25GHz	**Polarization :**	Vertical



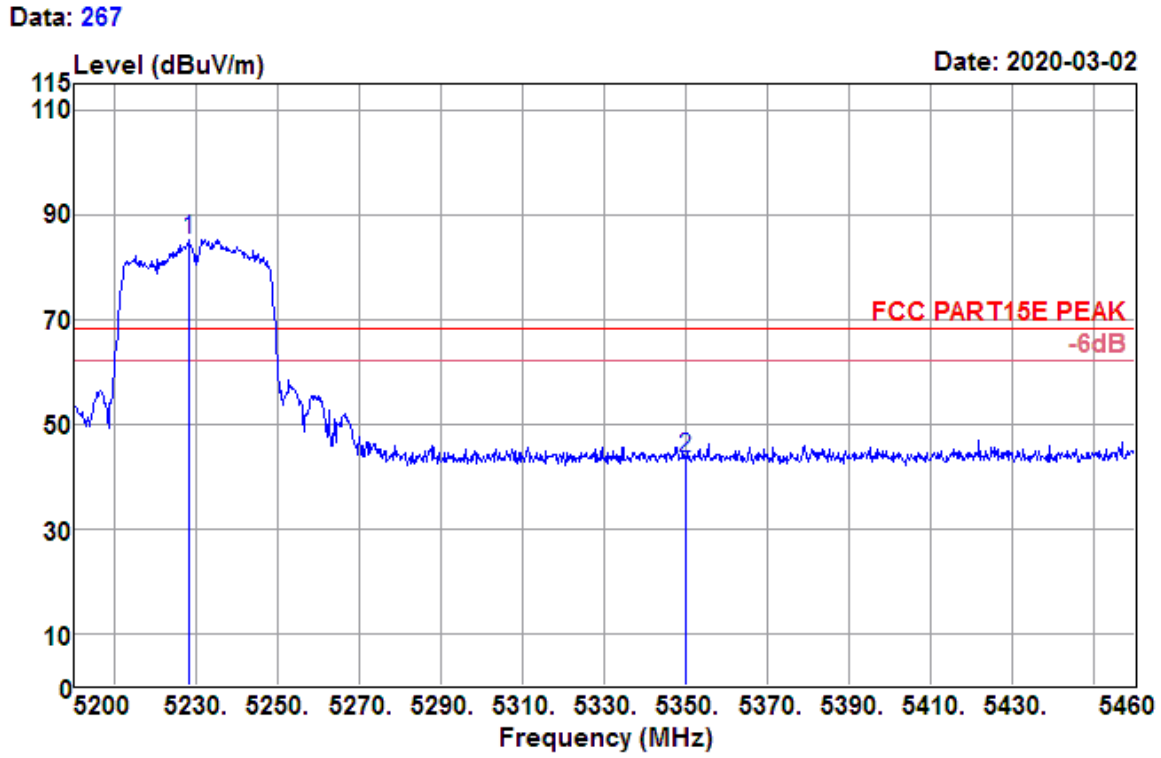
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	45.96	31.32	5.65	35.70	47.23	68.20	-20.97	Peak
5192.750	84.26	31.35	5.69	35.64	85.66	68.20	17.46	Peak

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.25GHz	**Polarization :**	Vertical



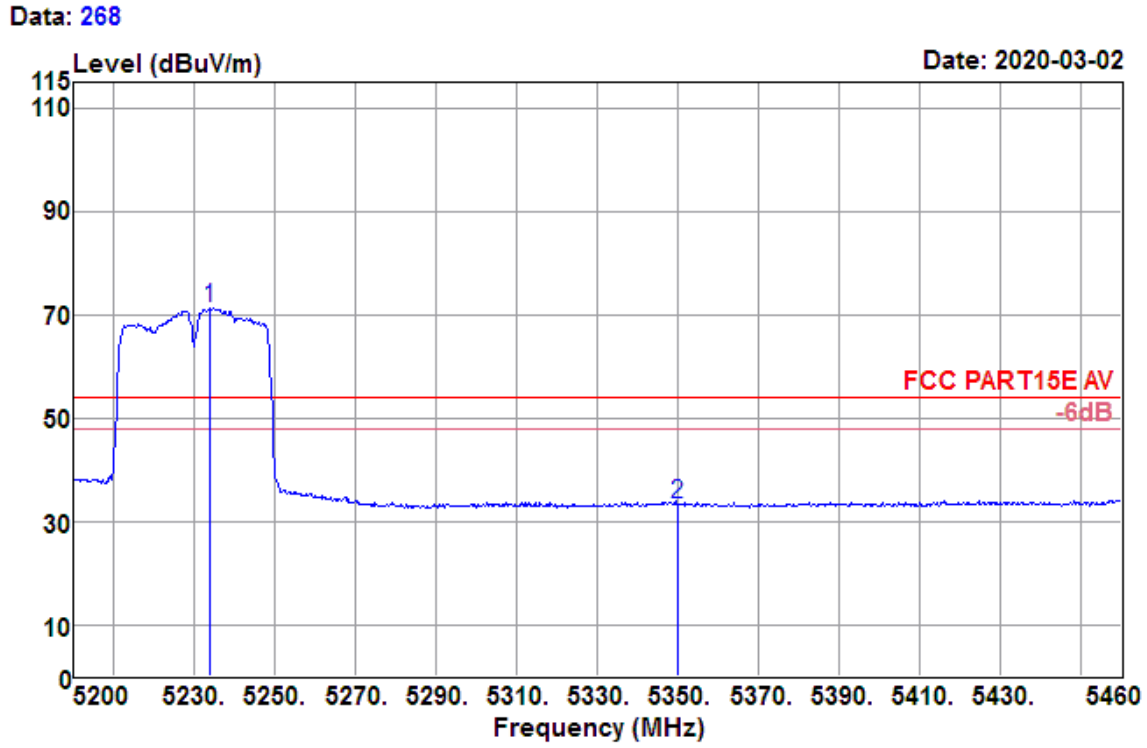
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	33.24	31.32	5.65	35.70	34.51	54.00	-19.49	Average
5194.250	69.94	31.36	5.69	35.64	71.35	54.00	17.35	Average

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal



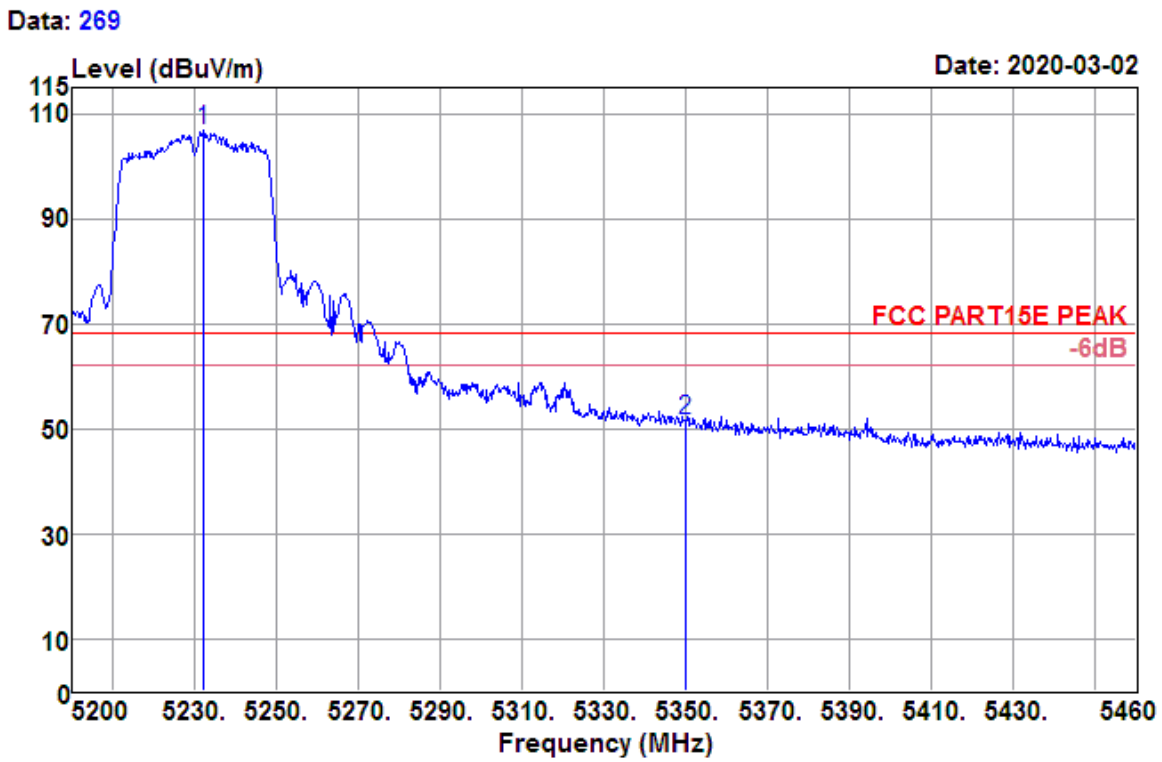
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5228.080	83.70	31.38	5.70	35.60	85.18	68.20	16.98	Peak
5350.000	41.78	31.48	5.71	35.43	43.54	68.20	-24.66	Peak

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal



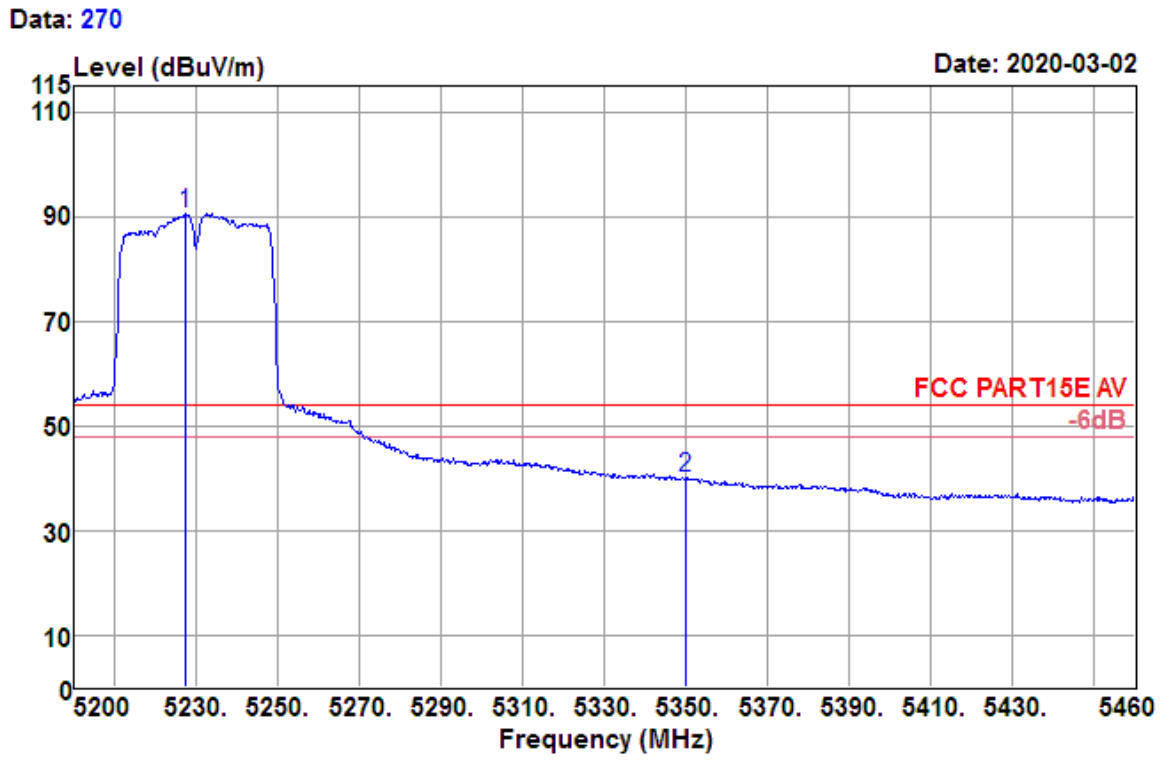
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5233.800	69.85	31.39	5.70	35.59	71.35	54.00	17.35	Average
5350.020	31.43	31.48	5.72	35.43	33.20	54.00	-20.80	Average

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical



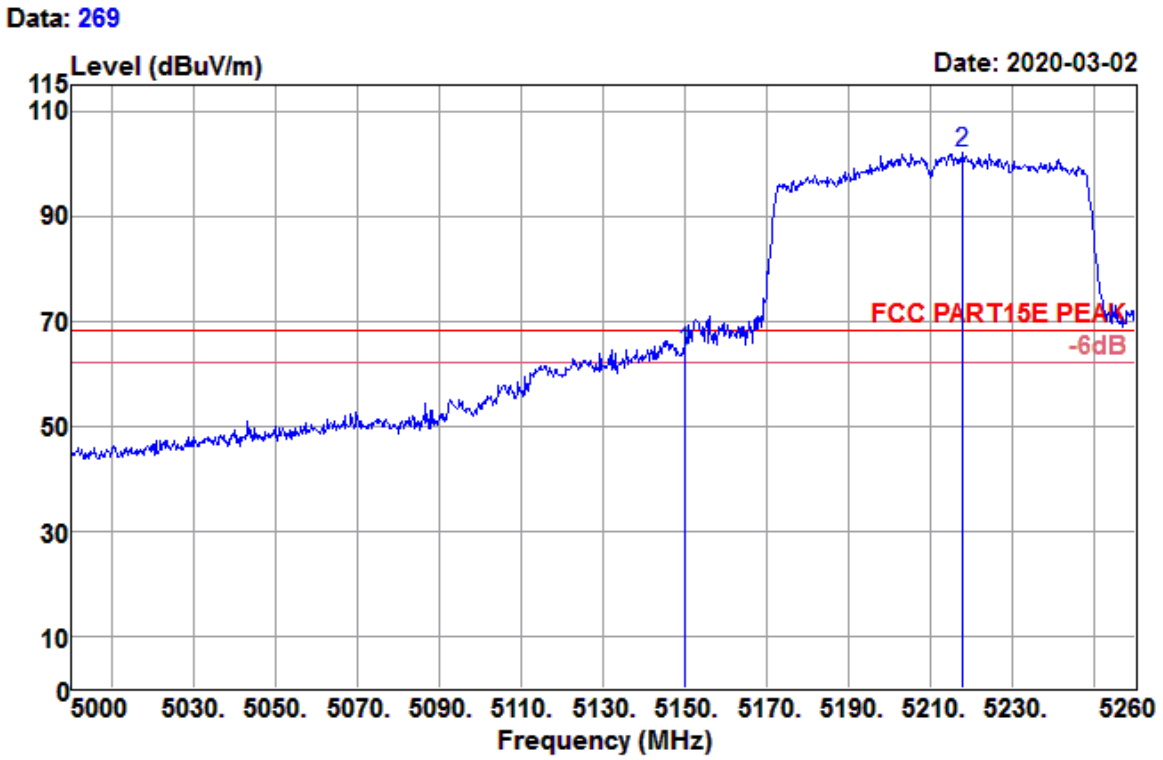
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5231.980	105.30	31.39	5.70	35.59	106.80	68.20	38.60	Peak
5350.000	49.85	31.48	5.71	35.43	51.61	68.20	-16.59	Peak

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical



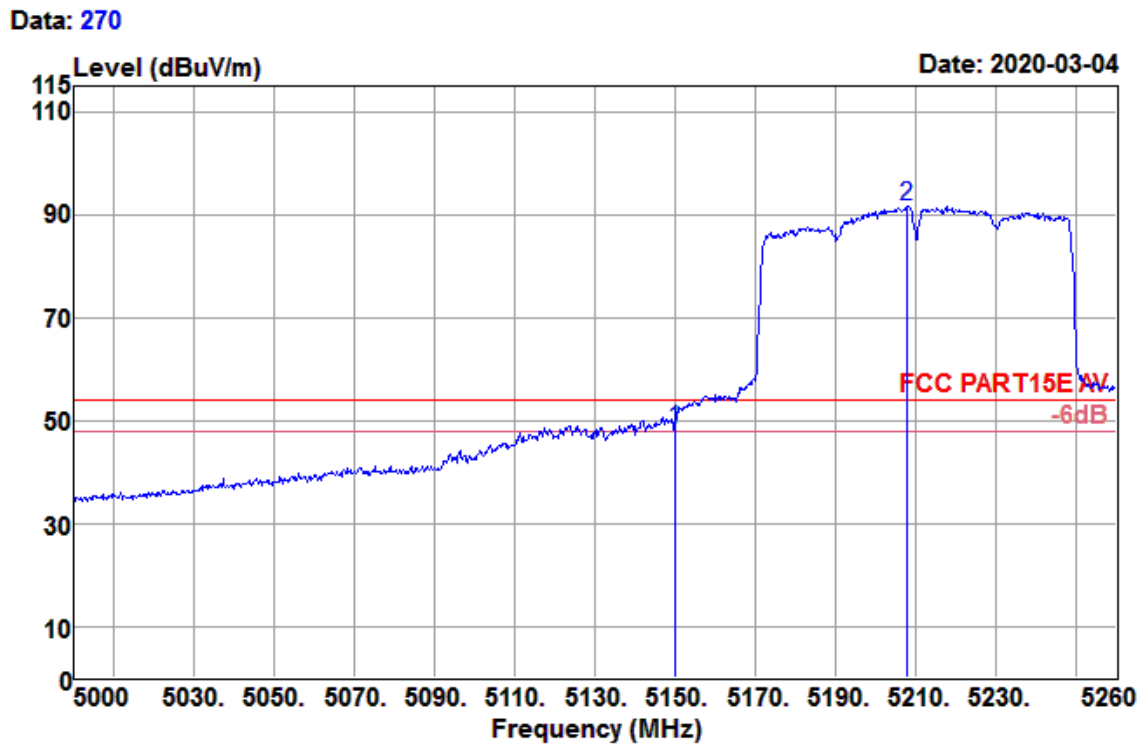
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5227.560	89.00	31.38	5.70	35.60	90.48	54.00	36.48	Average
5350.000	38.33	31.48	5.71	35.43	40.09	54.00	-13.91	Average

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.26GHz	**Polarization :**	Horizontal



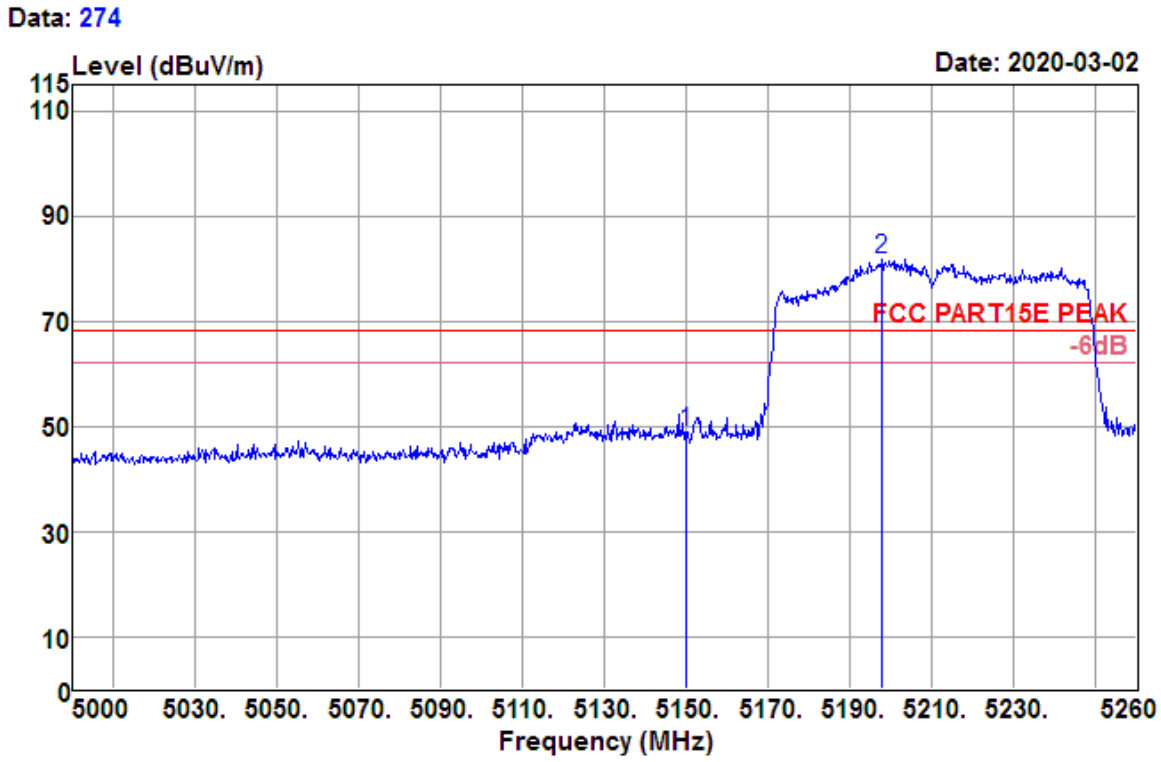
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	63.01	31.32	5.65	35.70	64.28	68.20	-3.92	Peak
5217.880	100.73	31.37	5.70	35.61	102.19	68.20	33.99	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.26GHz	**Polarization :**	Horizontal



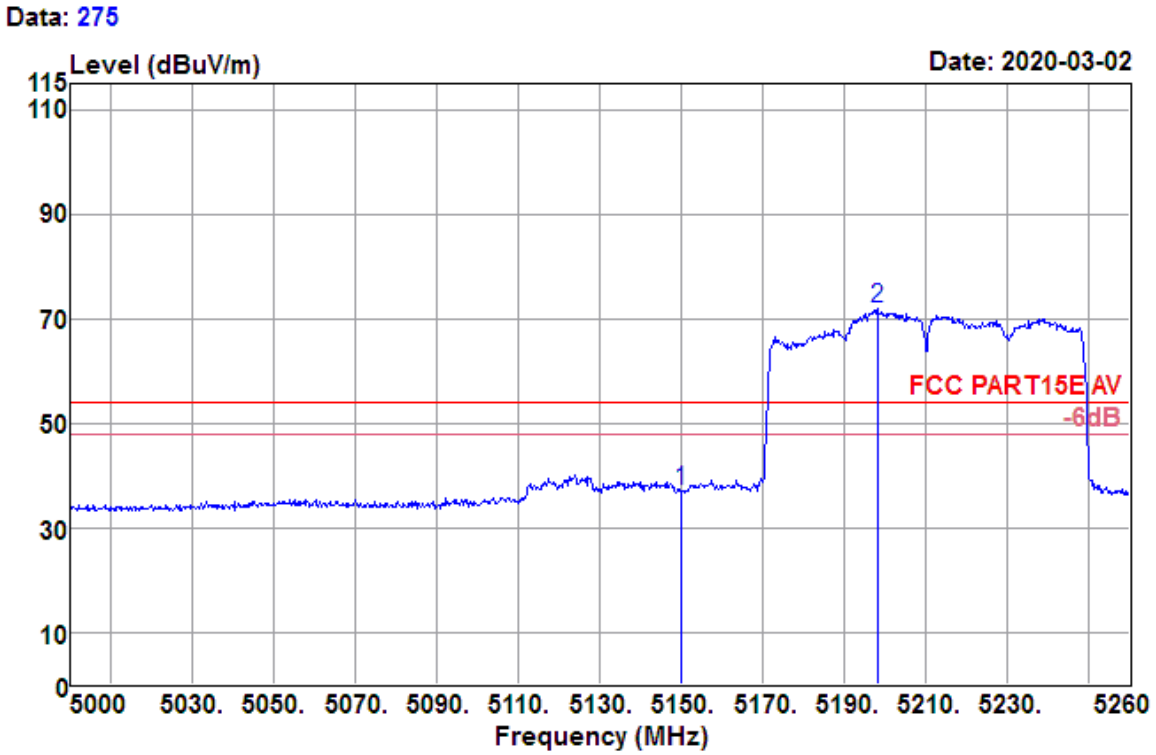
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	46.88	31.32	5.65	35.70	48.15	54.00	-5.85	Average
5207.740	90.22	31.37	5.70	35.62	91.67	54.00	37.67	Average

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.26GHz	**Polarization :**	Vertical



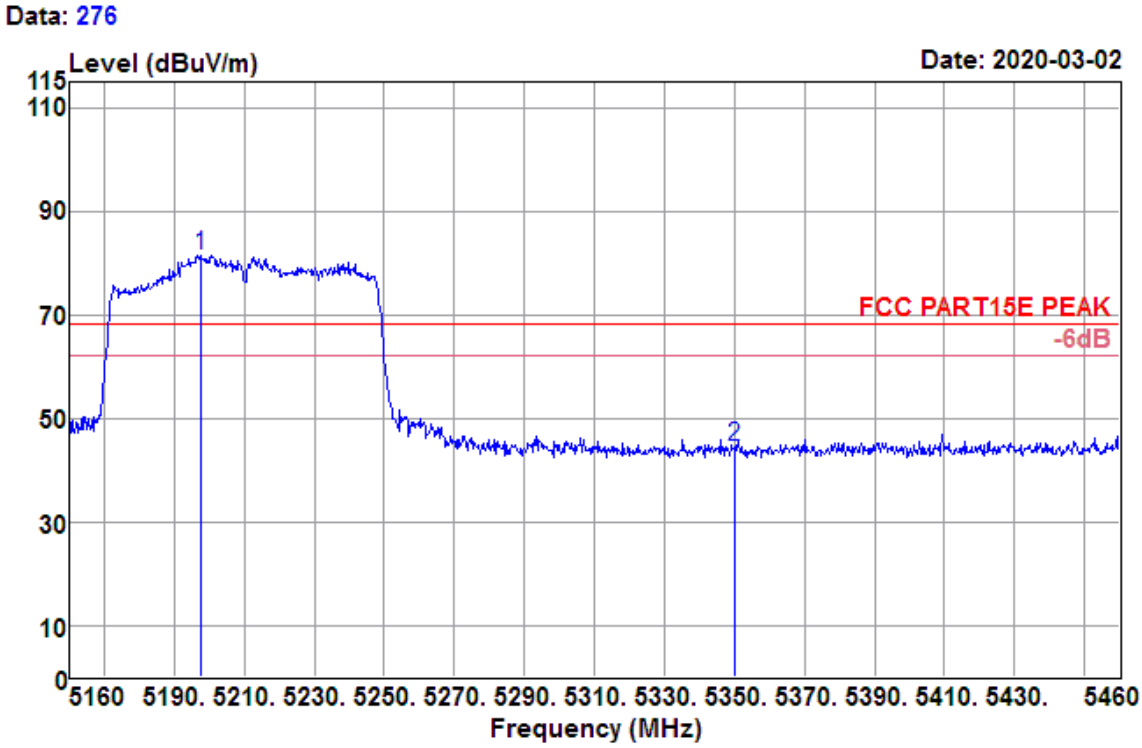
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	47.54	31.32	5.65	35.70	48.81	68.20	-19.39	Peak
5197.860	80.43	31.36	5.70	35.64	81.85	68.20	13.65	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.26GHz	**Polarization :**	Vertical



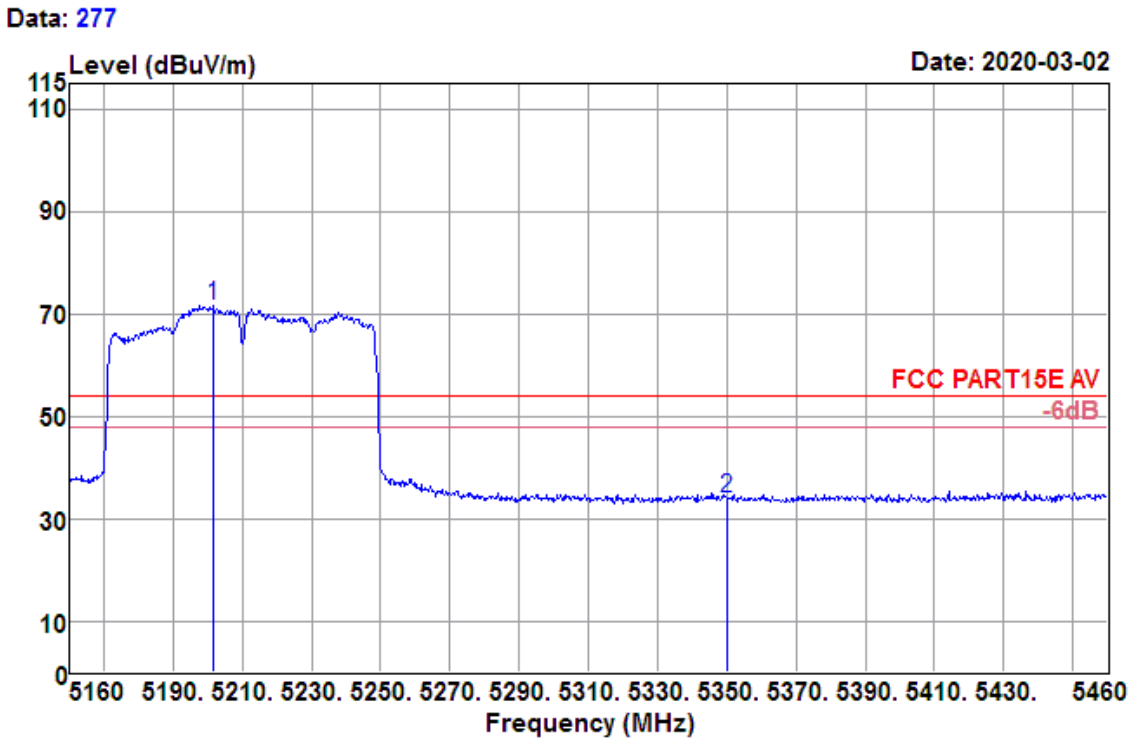
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	35.72	31.32	5.65	35.70	36.99	54.00	-17.01	Average
5198.120	70.54	31.36	5.70	35.64	71.96	54.00	17.96	Average

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.16GHz~5.46GHz	**Polarization :**	Horizontal



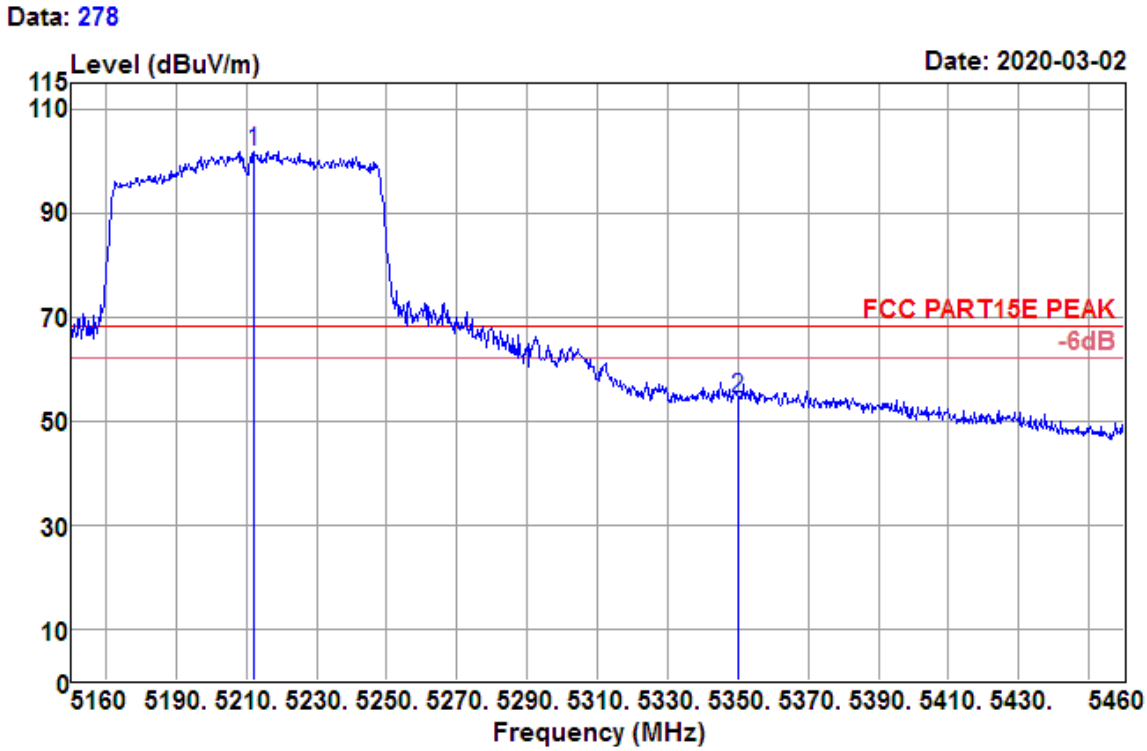
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5197.500	80.10	31.36	5.70	35.64	81.52	68.20	13.32	Peak
5350.000	42.58	31.48	5.71	35.43	44.34	68.20	-23.86	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.16GHz~5.46GHz	**Polarization :**	Horizontal



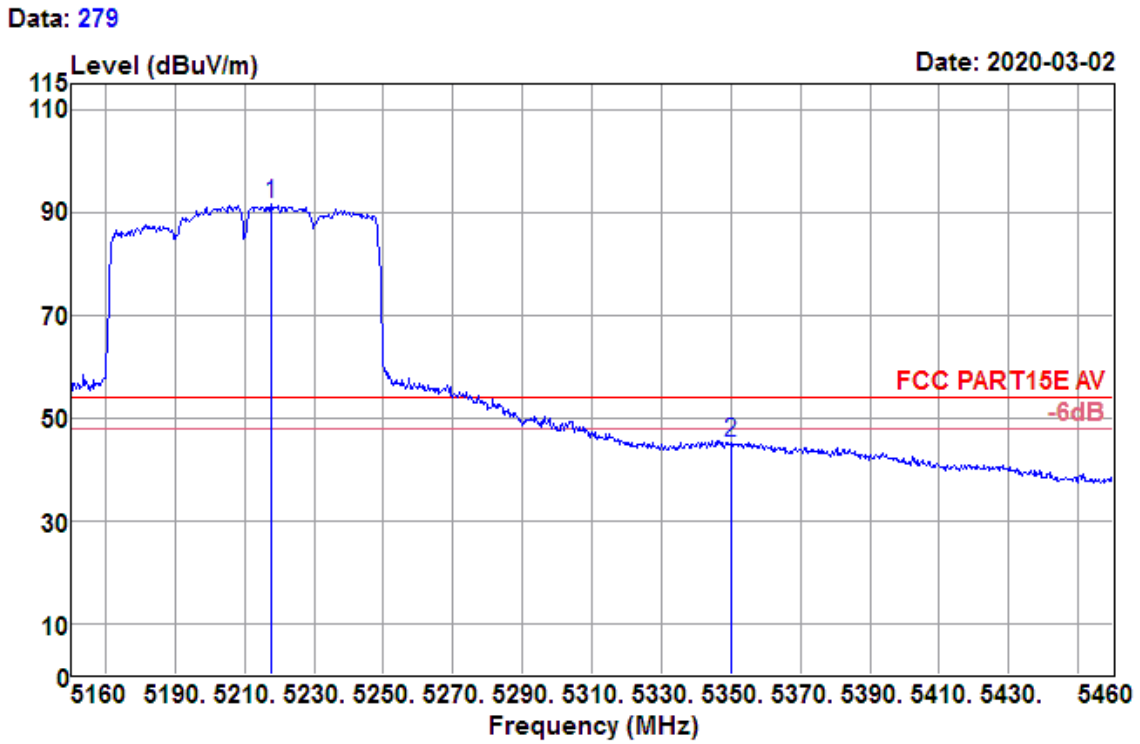
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5201.700	70.24	31.36	5.70	35.63	71.67	54.00	17.67	Average
5350.000	32.05	31.48	5.71	35.43	33.81	54.00	-20.19	Average

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.16GHz~5.46GHz	**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
5212.200	100.46	31.37	5.70	35.62	101.91	68.20	33.71	Peak
5350.000	52.49	31.48	5.71	35.43	54.25	68.20	-13.95	Peak

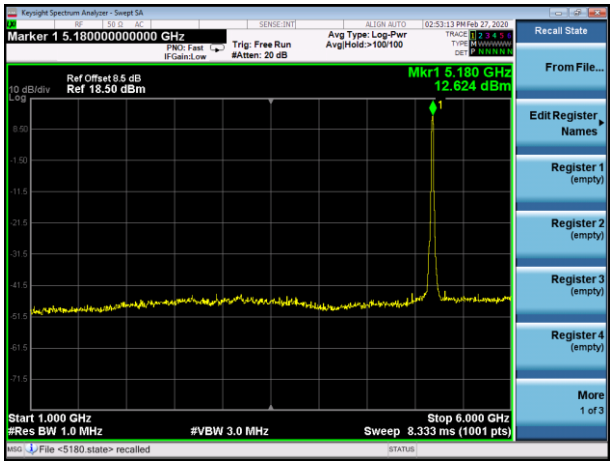
Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.16GHz~5.46GHz	**Polarization :**	Vertical

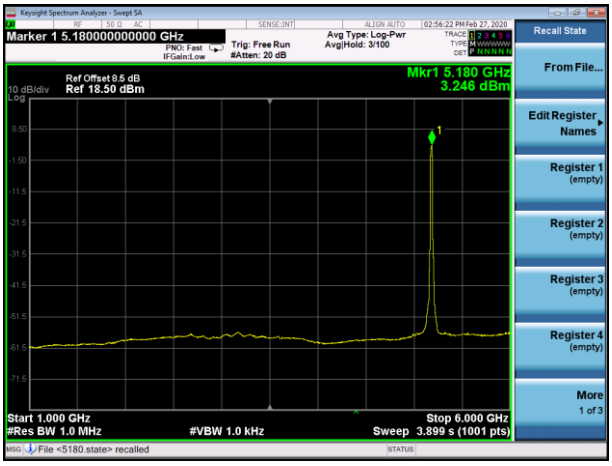


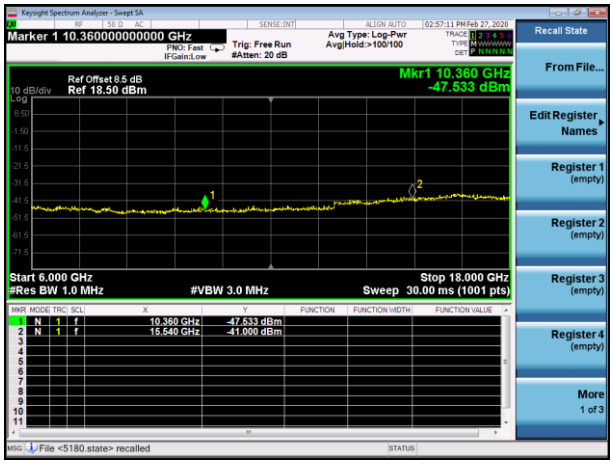
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5217.900	90.08	31.37	5.70	35.61	91.54	54.00	37.54	Average
5350.000	43.31	31.48	5.71	35.43	45.07	54.00	-8.93	Average

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

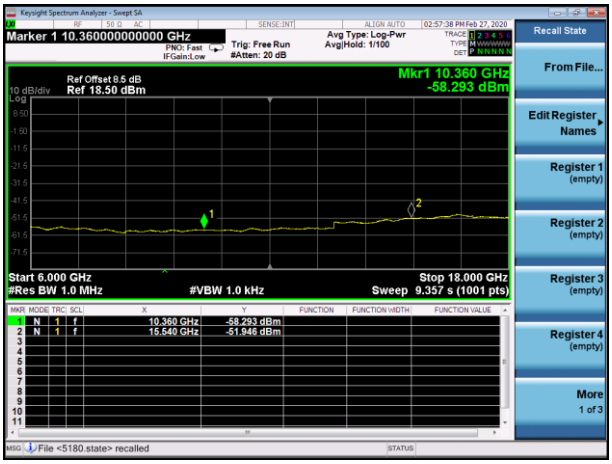
Test Mode:		802.11a		Test channel:		5180MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10360	-47.53	2	-45.53	49.72	68.2	-18.48	Peak
15540	-41.00	2	-39.00	56.26	68.2	-11.94	Peak
10360	-58.29	2	-56.29	38.96	54	-15.04	Average
15540	-51.95	2	-49.95	45.31	54	-8.69	Average





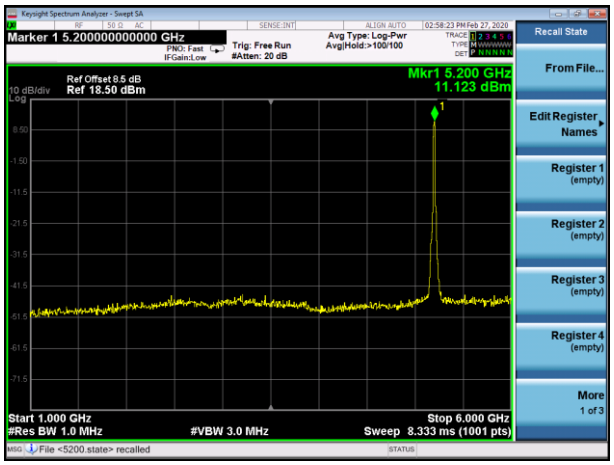


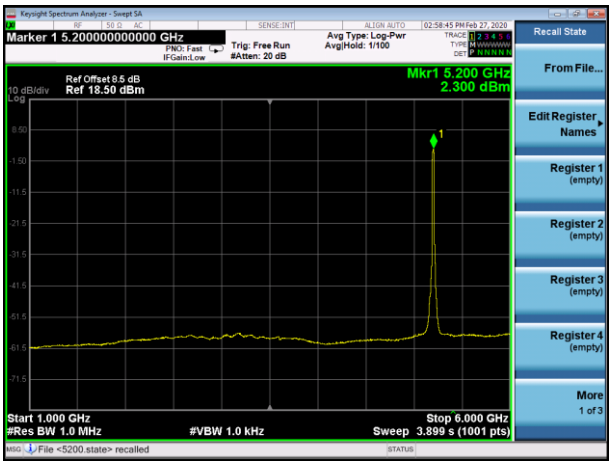
Peak



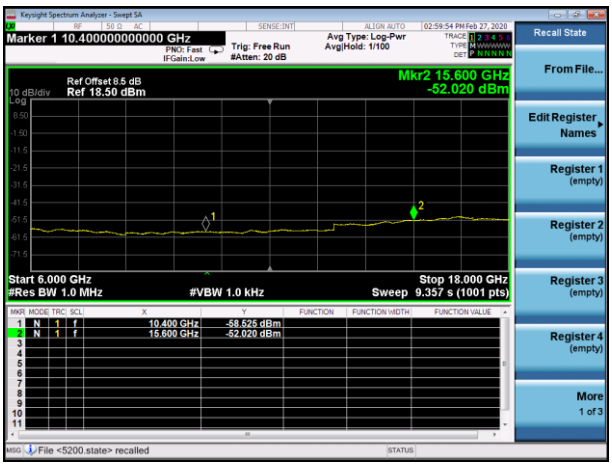
Average

Test Mode:		802.11a		Test channel:		5200MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10400	-46.89	2.00	-44.89	50.36	68.20	-17.84	Peak
15600	-40.14	2.00	-38.14	57.12	68.20	-11.08	Peak
10400	-58.53	2.00	-56.53	38.73	54.00	-15.27	Average
15600	-52.02	2.00	-50.02	45.24	54.00	-8.76	Average



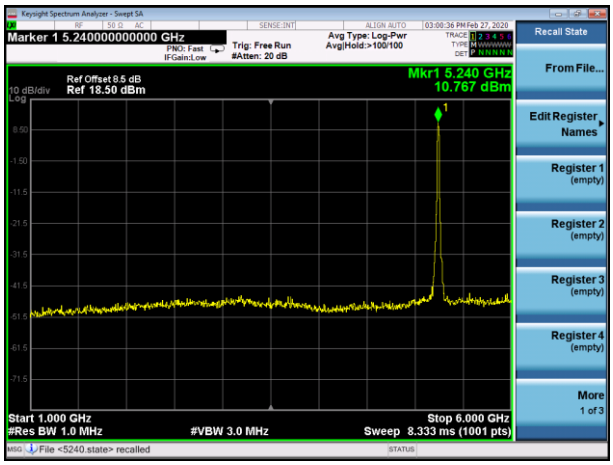


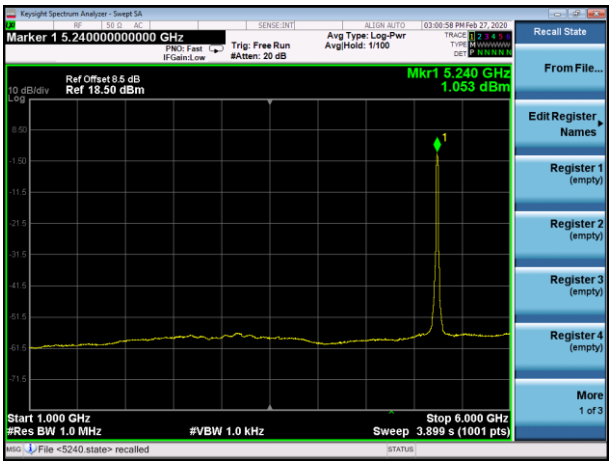
Peak



Average

Test Mode:		802.11a		Test channel:		5240MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10480	-47.66	2.00	-45.66	49.60	68.20	-18.60	Peak
15720	-40.86	2.00	-38.86	56.40	68.20	-11.80	Peak
10480	-58.46	2.00	-56.46	38.80	54.00	-15.20	Average
15720	-51.82	2.00	-49.82	45.44	54.00	-8.56	Average





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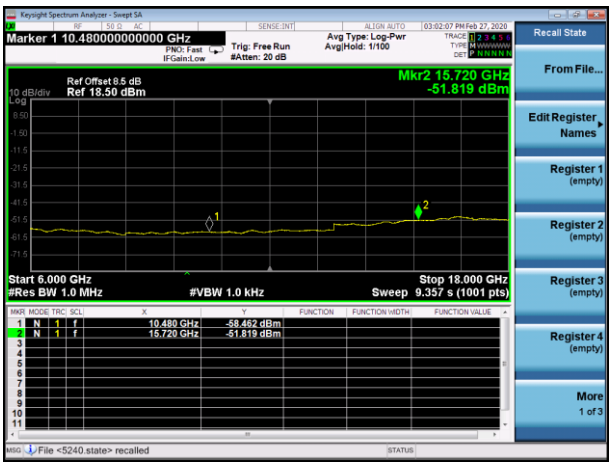
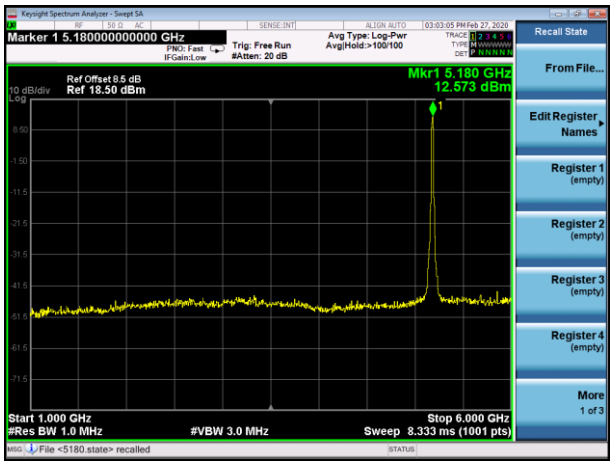
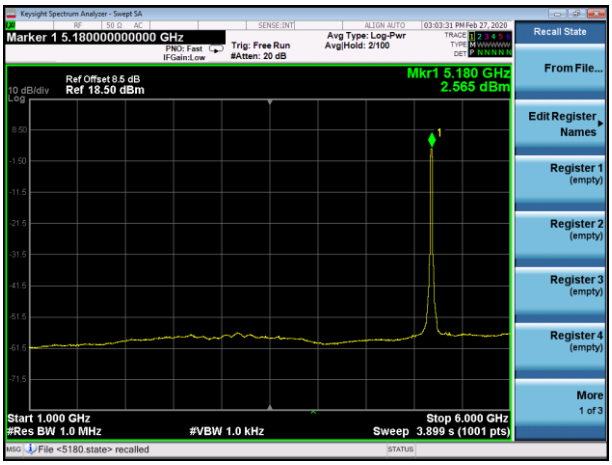
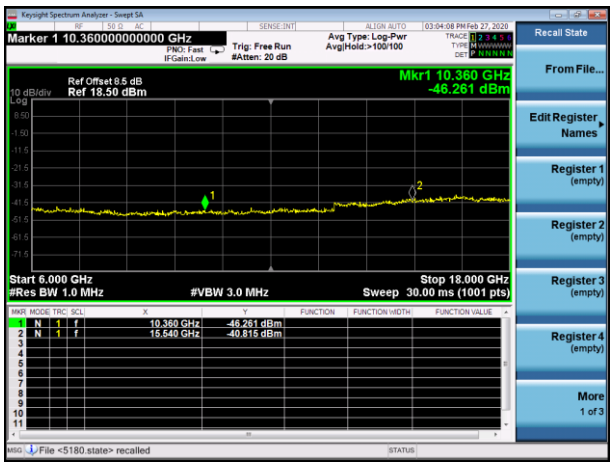


Average

Test Mode:		802.11n HT20		Test channel:		5180MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10360	-46.26	2.00	-44.26	51.00	68.20	-17.20	Peak
15540	-40.82	2.00	-38.82	56.44	68.20	-11.76	Peak
10360	-58.42	2.00	-56.42	38.84	54.00	-15.16	Average
15540	-52.07	2.00	-50.07	45.18	54.00	-8.82	Average







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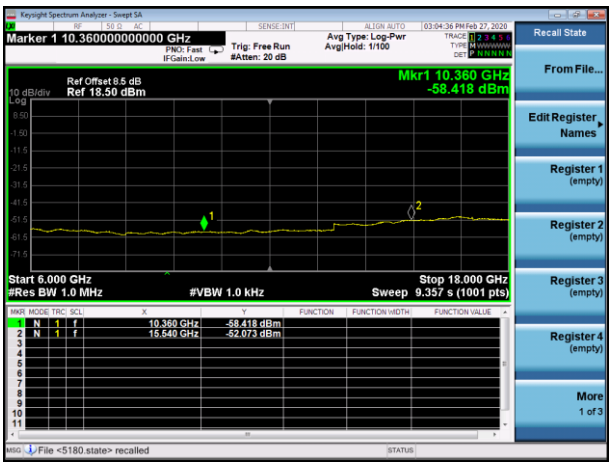
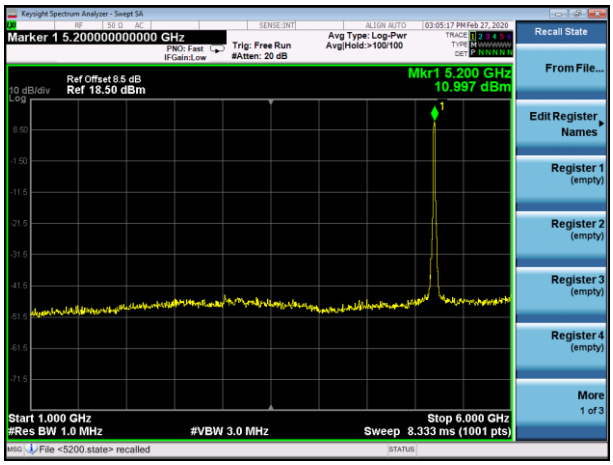
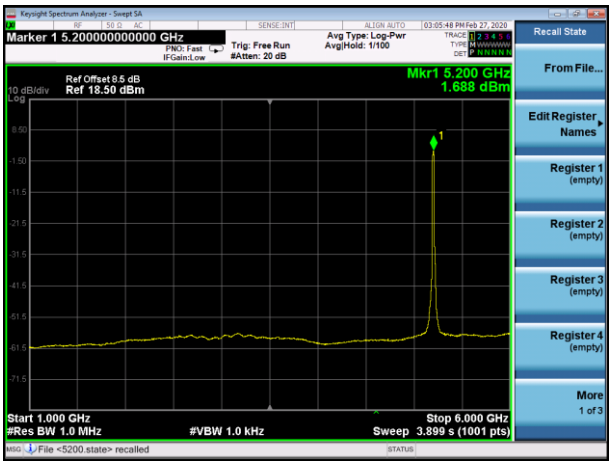
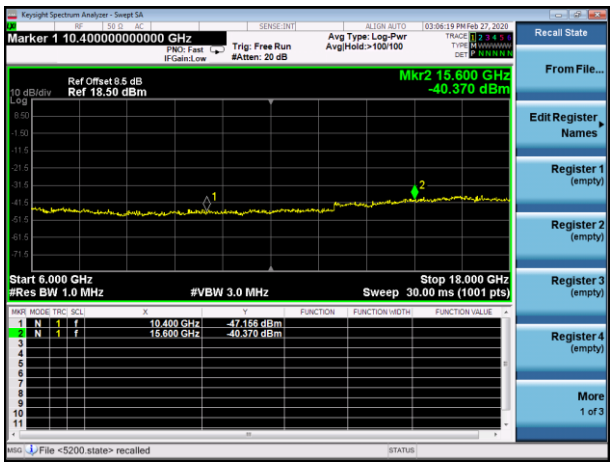


Average

Test Mode:		802.11n HT20		Test channel:		5200MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10400	-47.16	2.00	-45.16	50.10	68.20	-18.10	Peak
15600	-40.37	2.00	-38.37	56.89	68.20	-11.31	Peak
10400	-58.60	2.00	-56.60	38.65	54.00	-15.35	Average
15600	-51.86	2.00	-49.86	45.40	54.00	-8.60	Average







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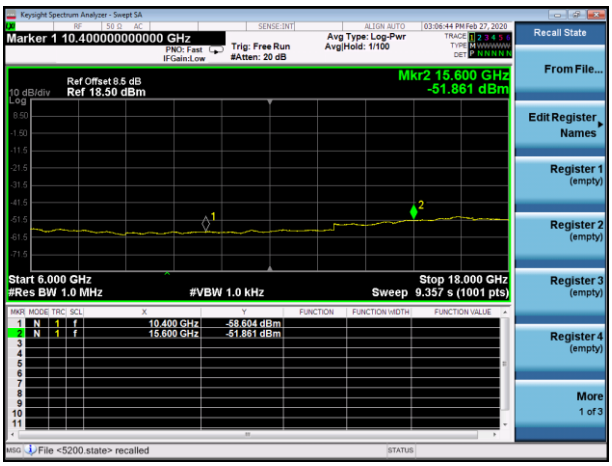
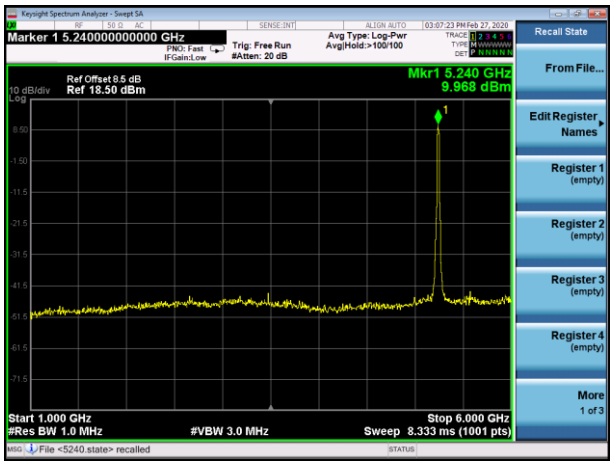
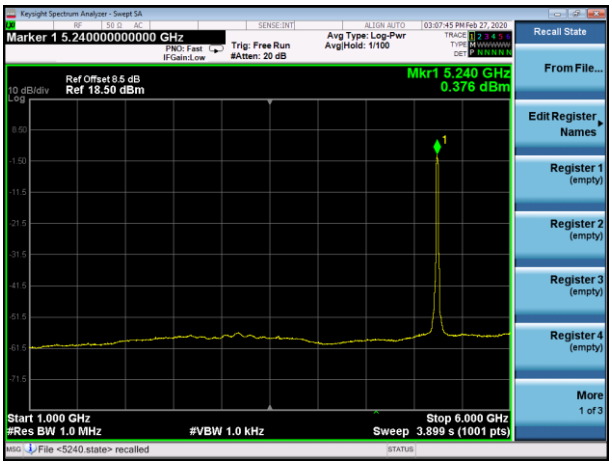


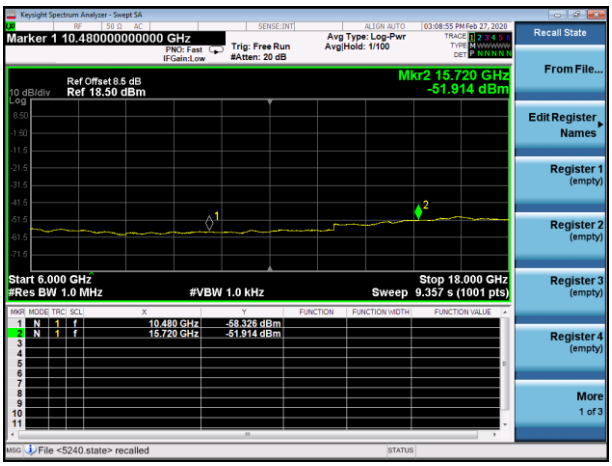
Average

Test Mode:		802.11n HT20		Test channel:		5240MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10480	-46.56	2.00	-44.56	50.69	68.20	-17.51	Peak
15720	-38.81	2.00	-36.81	58.44	68.20	-9.76	Peak
10480	-58.33	2.00	-56.33	38.93	54.00	-15.07	Average
15720	-51.91	2.00	-49.91	45.34	54.00	-8.66	Average



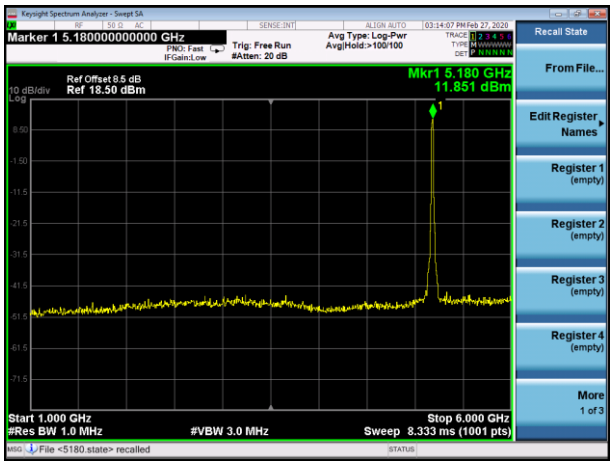


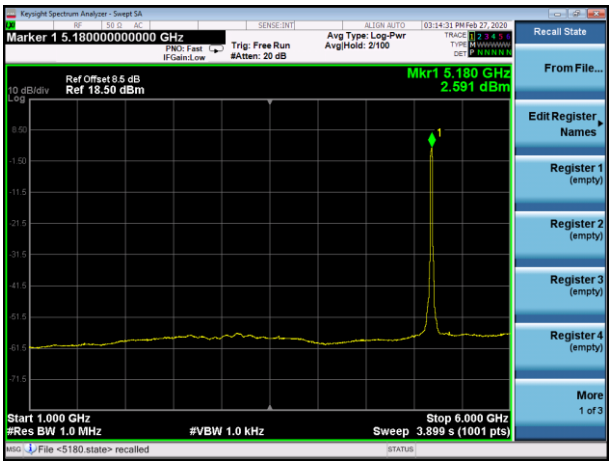
Peak



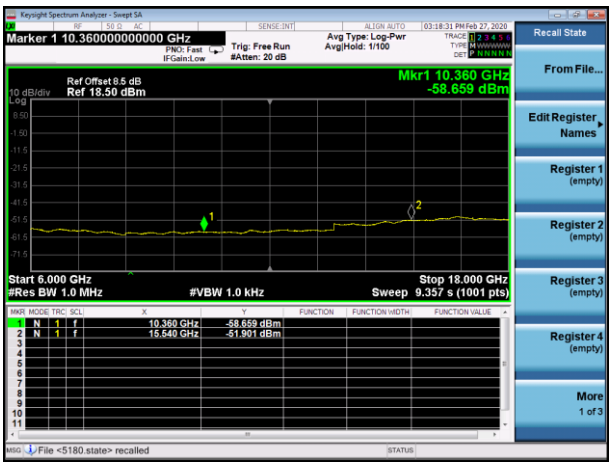
Average

Test Mode:		802.11ac HT20		Test channel:		5180MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10360	-47.50	2.00	-45.50	49.76	68.20	-18.44	Peak
15540	-41.07	2.00	-39.07	56.19	68.20	-12.01	Peak
10360	-58.66	2.00	-56.66	38.60	54.00	-15.40	Average
15540	-51.90	2.00	-49.90	45.36	54.00	-8.64	Average



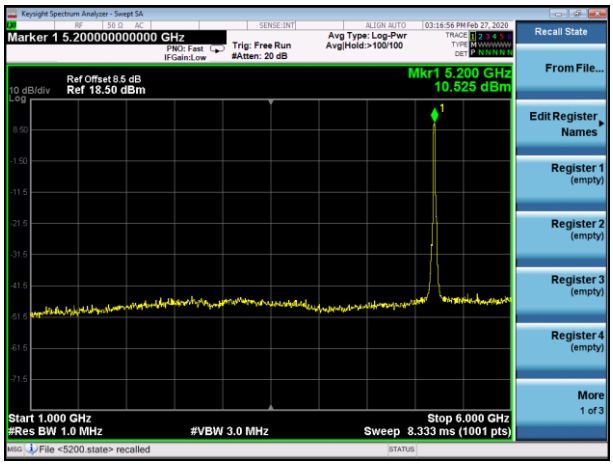


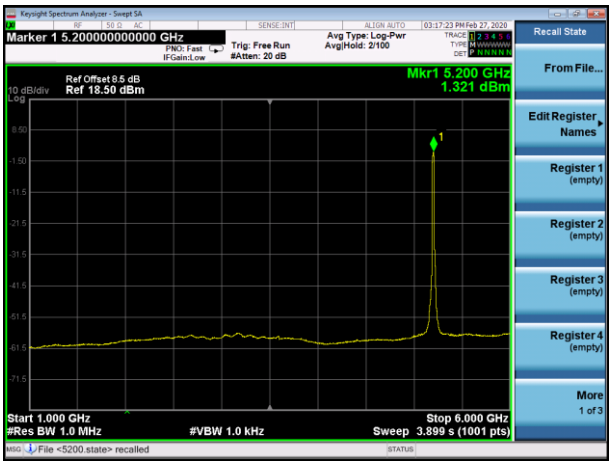
Peak



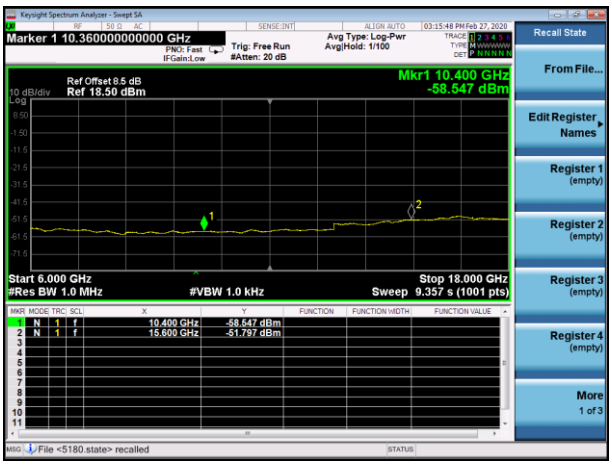
Average

Test Mode:		802.11ac HT20		Test channel:		5200MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10400	-47.99	2.00	-45.99	49.27	68.20	-18.93	Peak
15600	-40.11	2.00	-38.11	57.15	68.20	-11.05	Peak
10400	-58.55	2.00	-56.55	38.71	54.00	-15.29	Average
15600	-51.80	2.00	-49.80	45.46	54.00	-8.54	Average



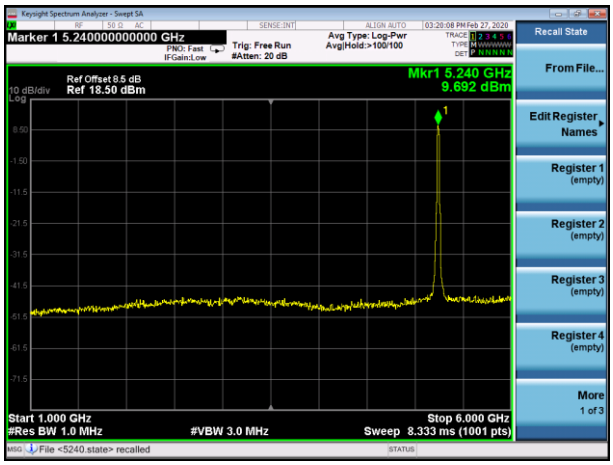


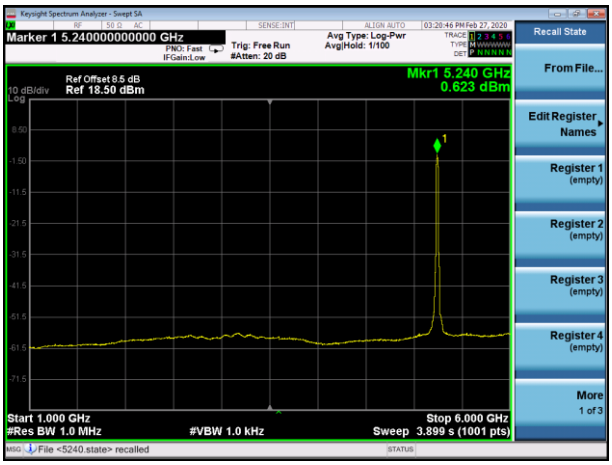
Peak



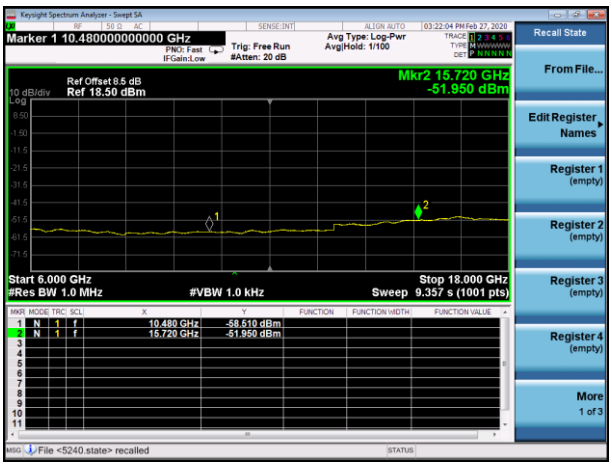
Average

Test Mode:		802.11ac HT20		Test channel:		5240MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10480	-46.19	2.00	-44.19	51.07	68.20	-17.13	Peak
15720	-39.84	2.00	-37.84	57.42	68.20	-10.78	Peak
10480	-58.51	2.00	-56.51	38.75	54.00	-15.25	Average
15720	-51.95	2.00	-49.95	45.31	54.00	-8.69	Average



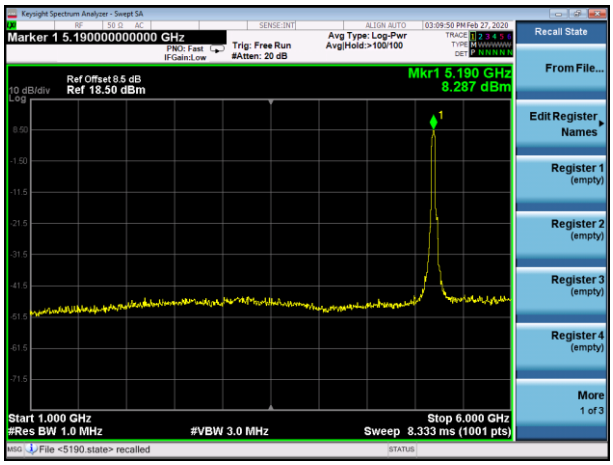


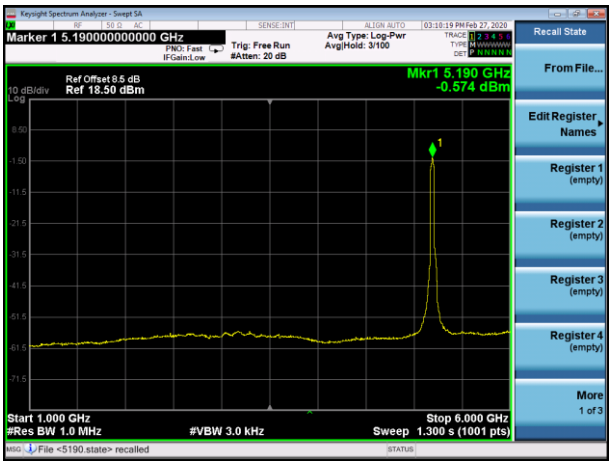
Peak



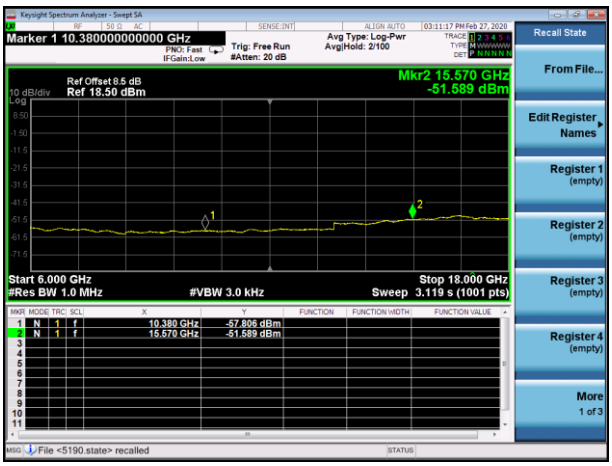
Average

Test Mode:		802.11n HT40		Test channel:		5190MHz	
Frequency (MHz)	Read Level (dBm)	Antenna Gain (dBi)	EIRP (dBm)	E (dBμV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
10380	-47.03	2.00	-45.03	50.23	68.20	-17.97	Peak
15570	-40.18	2.00	-38.18	57.08	68.20	-11.12	Peak
10380	-57.81	2.00	-55.81	39.45	54.00	-14.55	Average
15570	-51.59	2.00	-49.59	45.67	54.00	-8.33	Average





Peak



Average