FCC RF Test Report

For

Shenzhen Hysiry Technology Co., Ltd.

Test Standards:	Part 15C Subpart C §15.247
Product Description:	Wi-Fi Smart Plug
Tested Model:	X10S
Additional Model No.:	X10
Brand Name:	N/A
FCC ID:	2AKBP-X10S
Classification	(DTS) Digital Transmission System
Report No.:	EC1905002F01
Tested Date:	2019-05-10 to 2019-05-22
Issued Date:	2019-05-22
Prepared By:	Damon Zhang Damon Zhang/ Engineer
Approved By:	Bacon Wu Bacon Wu / RF Manager

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2019.05.22	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 2.19 dB at 4874 MHz
15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 11.59 dB at 0.963 MHz
15.203 & 15.247(b)	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 Hysiry Technology Co., Ltd.
2403D, 24th floor, coast huanqing building, no.24 futian road, wei town community, futian street, futian district, shenzhen, China.

2.2 Manufacturer

Shenzhen Hysiry Technology Co., Ltd.
2403D, 24th floor, coast huanqing building, no.24 futian road, wei town community, futian street, futian district, shenzhen, China.

2.3 General Description Of EUT

Product	Wi-Fi Smart Plug
Model No.	X10S
Additional No.	X10
Difference Description	The only difference is that the software
FCC ID	2AKBP-X10S
Power Supply	120Vac (Power Supply)
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 : 8.74 dBm (0.00748 W) 802.11g : 8.34 dBm (0.00682 W) 802.11n HT20 : 7.37 dBm (0.00546 W)
Antenna Type	PCB Antenna with 1.7dBi gain
I/O Ports	Refer to user's manual
Cable Supplied	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. EUT is tested at full load

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

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 Average conducted output power as follows:

Frequency Range(MHz)	Mode	Rate	Output Power(dBm)
2412~2462	802.11b	1 MHz	7.48
2412~2462	802.11g	6 Mbps	6.82
2412~2462	802.11n HT20	MCS0	5.46

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 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011

3.2.2 Radiated Emission Test (Below 1GHz)

Radiated Test Cases	
	Mode 1:power supply + wlan Idle + Lamp

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**	**802.11n HT40**
Radiated Test Cases	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH03 Mode 2: CH06 Mode 3: CH09

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

3.2.4 Power Line Conducted Emission Test:

AC Conducted Emission	Mode 1 : Power Supply + WLAN Idle + Lamp

3.3 Support Equipment

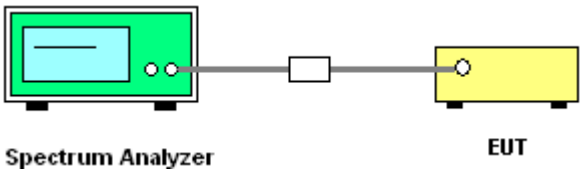
Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	E470C	FCC DoC	N/A	shielded cable DC O/P 1.8 m unshielded AC I/P cable1.2 m
4.	Lamp	VINTAGE	N/A	FCC DoC	N/A	N/A

3.4 Test Setup

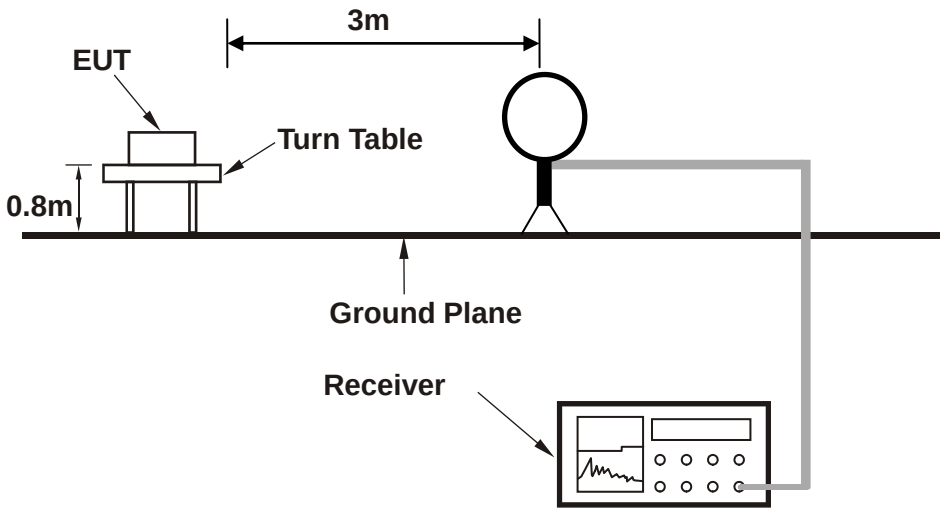
The EUT is continuously communicating to the Bluetooth tester during the tests.

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

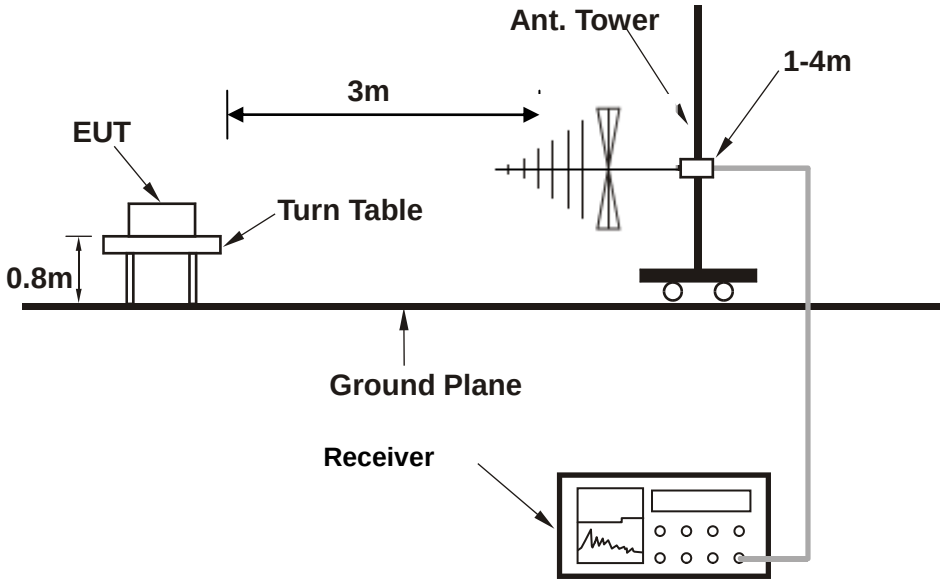
Setup diagram for Conducted Test



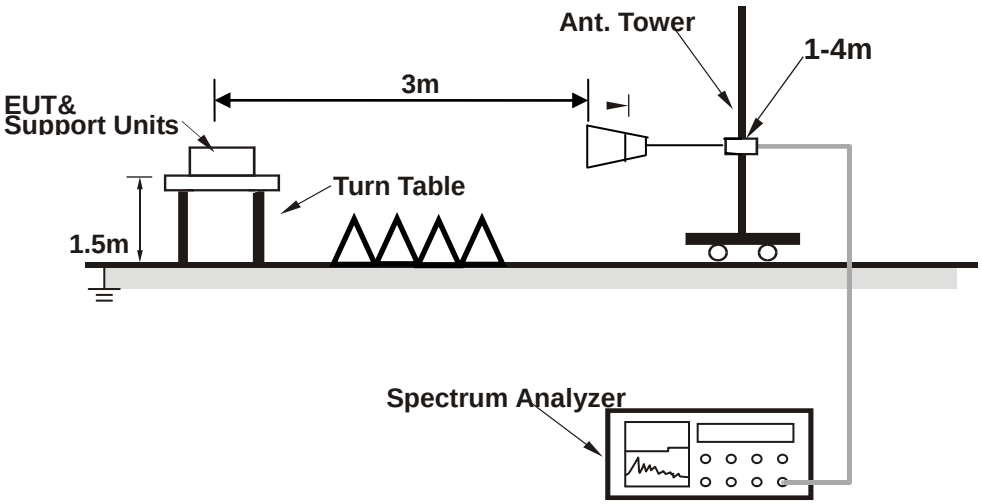
Setup diagram for Raidation(9KHz~30MHz) Test



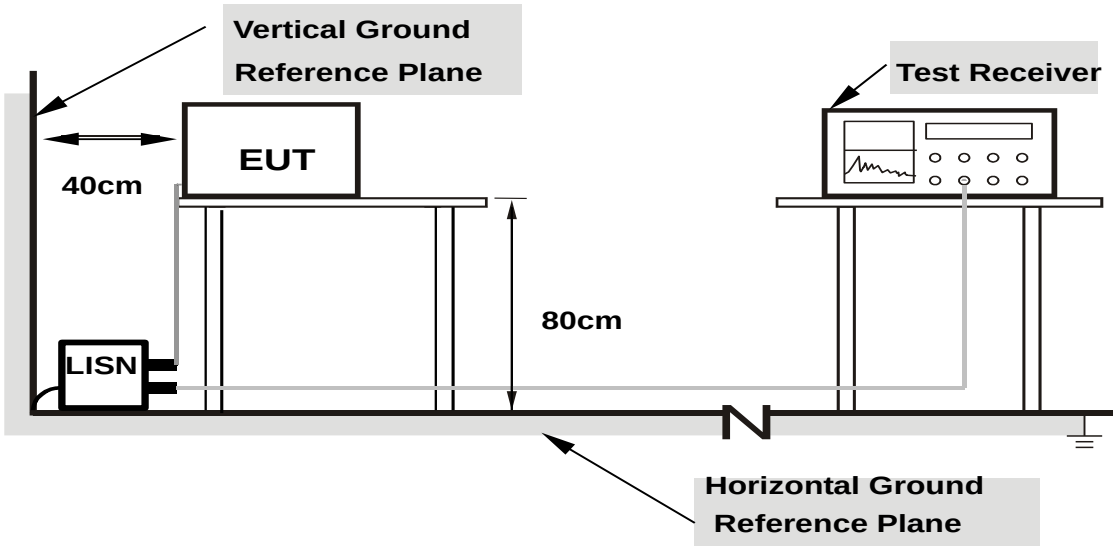
Setup diagram for Raidation(Below 1G) Test



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)

4 Test Result

4.1 6dB and 99% Bandwidth Measurement

4.1.1 Limit of 6dB and 99% Bandwidth

FCC §15.247 (a) (2)

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

4.1.2 Test Procedures

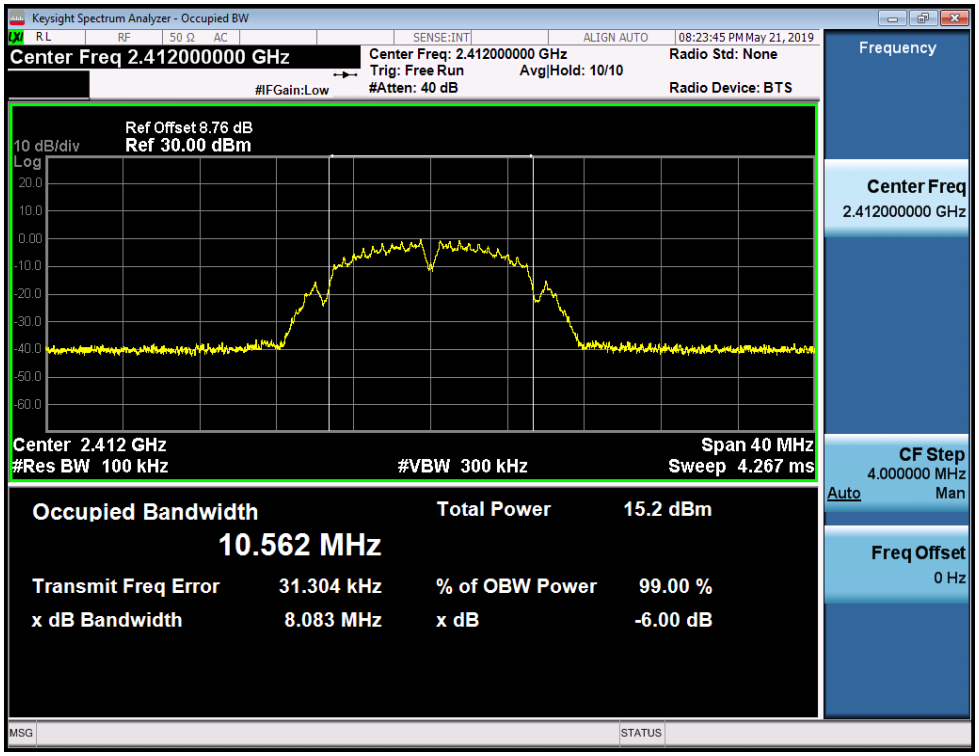
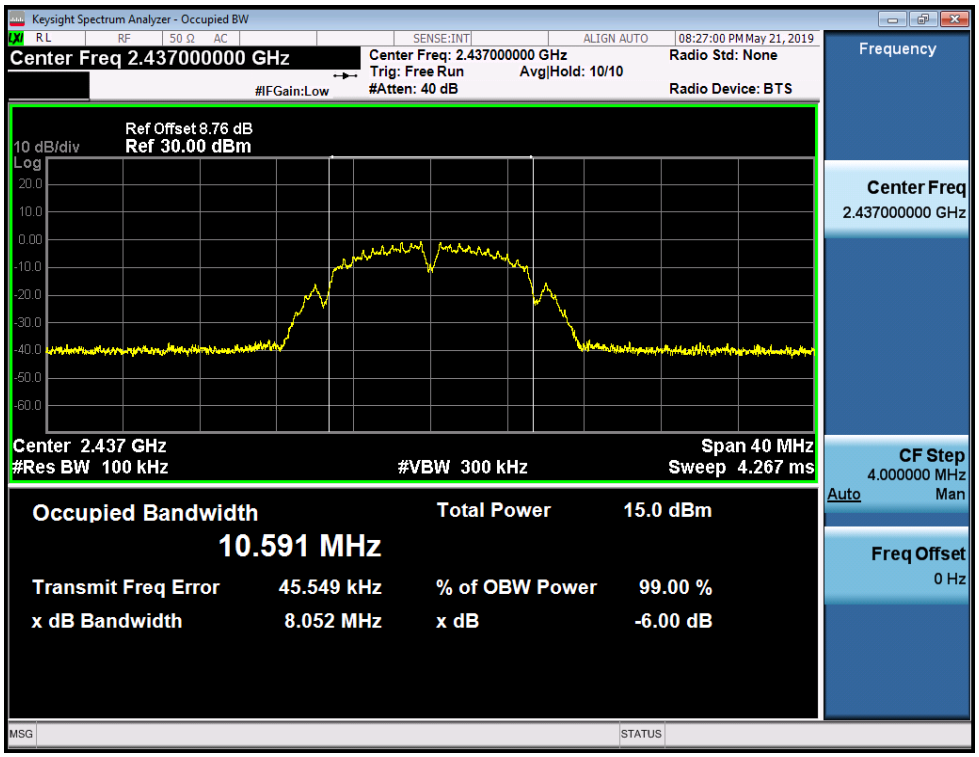
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v05r02.
2. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
3. Turn on the EUT and connect it to measurement instrument.
4. Set to the maximum 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) = 100KHz and set the Video bandwidth (VBW) = 300KHz.

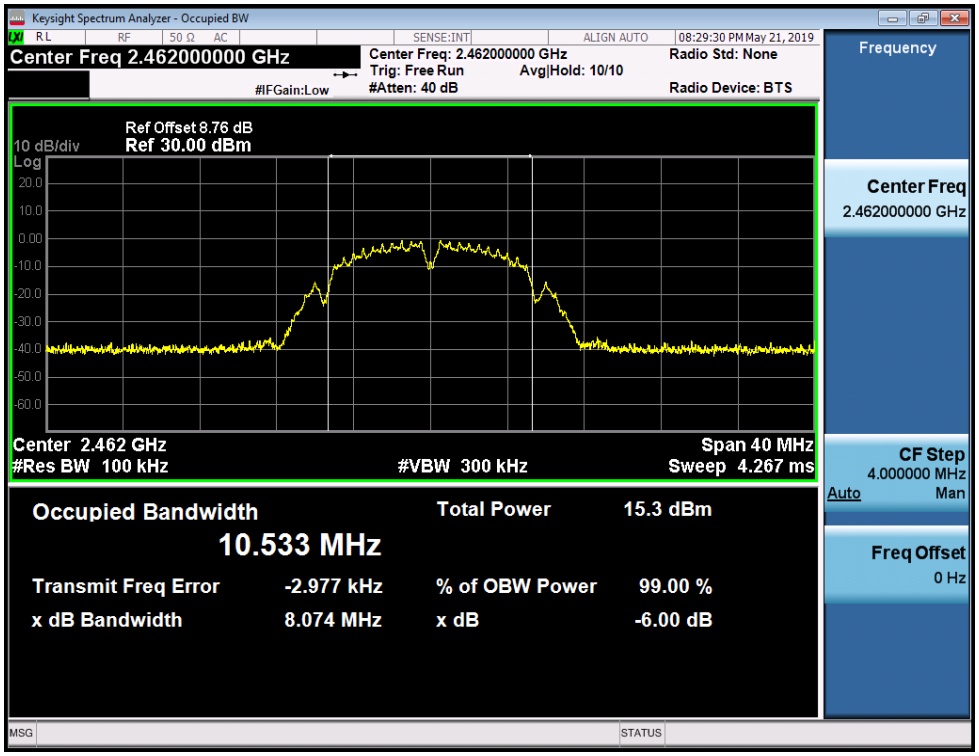
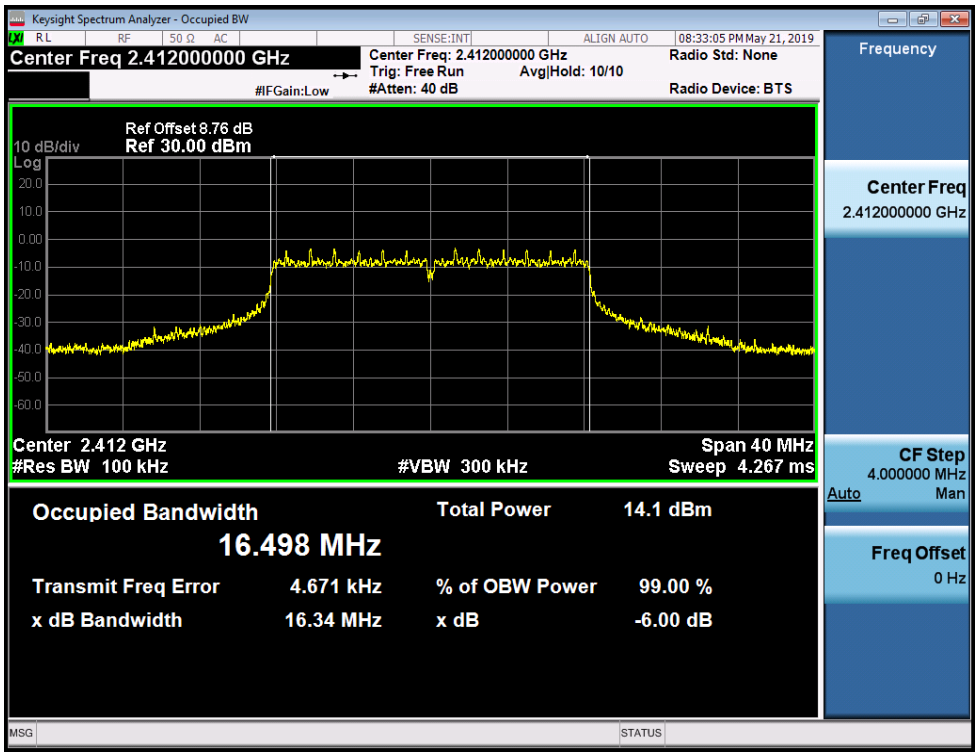
4.1.3 Test Result of 6dB and 99% Bandwidth

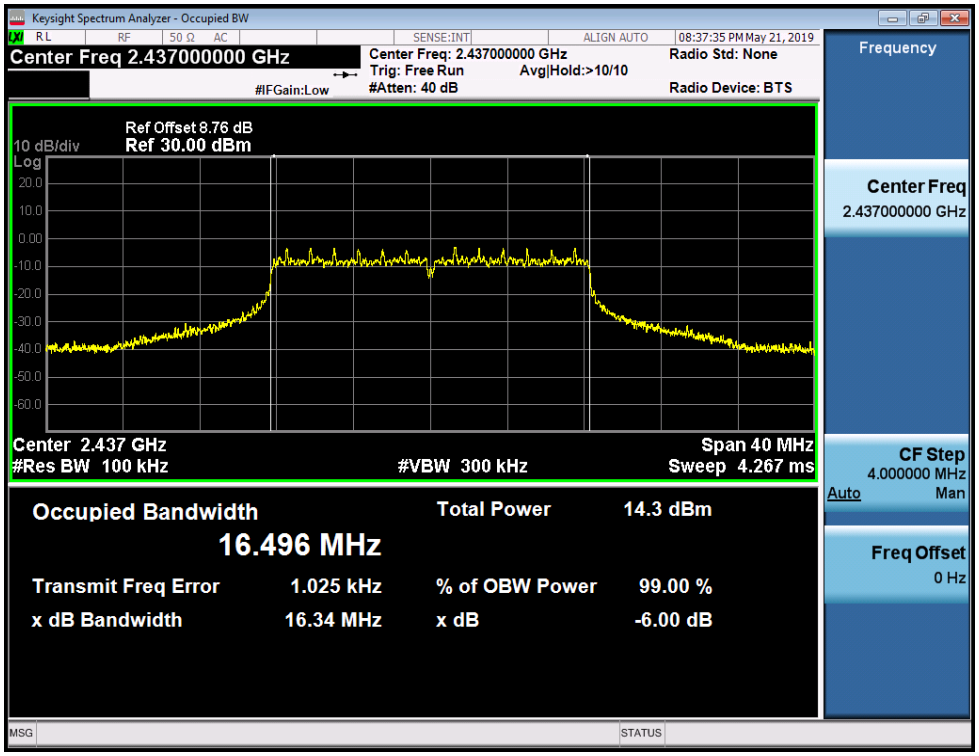
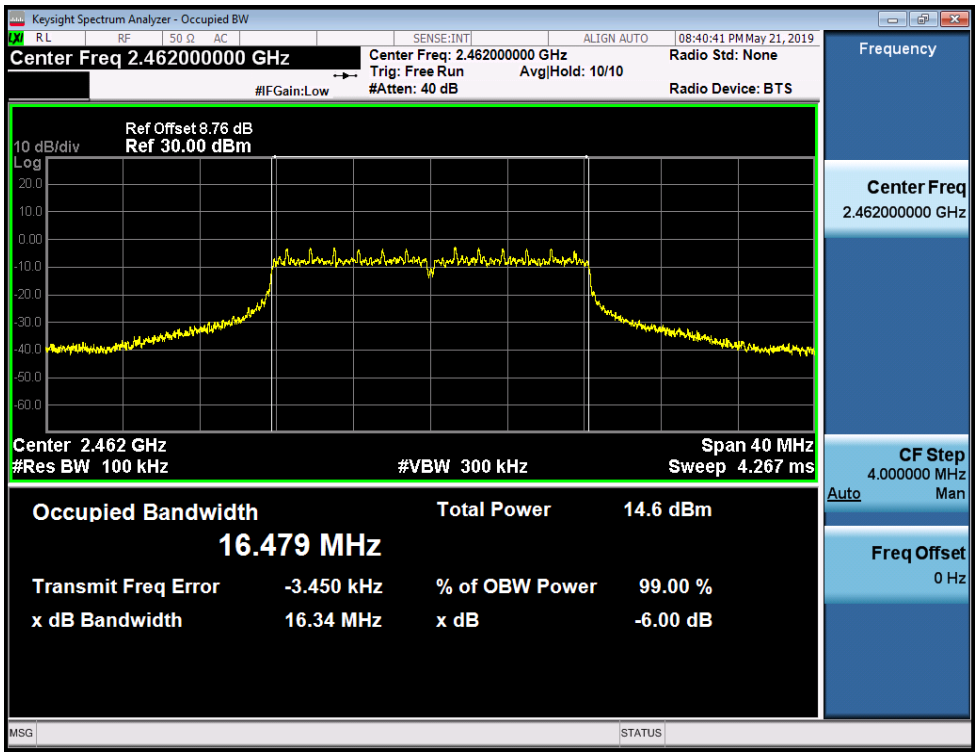
Test Mode :	2.4G wifi	**Temperature :**	24~26℃
Test Engineer :	Damon Zhang	**Relative Humidity :**	50~53%

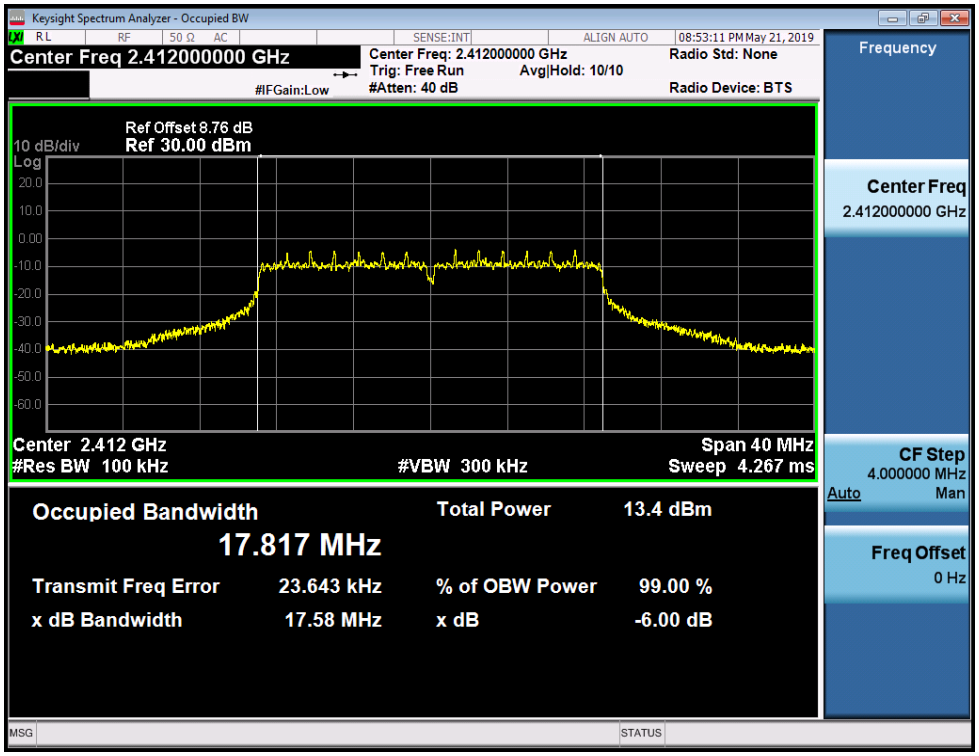
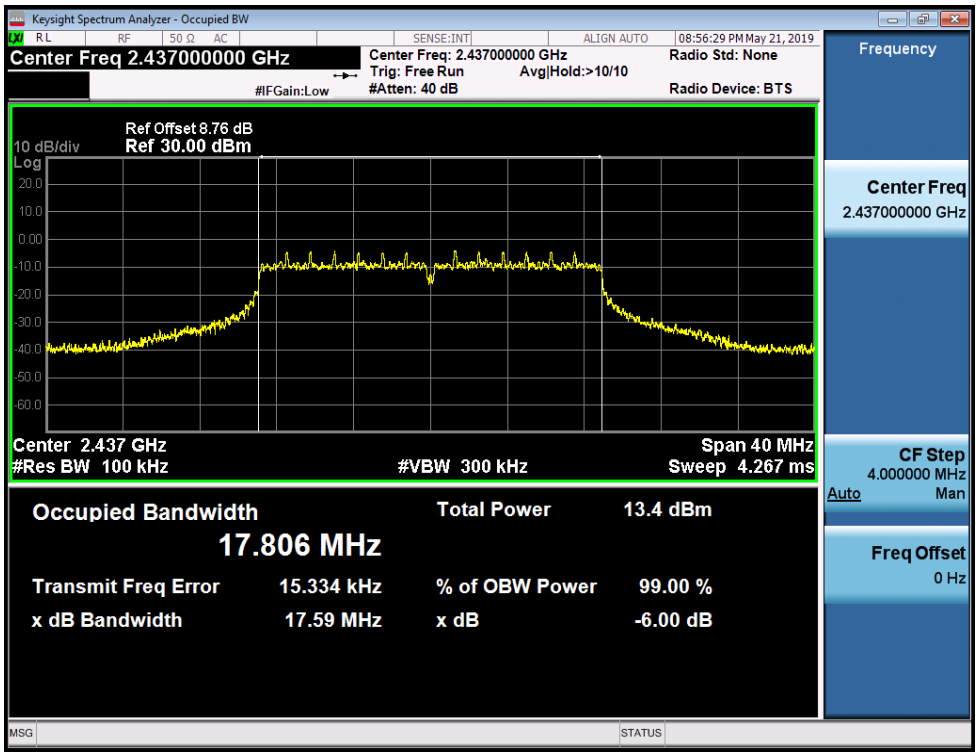
Mode	Channel	6dB Bandwidth [MHz]	99% OBW [MHz]	Verdict
11B	LCH	8.083	10.562	PASS
11B	MCH	8.052	10.591	PASS
11B	HCH	8.074	10.533	PASS
11G	LCH	16.34	16.498	PASS
11G	MCH	16.34	16.496	PASS
11G	HCH	16.34	16.479	PASS
11N20	LCH	17.58	17.817	PASS
11N20	MCH	17.59	17.806	PASS
11N20	HCH	17.57	17.806	PASS

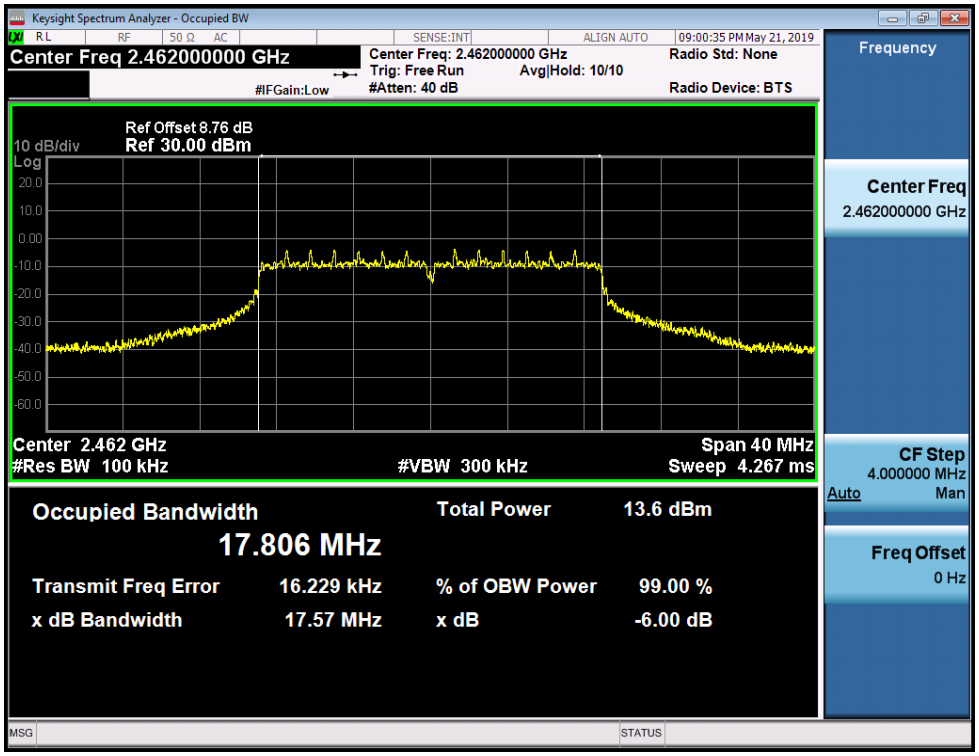
6dB and 99% Bandwidth Plot

Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

11G/MCH	
11G/HCH	

11N20/LCH	
11N20/MCH	

11N20/HCH	

Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:00:35 PM May 21, 2019
Center Freq 2.462000000 GHz
Center Freq: 2.462000000 GHz
Trig: Free Run
Avg|Hold: 10/10
#IFGain:Low
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 8.76 dB
10 dB/div
Ref 30.00 dBm
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Center Freq
2.462000000 GHz
Center 2.462 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 40 MHz
Sweep 4.267 ms
CF Step
4.000000 MHz
Auto
Man
Occupied Bandwidth
17.806 MHz
Total Power
13.6 dBm
Transmit Freq Error
16.229 kHz
% of OBW Power
99.00 %
x dB Bandwidth
17.57 MHz
x dB
-6.00 dB
Freq Offset
0 Hz
MSG
STATUS

4.2 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.

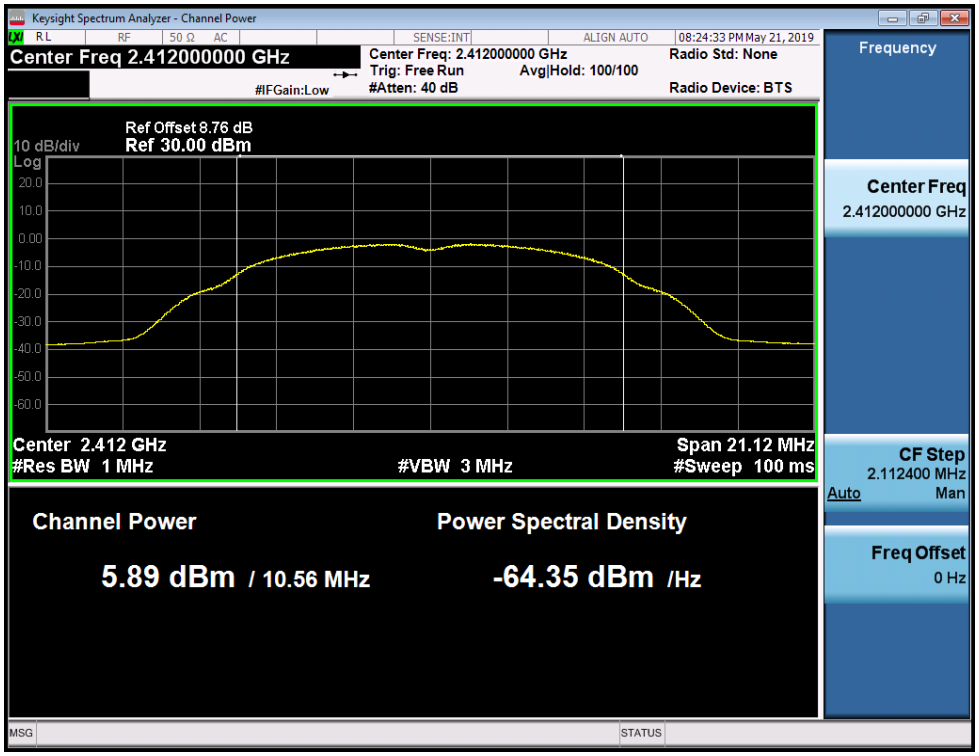
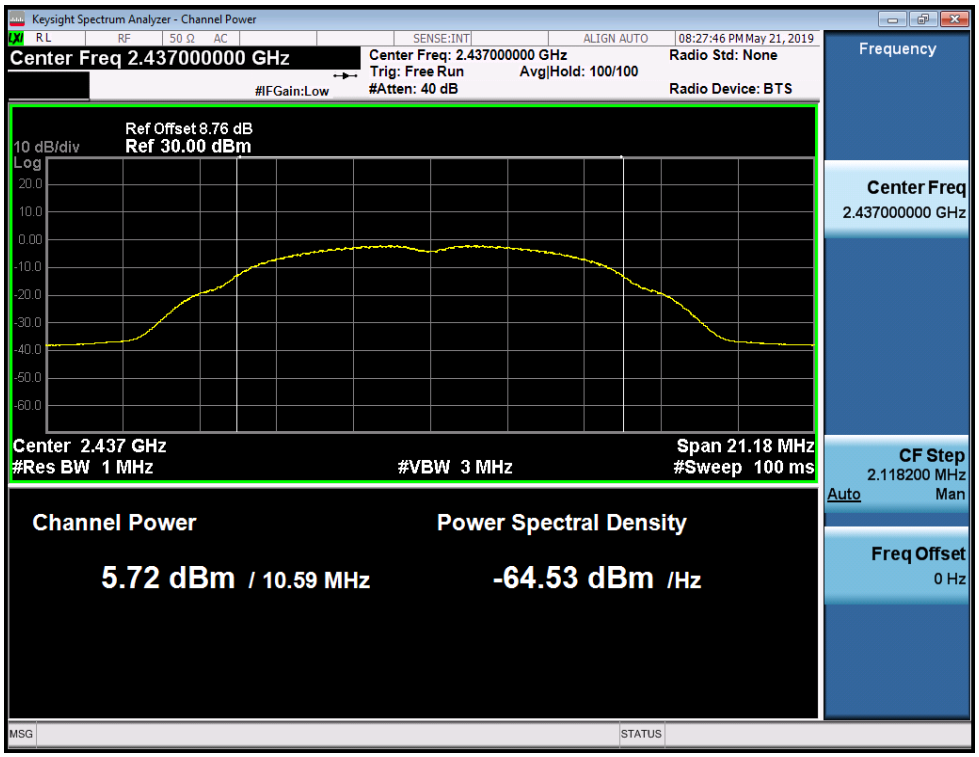
4.2.2 Test Procedures

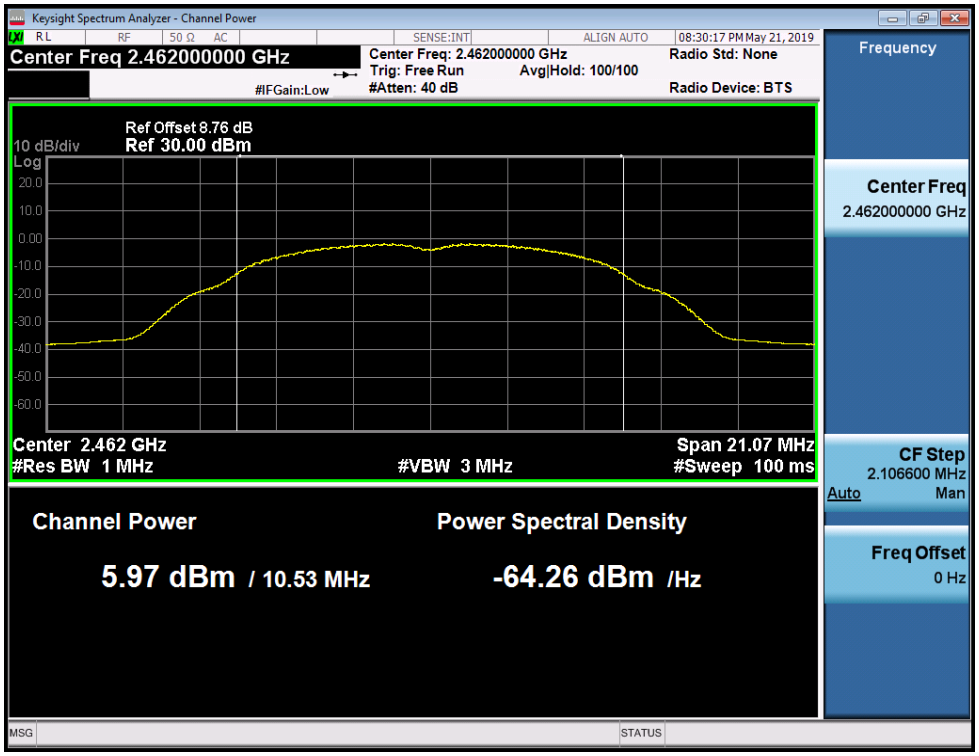
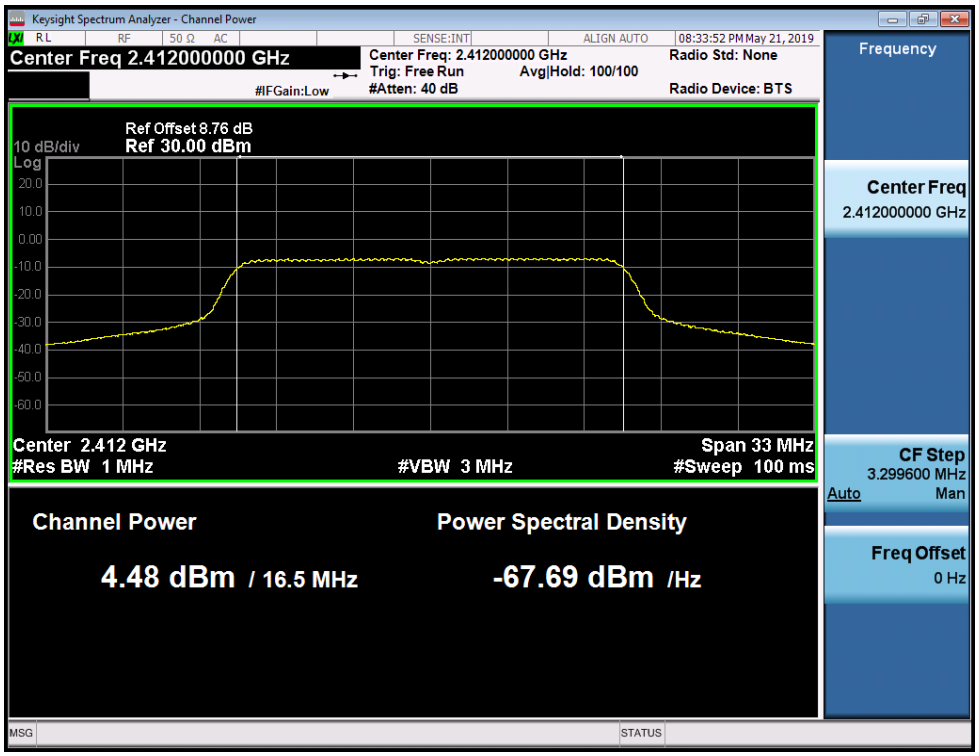
1. The testing follows the Measurement Procedure of ANSI C63.10-2013 section 11.9.2.2.4 Measurement using a spectrum analyzer.
2. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
3. Turn on the EUT and connect it to spectrum analyzer.
4. Set to the maximum power setting and enaBle Transmitting the EUT transmit continuously
5. 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
6. Set span to at least 1.5*OBW.Set RBW=1MHz,VBW=3MHz, Number of points in sweep ≥ 2/3* span, Sweep time = auto. Detector = RMS
7. Allow the sweep to “free run”. Trace average 100 traces in RMS mode
8. 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.
9. Add 10 log (1/x), where x is the duty cycle.

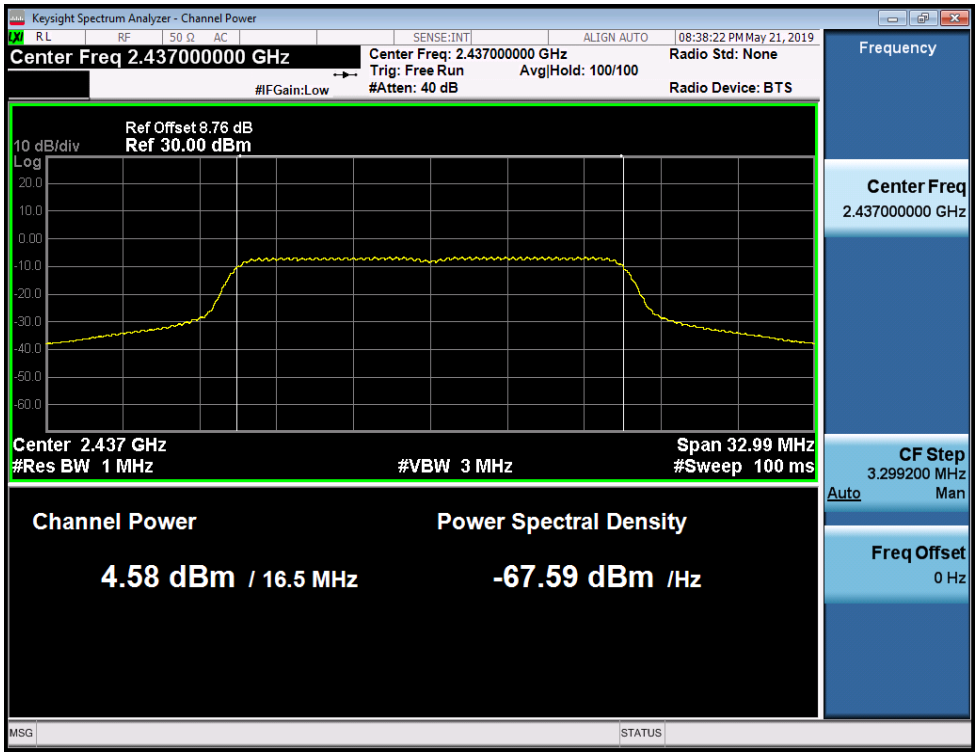
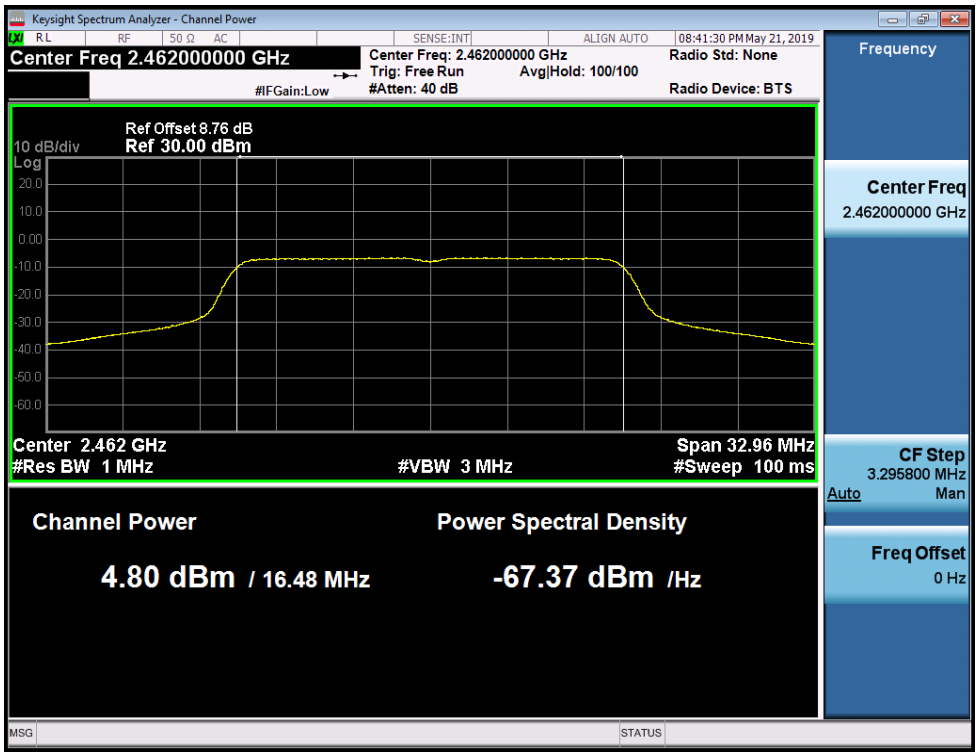
4.2.3 Test Result of Average Output Power

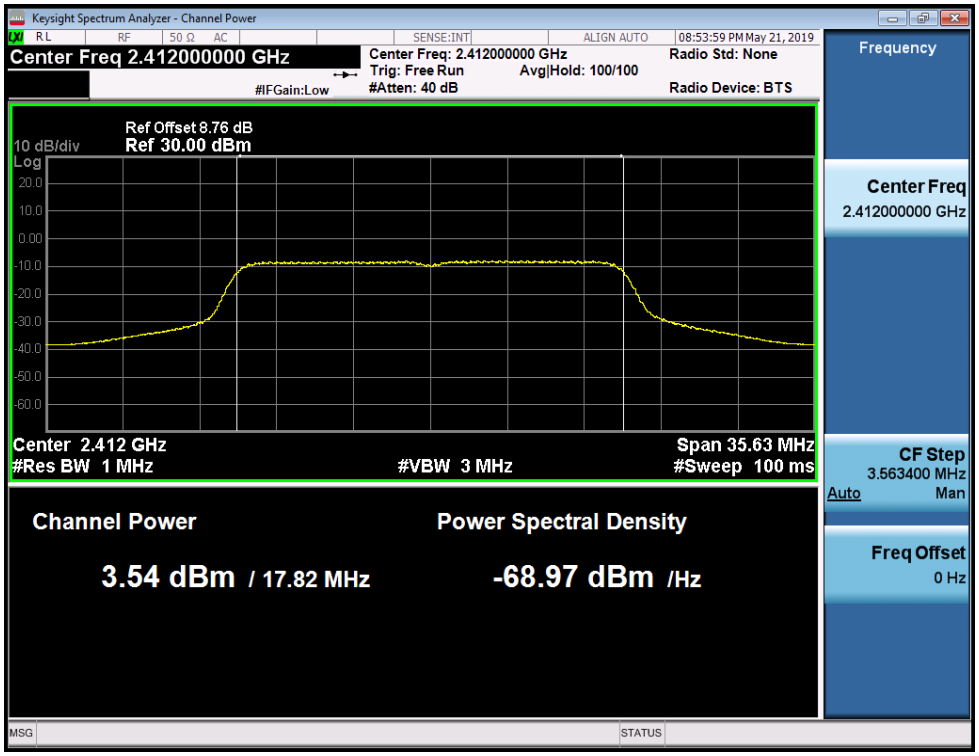
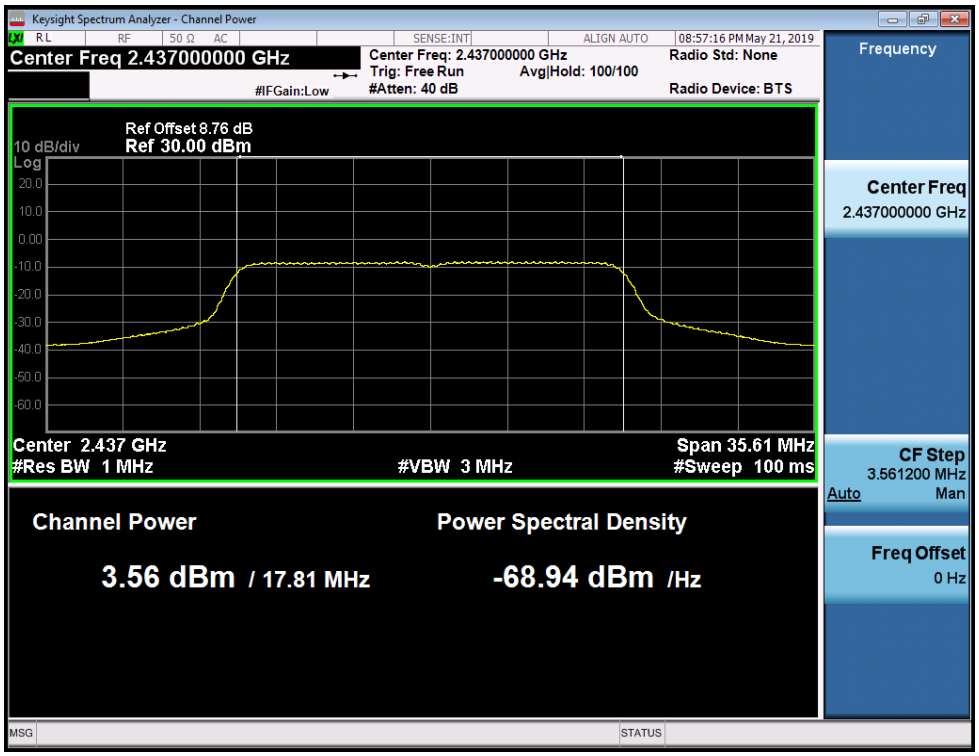
Test Mode :		2.4G wifi	Temperature :		24~26℃	
Test Engineer :		Damon Zhang	Relative Humidity :		50~53%	
Mode	Channel	Meas.Level [dBm]	DT	10 log (1/x)	AV.Power [dBm]	Verdict
11B	LCH	5.89	52.62 %	2.79	8.68	PASS
11B	MCH	5.72	52.74 %	2.78	8.5	PASS
11B	HCH	5.97	52.85 %	2.77	8.74	PASS
11G	LCH	4.48	44.35 %	3.53	8.01	PASS
11G	MCH	4.58	44.35 %	3.53	8.11	PASS
11G	HCH	4.8	44.24 %	3.54	8.34	PASS
11N20	LCH	3.54	43.6 %	3.61	7.15	PASS
11N20	MCH	3.56	43.87 %	3.58	7.14	PASS
11N20	HCH	3.78	43.75 %	3.59	7.37	PASS

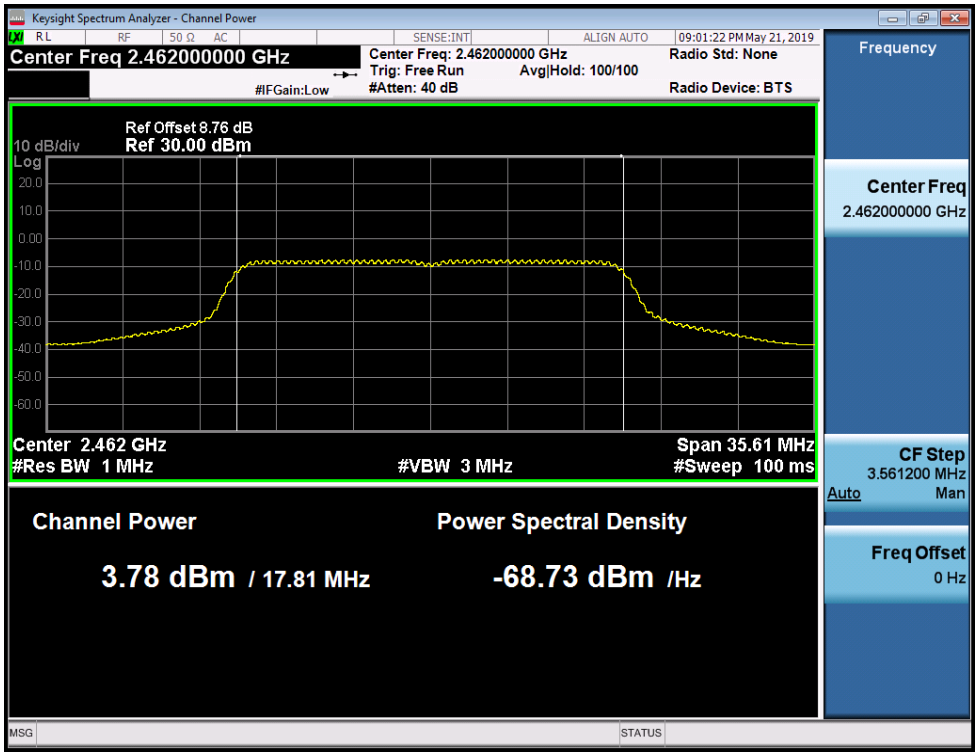
Meas.Level Plot

Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

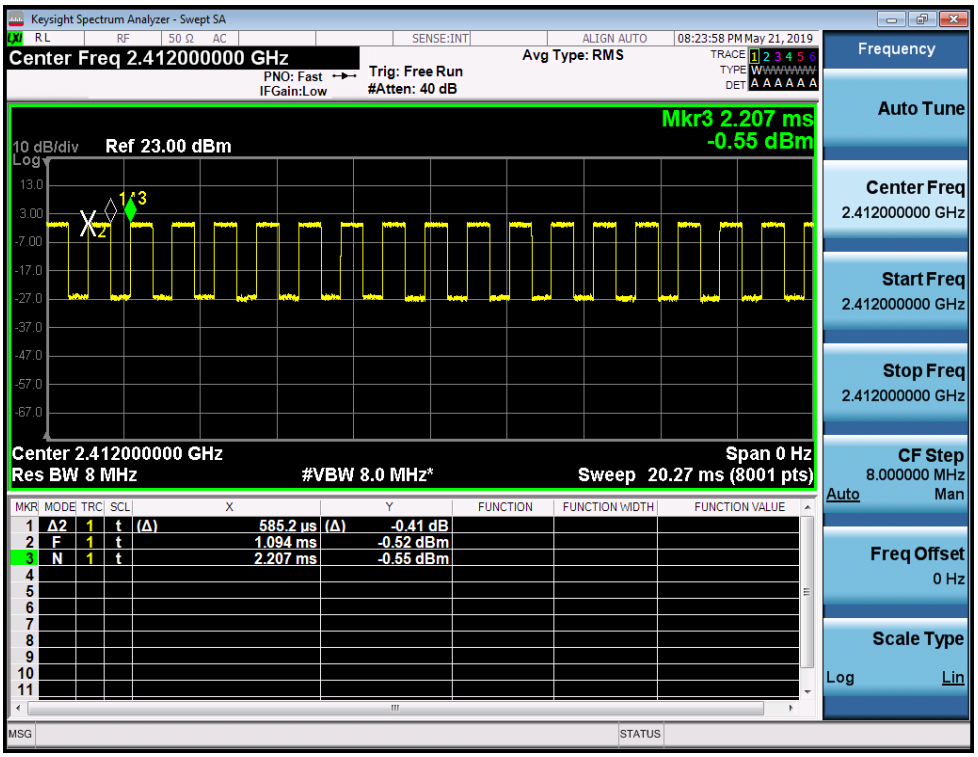
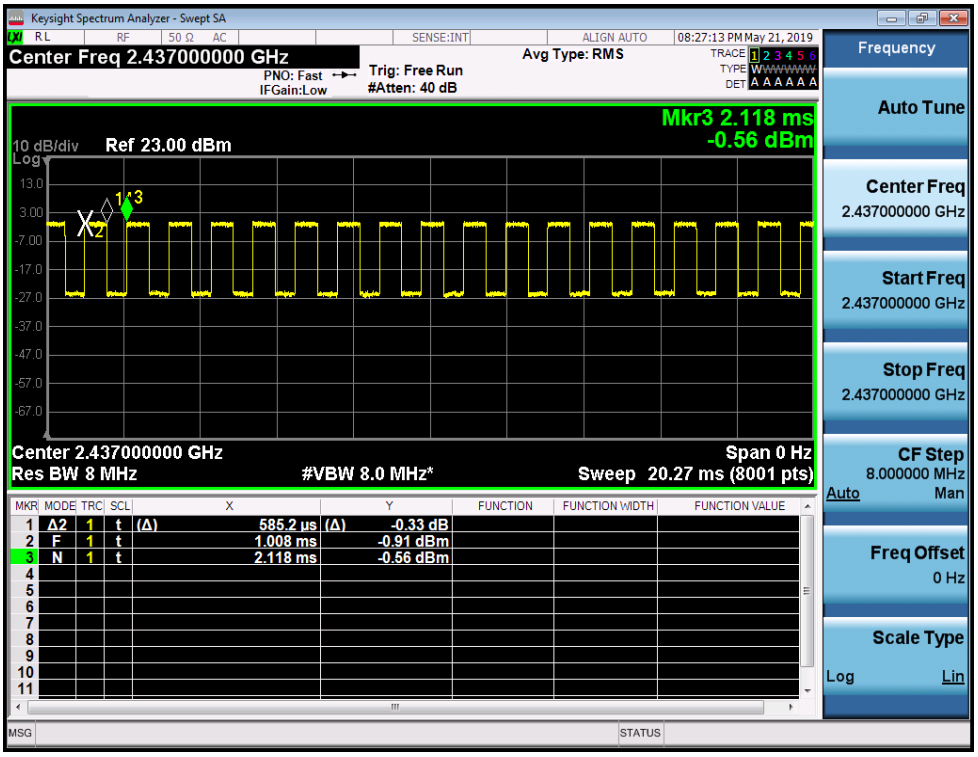
11G/MCH	
11G/HCH	

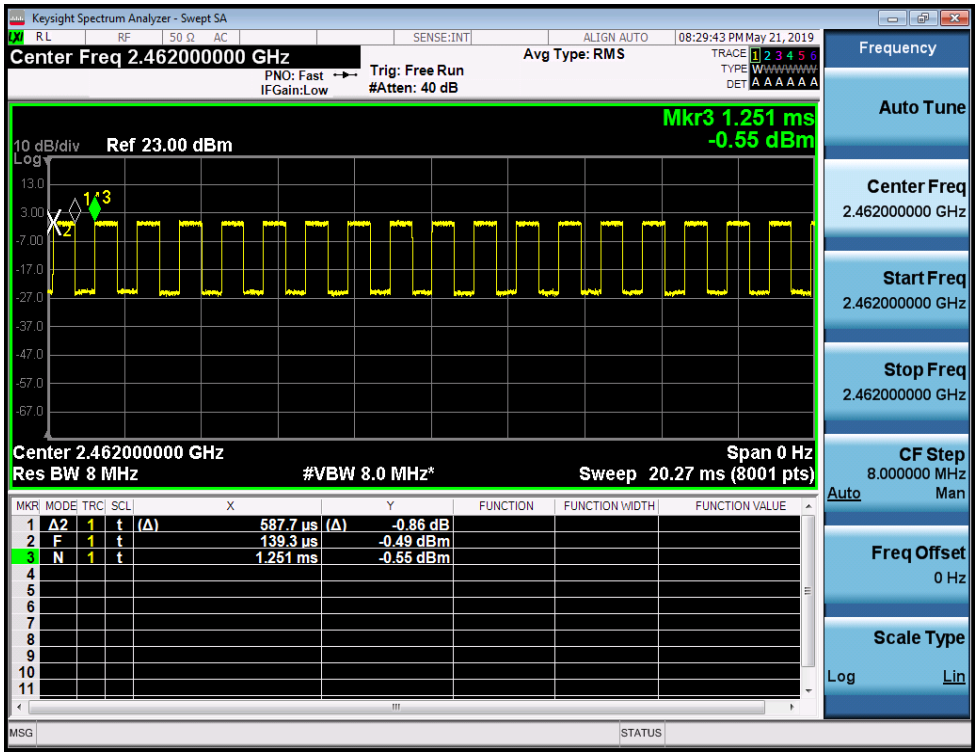
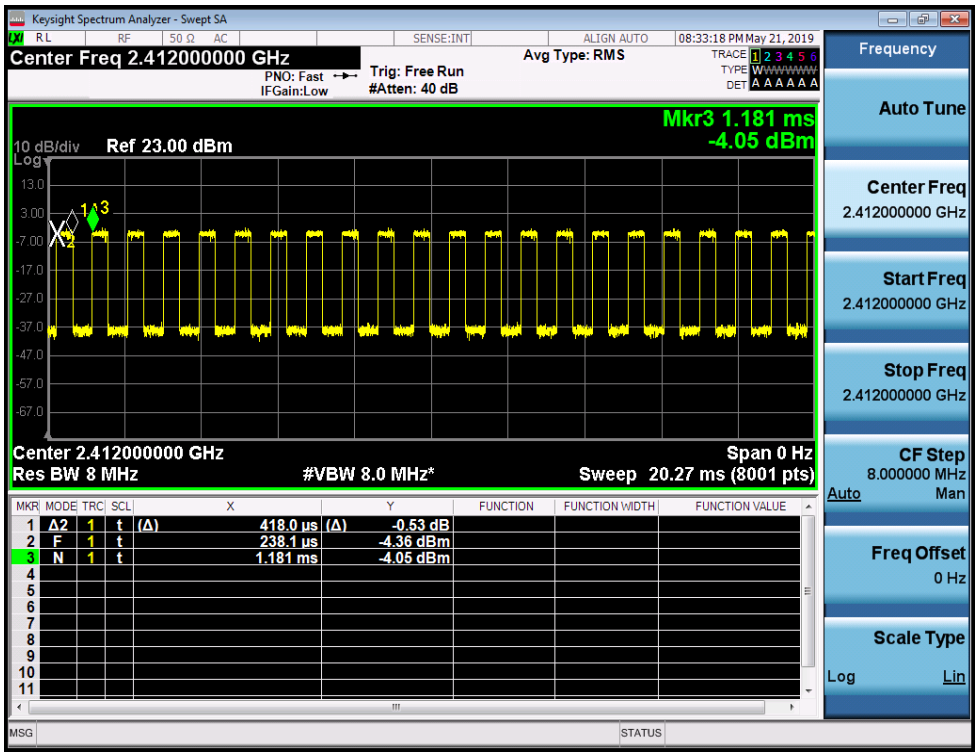
11N20/LCH	
11N20/MCH	

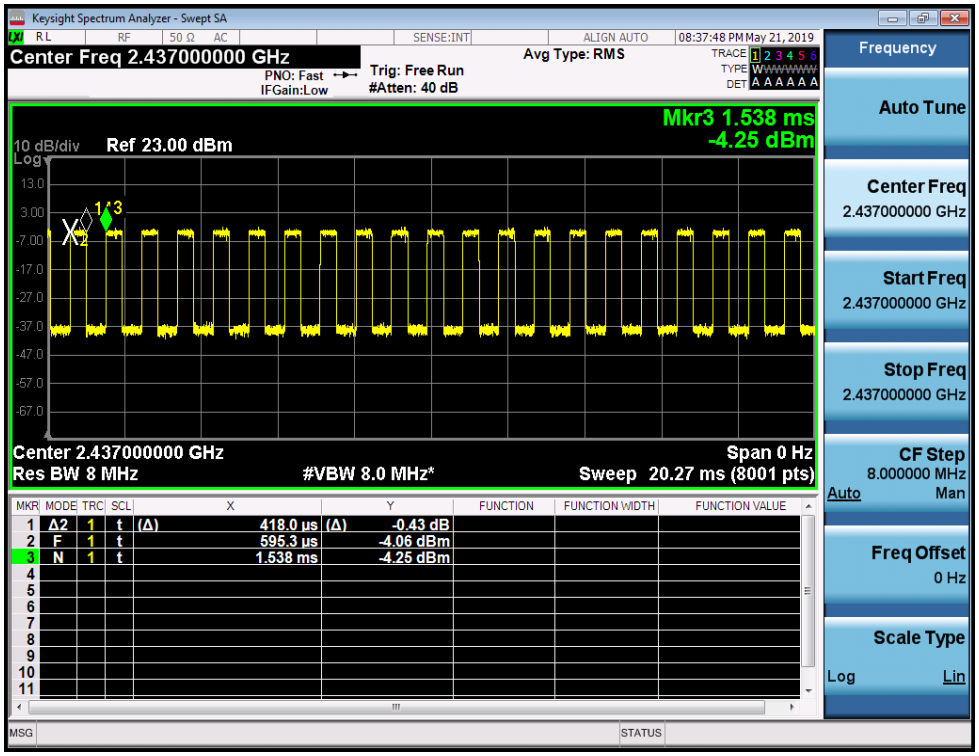
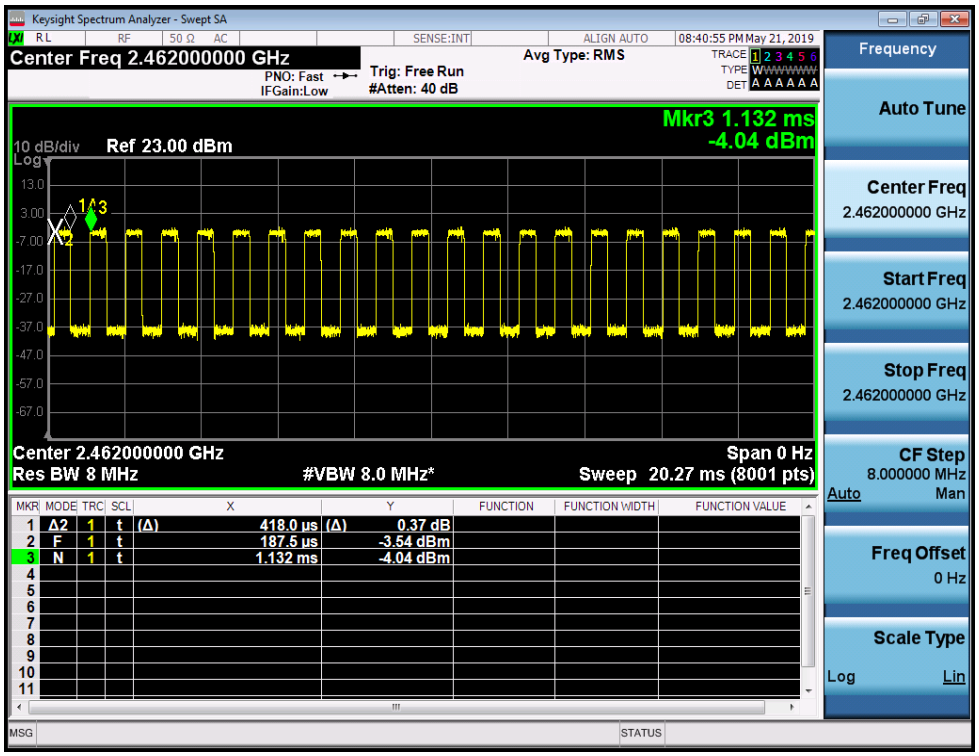
11N20/HCH	

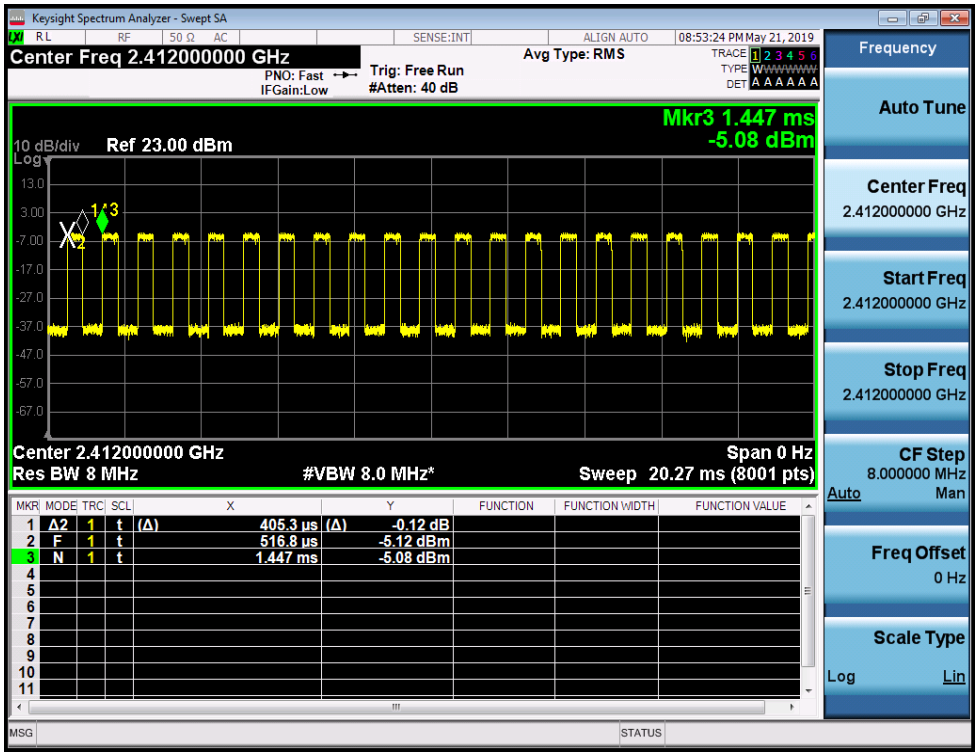
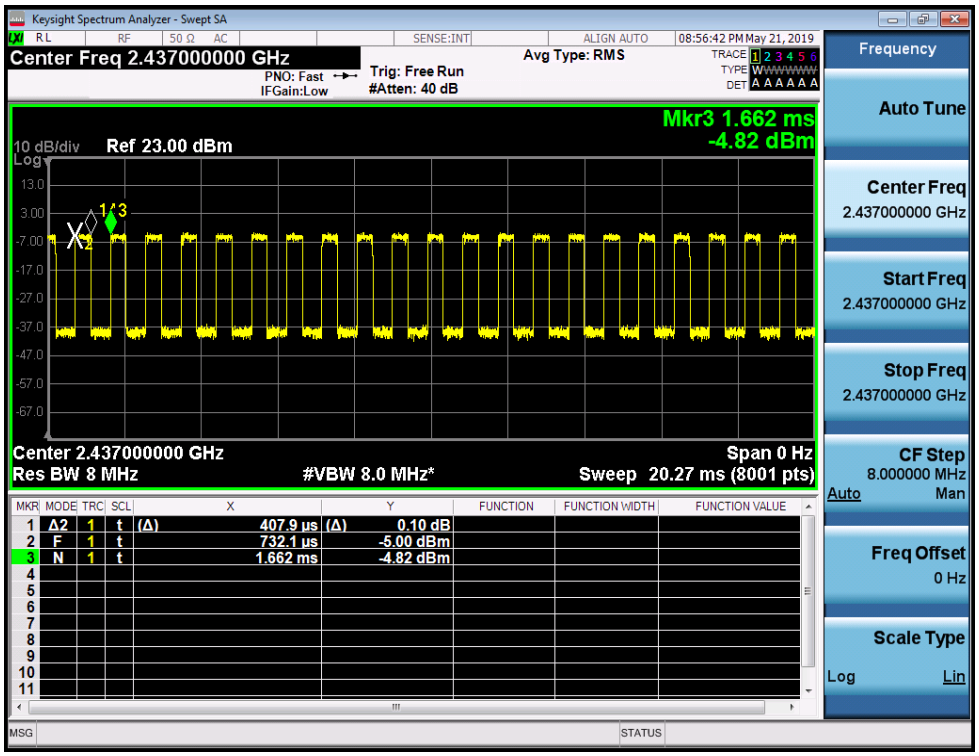
Keysight Spectrum Analyzer - Channel Power
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:01:22 PM May 21, 2019
Center Freq 2.462000000 GHz
Center Freq: 2.462000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 8.76 dB
10 dB/div
Ref 30.00 dBm
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Center Freq
2.462000000 GHz
Center 2.462 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 35.61 MHz
#Sweep 100 ms
CF Step
3.561200 MHz
Auto
Man
Channel Power
3.78 dBm / 17.81 MHz
Power Spectral Density
-68.73 dBm /Hz
Freq Offset
0 Hz
MSG
STATUS

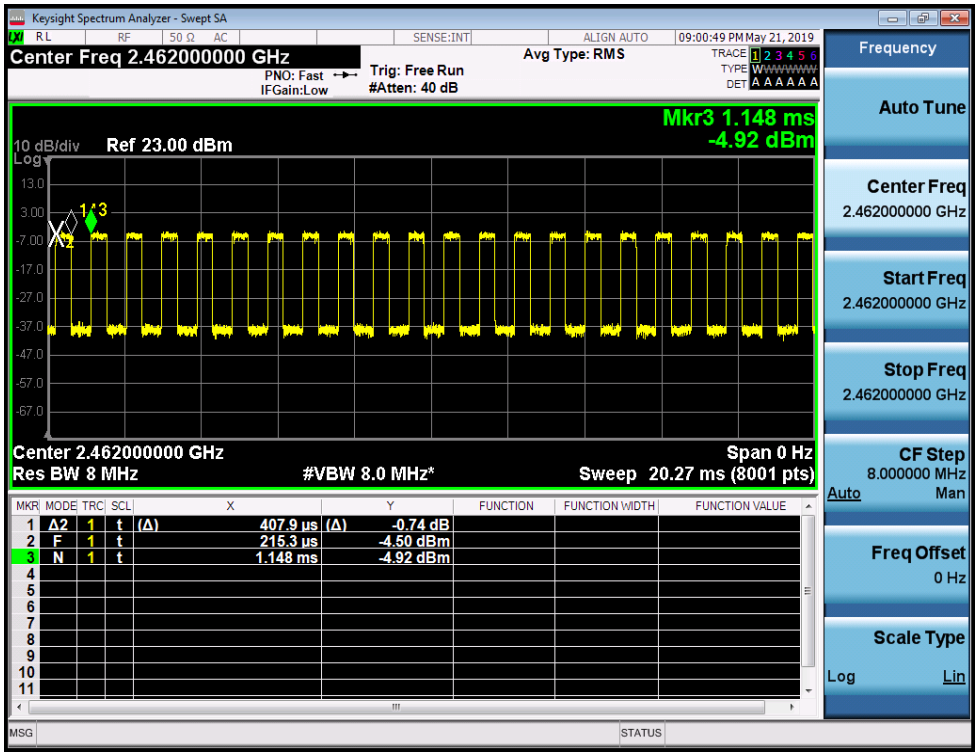
Duty cycle Plot

Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

11G/MCH	
11G/HCH	

11N20/LCH	
11N20/MCH	

11N20/HCH	

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.462000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: RMS
09:00:49 PM May 21, 2019
Mkr3 1.148 ms
-4.92 dBm
10 dB/div
Log
Ref 23.00 dBm
Center 2.462000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz*
Span 0 Hz
Sweep 20.27 ms (8001 pts)
1 Δ2 1 t (Δ) 407.9 µs (Δ) -0.74 dB
2 F 1 t 215.3 µs -4.50 dBm
3 N 1 t 1.148 ms -4.92 dBm
Frequency
Auto Tune
Center Freq
2.462000000 GHz
Start Freq
2.462000000 GHz
Stop Freq
2.462000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

4.3 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

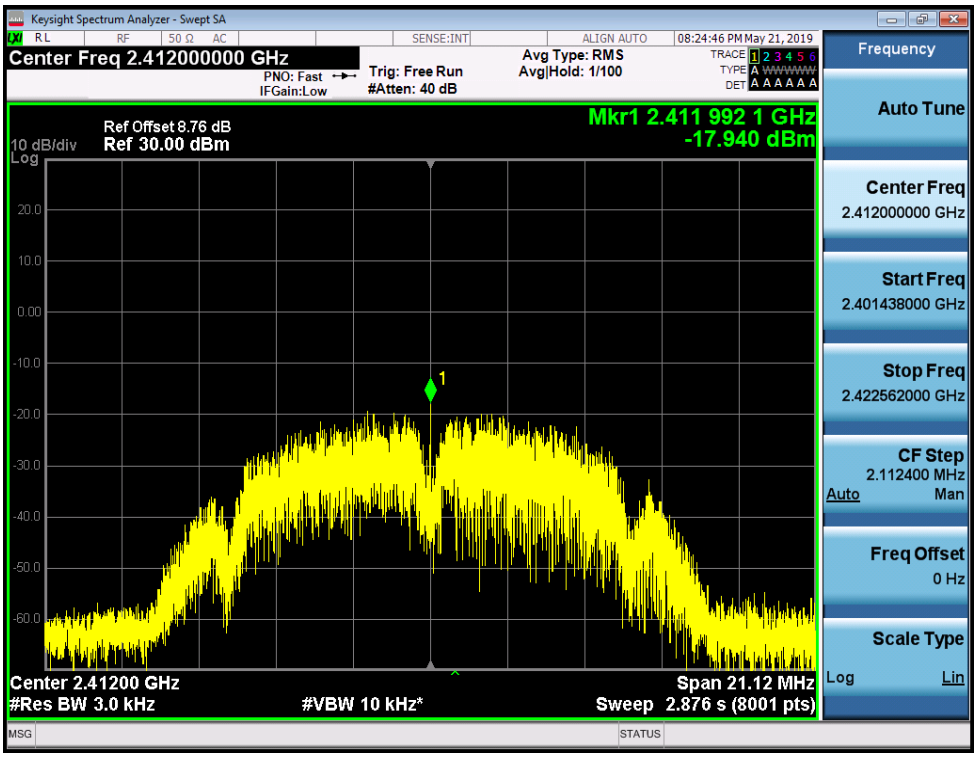
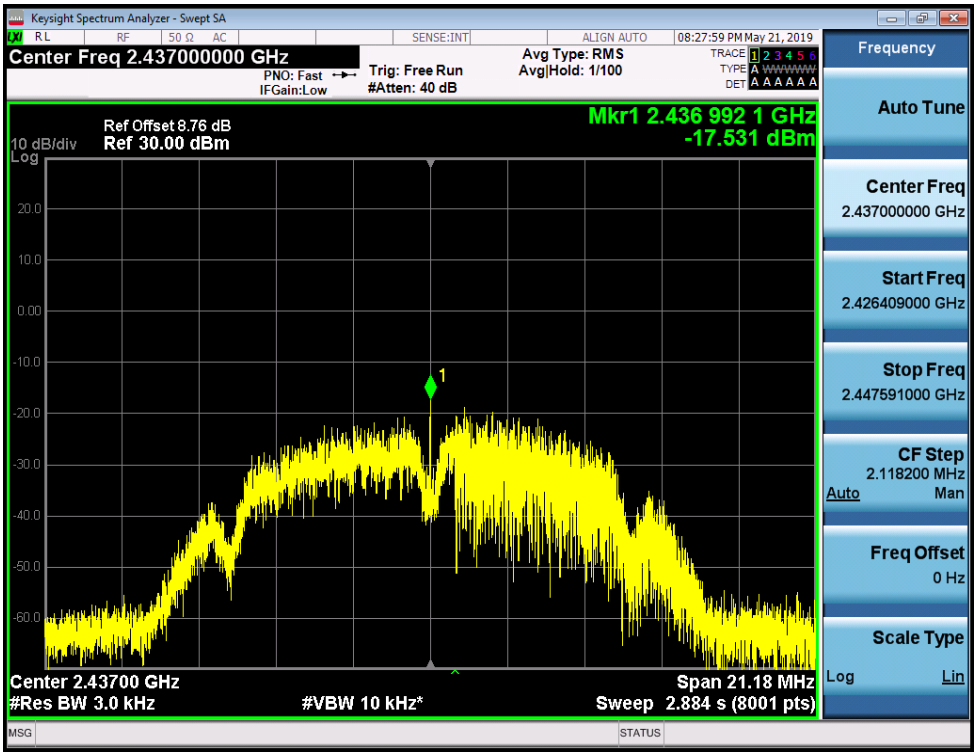
1. The testing follows Measurement Procedure 8.4 DTS maximum power spectral density level in the fundamental emission of ANSI C63.10-2013 section 11.9.2.2.4
2. Turn on the EUT and connect it to measurement instrument.
3. Measure the duty cycle, x, of the transmitter output signal as described in below:
   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= 3 KHz,VBW=10 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). 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.

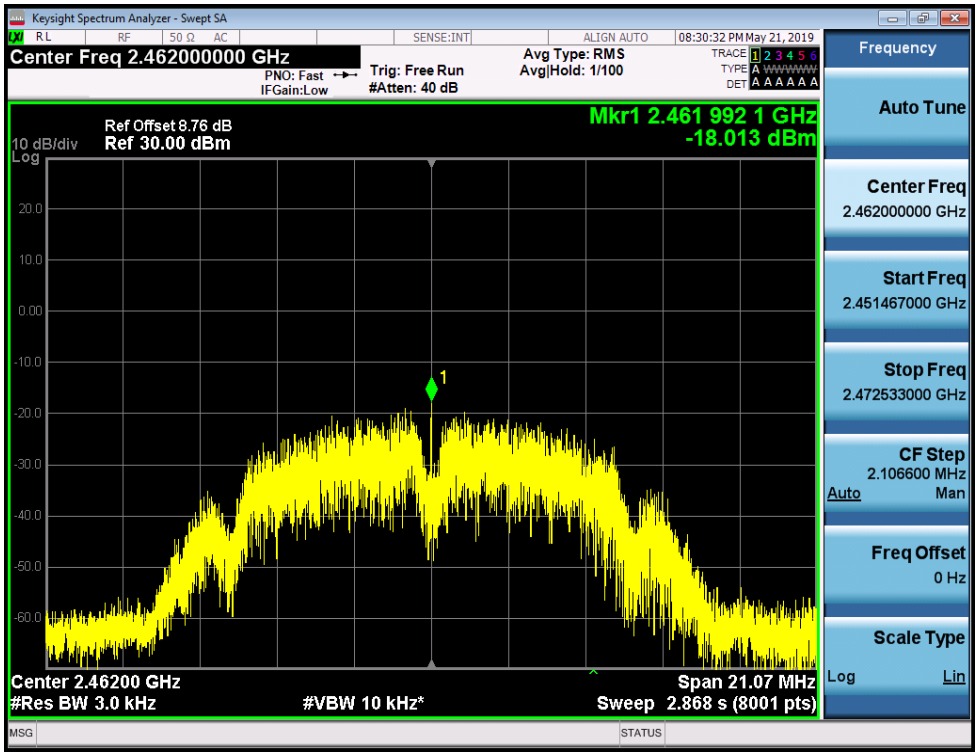
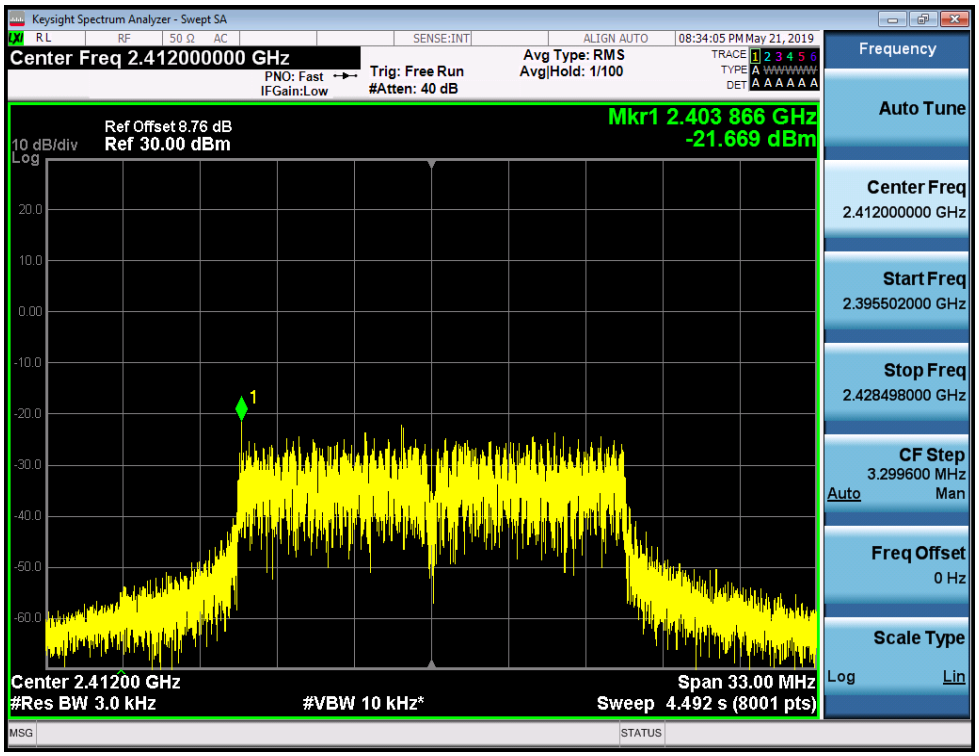
4.3.3 Test Result of Power Spectral Density

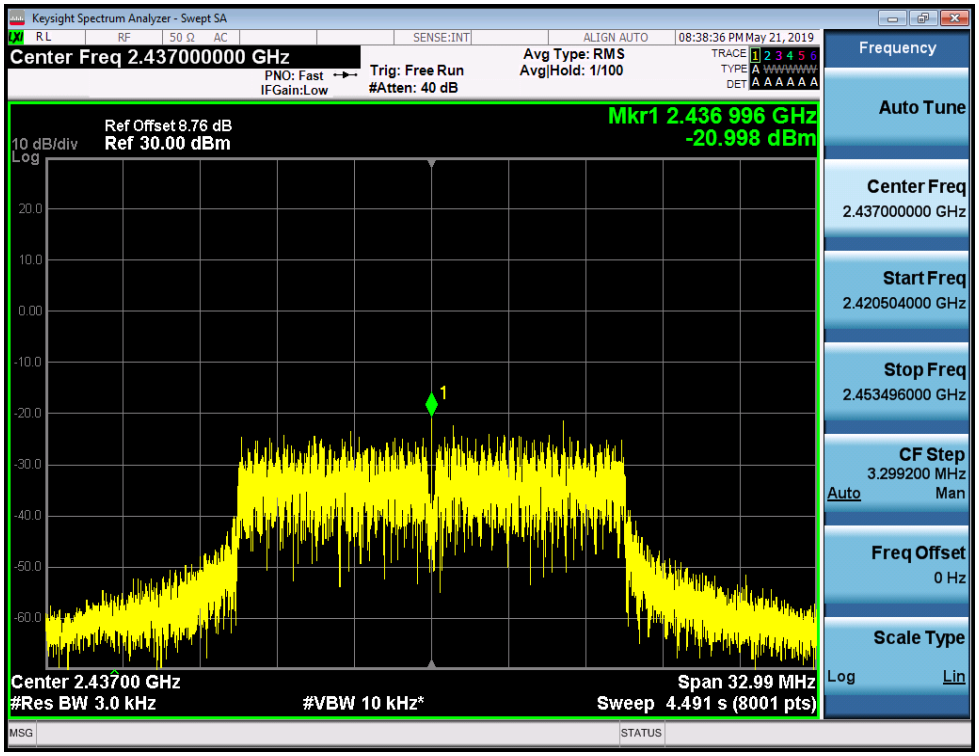
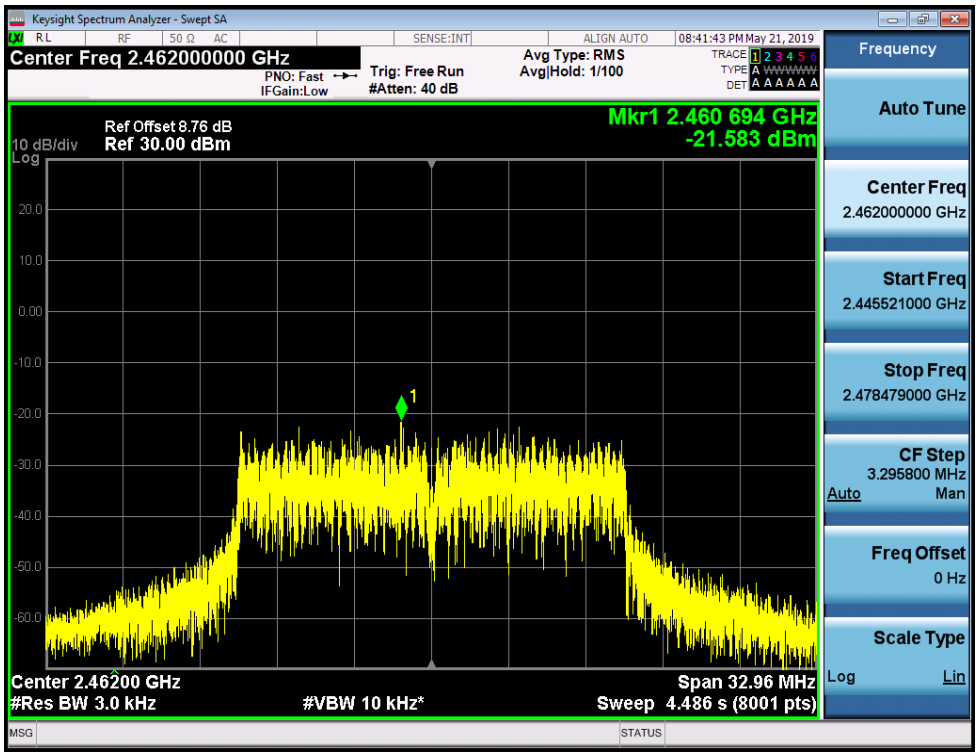
Test Mode :	2.4G wifi	Temperature :	24~26℃
Test Engineer :	Damon Zhang	Relative Humidity :	50~53%

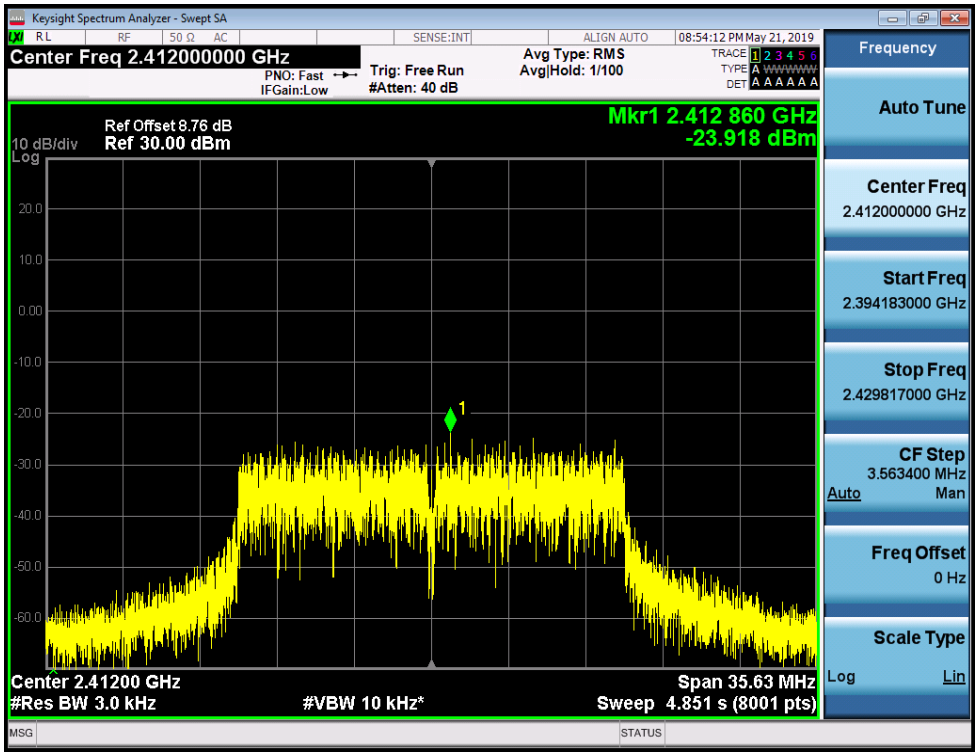
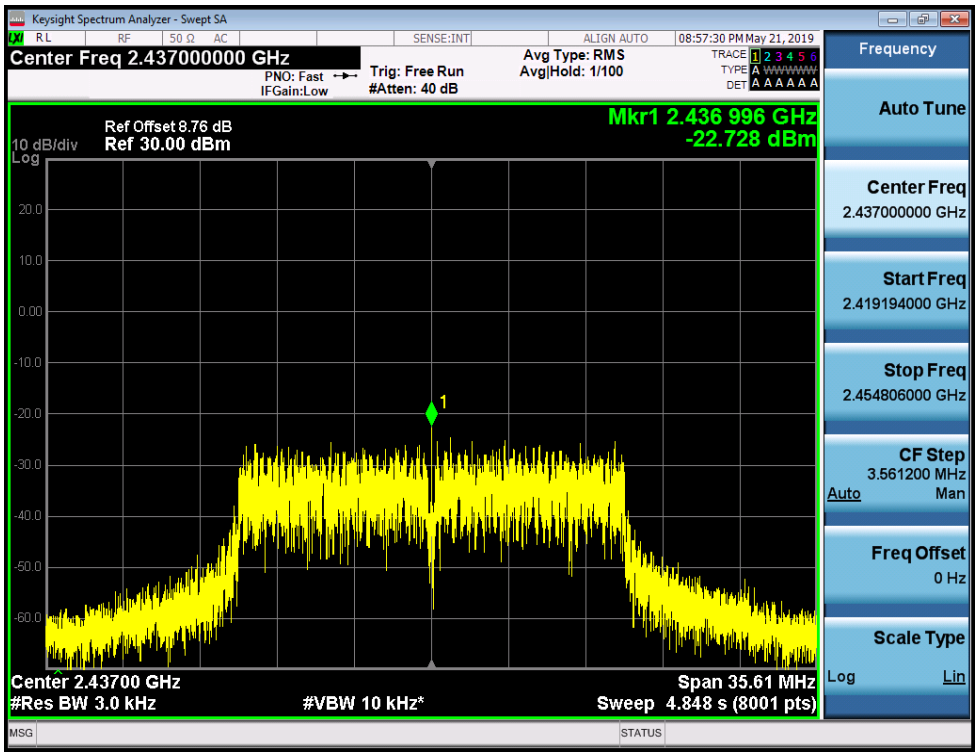
Mode	Channel	Meas.Level [dBm]	Av.PSD [dBm]	Verdict
11B	LCH	-17.940	-15.150	PASS
11B	MCH	-17.531	-14.751	PASS
11B	HCH	-18.013	-15.243	PASS
11G	LCH	-21.669	-18.139	PASS
11G	MCH	-20.998	-17.468	PASS
11G	HCH	-21.583	-18.043	PASS
11N20	LCH	-23.918	-20.308	PASS
11N20	MCH	-22.728	-19.148	PASS
11N20	HCH	-24.228	-20.638	PASS

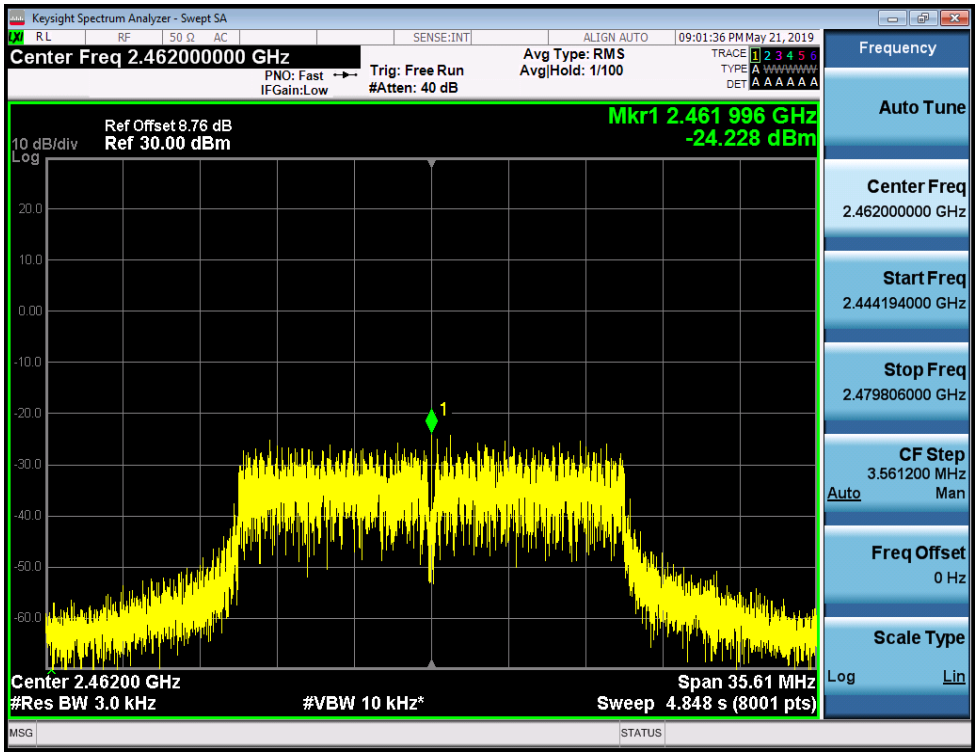
Power Spectral Density Plot

Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

11G/MCH	
11G/HCH	

11N20/LCH	
11N20/MCH	

11N20/HCH	

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.462000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: RMS
Avg|Hold: 1/100
09:01:36 PM May 21, 2019
Ref Offset 8.76 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 2.461 996 GHz
-24.228 dBm
Center 2.46200 GHz
#Res BW 3.0 kHz
#VBW 10 kHz*
Span 35.61 MHz
Sweep 4.848 s (8001 pts)
Frequency
Auto Tune
Center Freq
2.462000000 GHz
Start Freq
2.444194000 GHz
Stop Freq
2.479806000 GHz
CF Step
3.561200 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

4.4 Conducted 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).

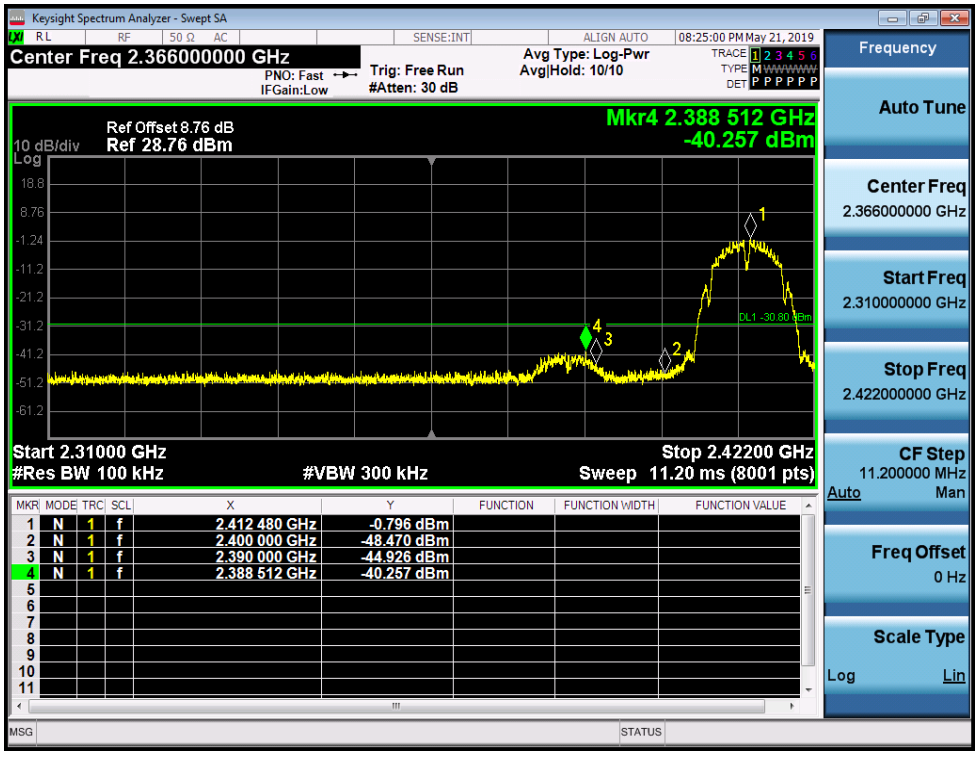
4.4.2 Test Procedures

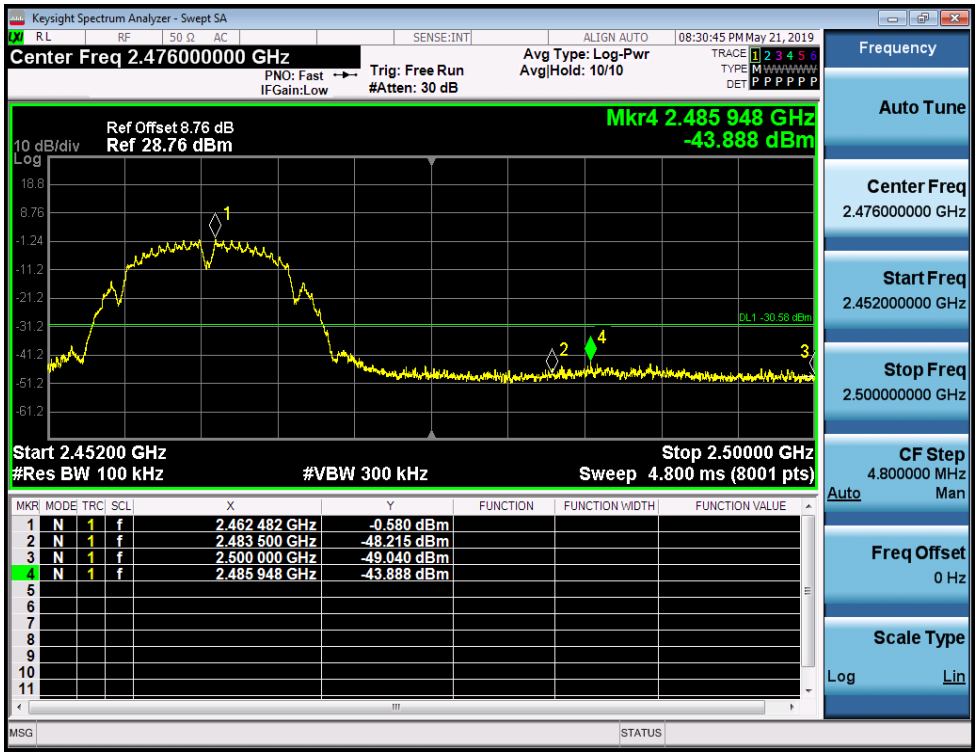
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside 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.

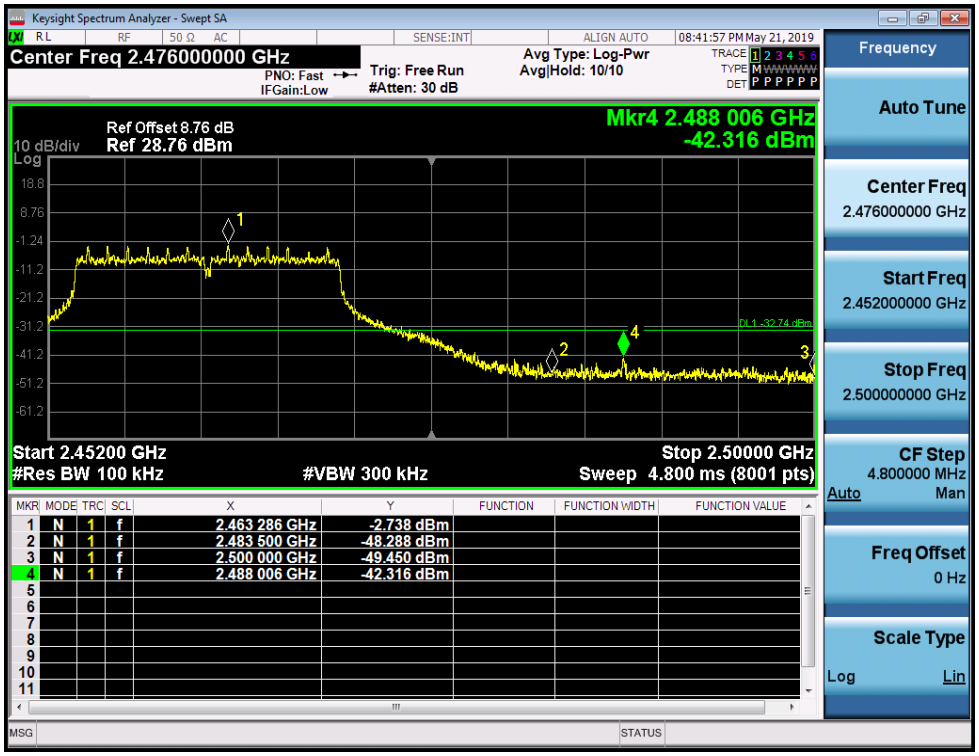
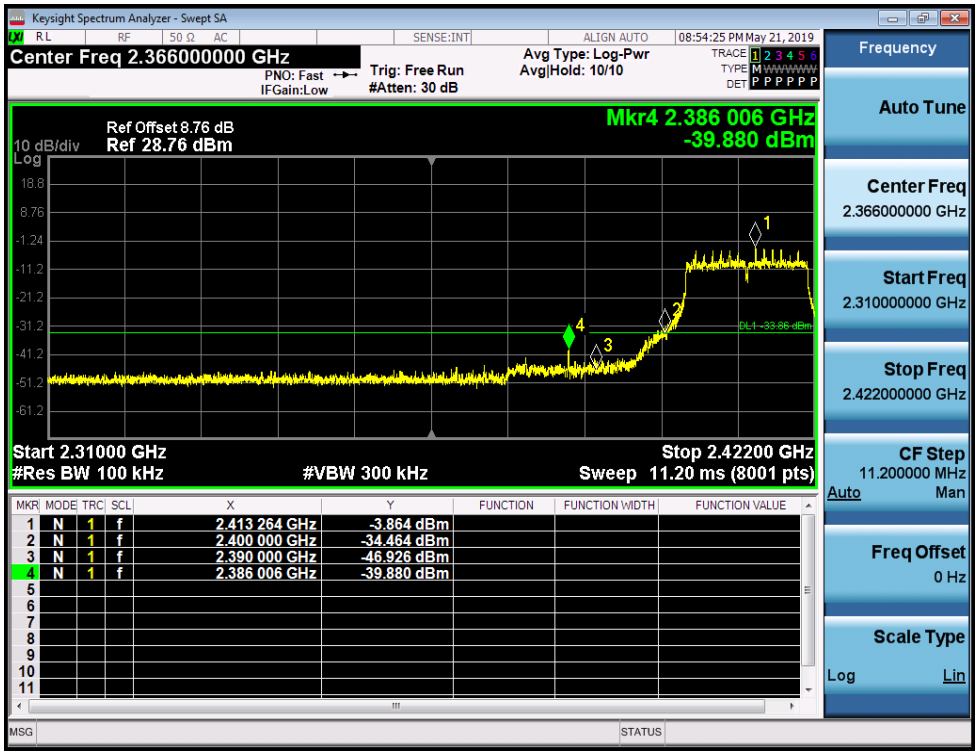
4.4.3 Test Result of Conducted Band Edges

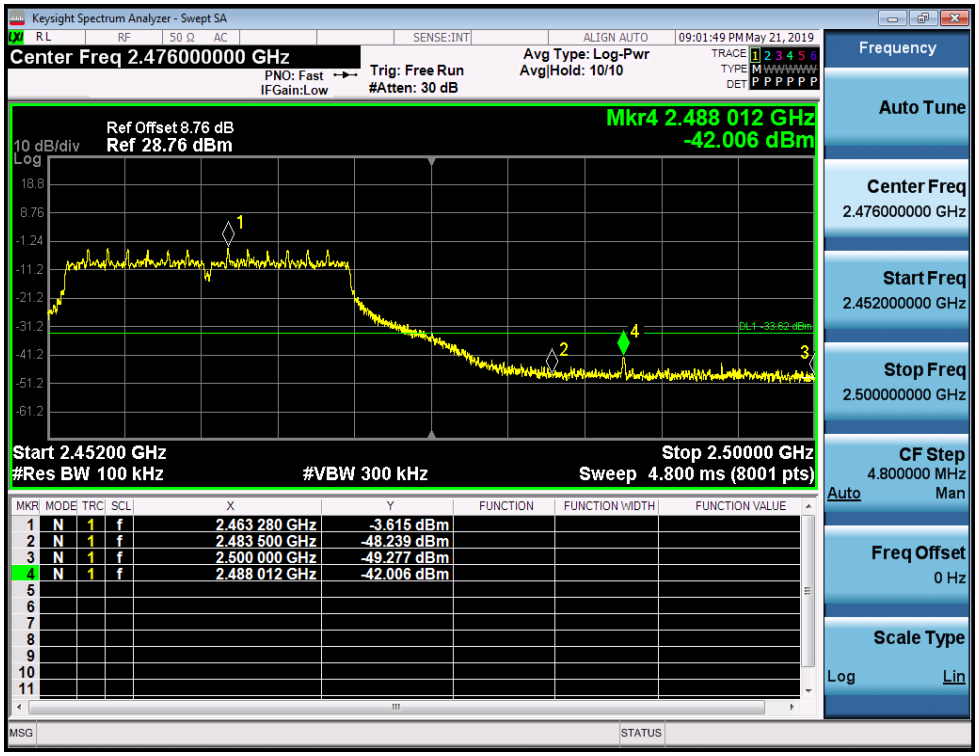
Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	-0.796	-40.257	-30.8	PASS
11B	HCH	-0.580	-43.888	-30.58	PASS
11G	LCH	-3.230	-34.494	-33.23	PASS
11G	HCH	-2.738	-42.316	-32.74	PASS
11N20SISO	LCH	-3.864	-34.464	-33.86	PASS
11N20SISO	HCH	-3.615	-42.006	-33.62	PASS

Test Graph

Graphs	
11B/LCH	

11B/HCH	
11G/LCH	

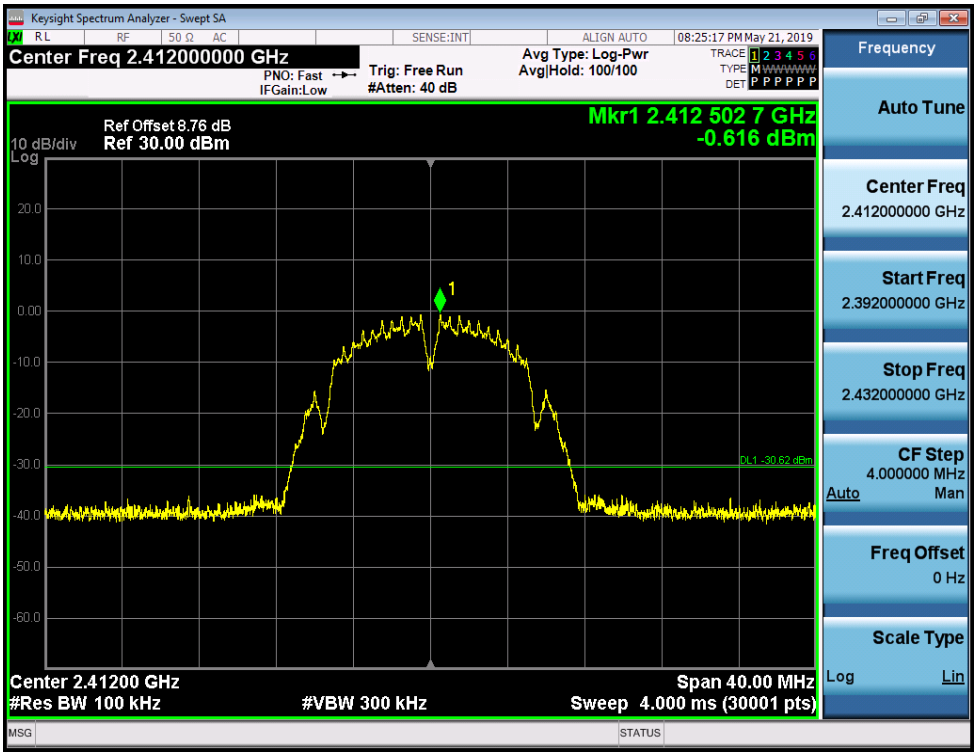
11G/HCH	
11N20SISO/LCH	

11N20SISO/HCH	

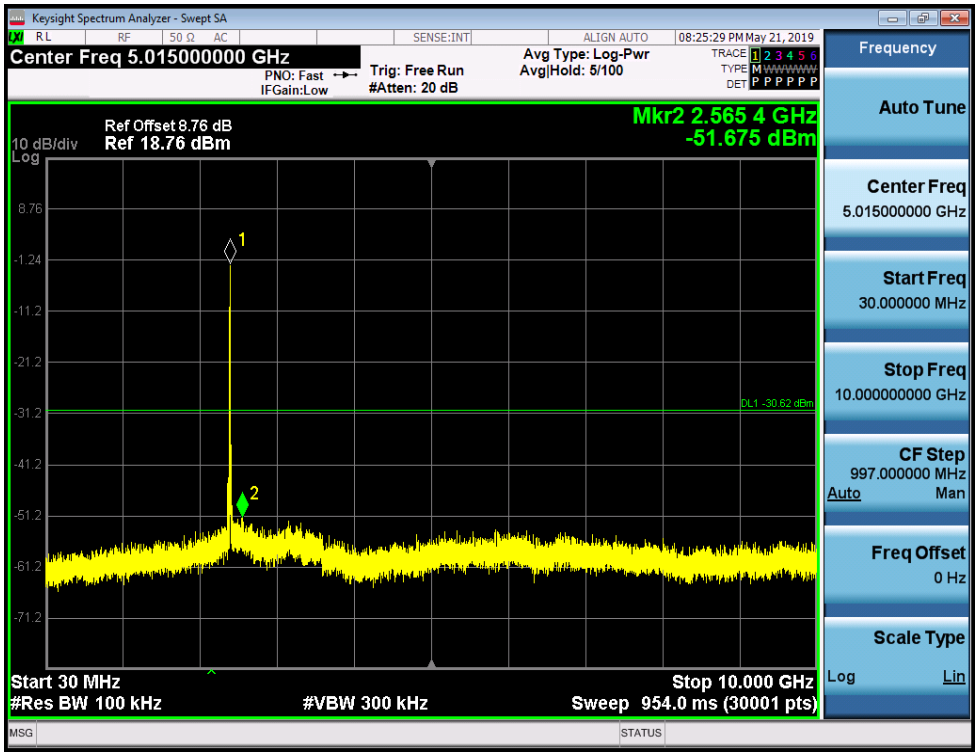
4.4.4 Test Result of Conducted Spurious Emission

Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
11B	LCH	-0.616	<Limit	PASS
11B	MCH	-0.72	<Limit	PASS
11B	HCH	-0.394	<Limit	PASS
11G	LCH	-2.889	<Limit	PASS
11G	MCH	-2.922	<Limit	PASS
11G	HCH	-2.717	<Limit	PASS
11N20SISO	LCH	-4.19	<Limit	PASS
11N20SISO	MCH	-3.909	<Limit	PASS
11N20SISO	HCH	-3.907	<Limit	PASS

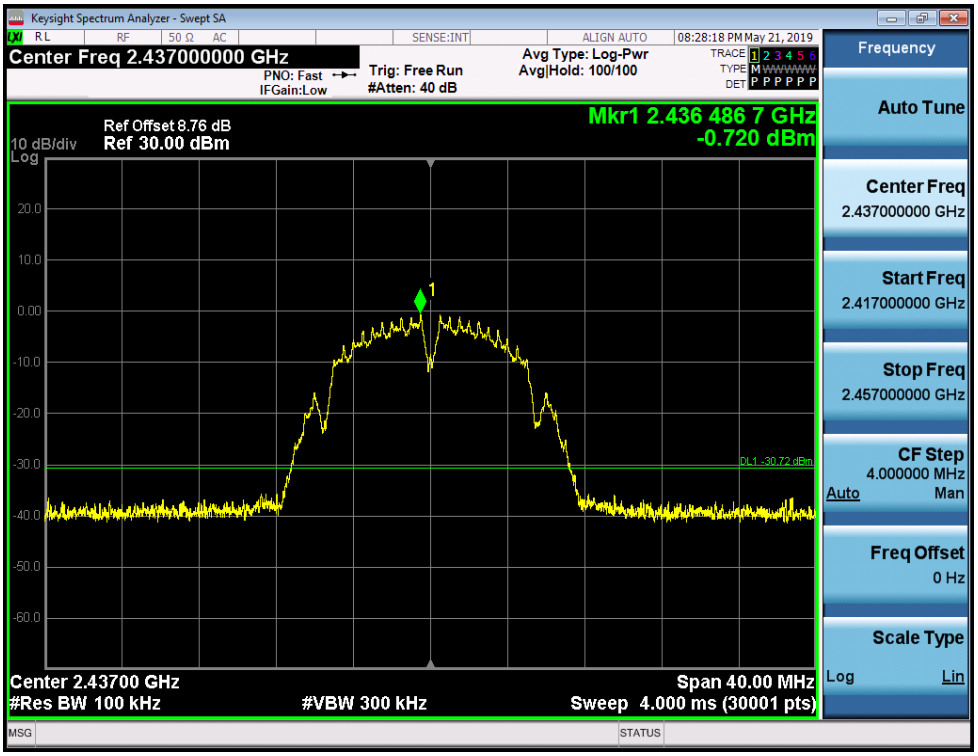
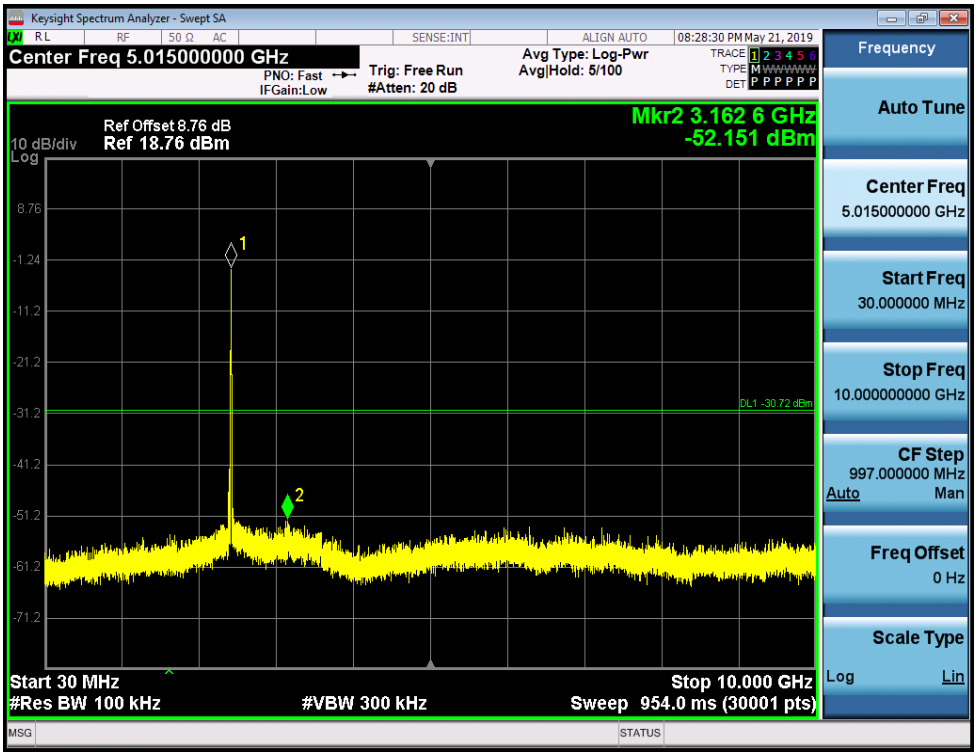
Conducted Spurious Emission Plot

11B_LCH_Graphs	
Pref/11B/LCH	

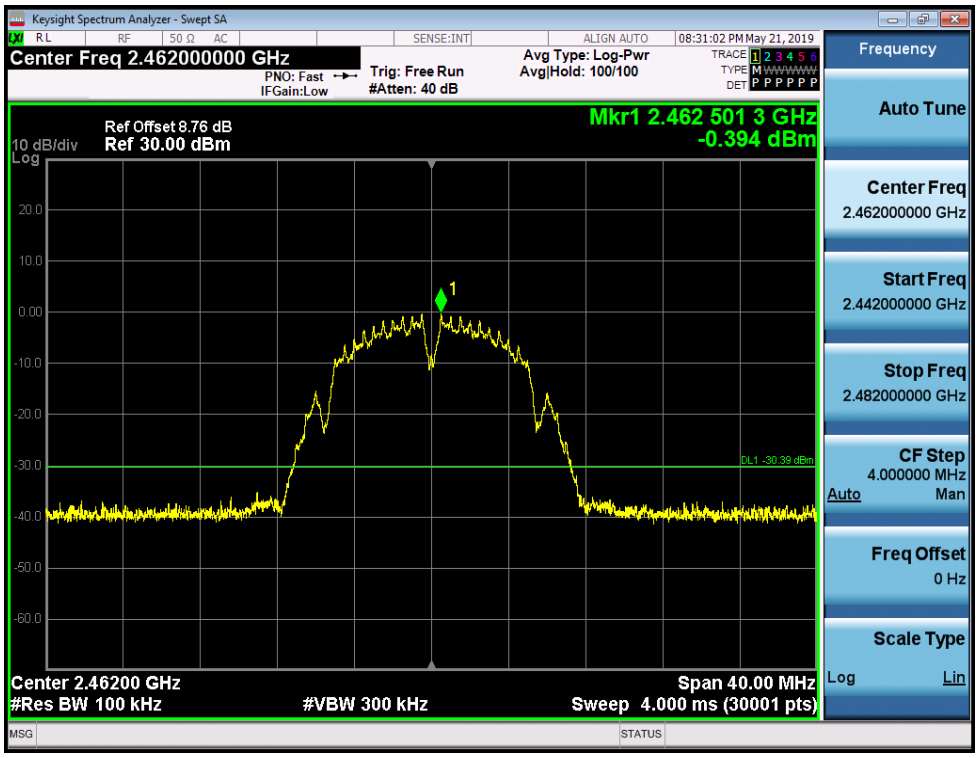
Puw/11B/LCH


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 5/100
08:25:29 PM May 21, 2019
Ref Offset 8.76 dB
10 dB/div
Ref 18.76 dBm
Log
Mkr2 2.565 4 GHz
-51.675 dBm
DL1 -30.62 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 954.0 ms (30001 pts)
Frequency
Auto Tune
Center Freq
5.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
10.000000000 GHz
CF Step
997.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

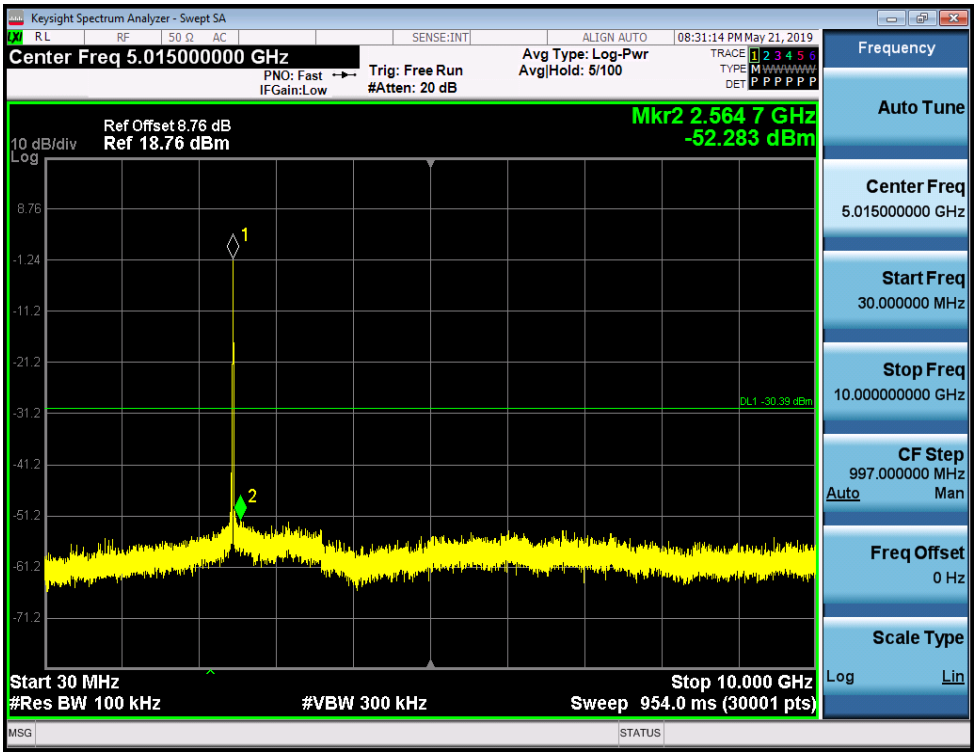

Keysight Spectrum Analyzer - Swept SA
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 3/100
08:25:39 PM May 21, 2019
Ref Offset 8.76 dB
10 dB/div
Ref 18.76 dBm
Log
Mkr1 25.302 9 GHz
-38.698 dBm
DL1 -30.62 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

11B_MCH_Graphs	
Pref/11B/MCH	
Puw/11B/MCH	

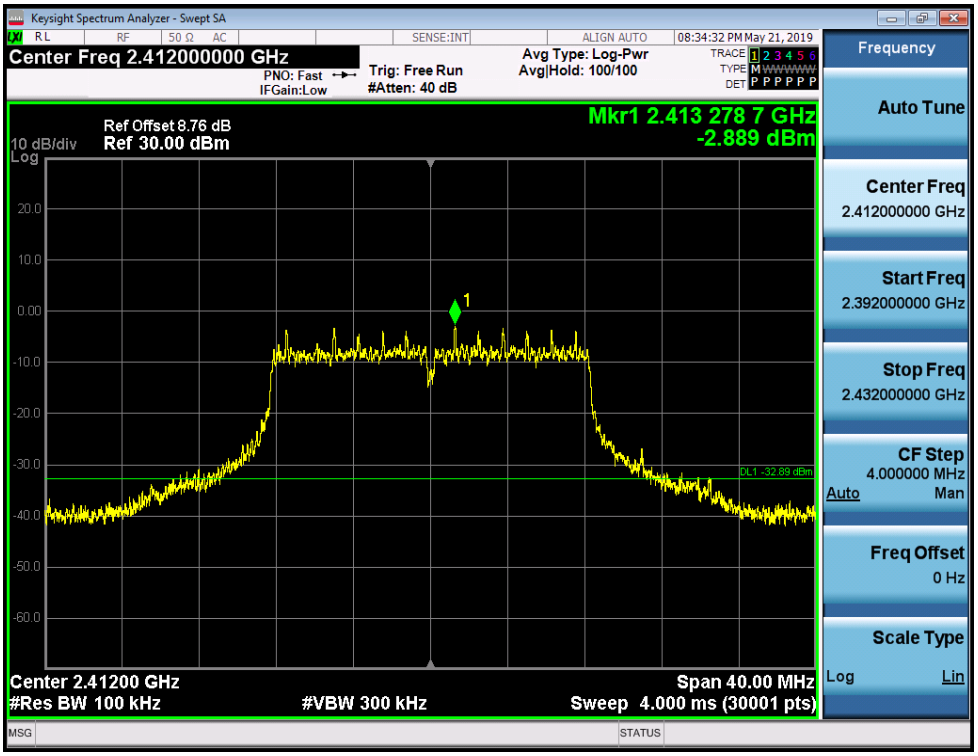
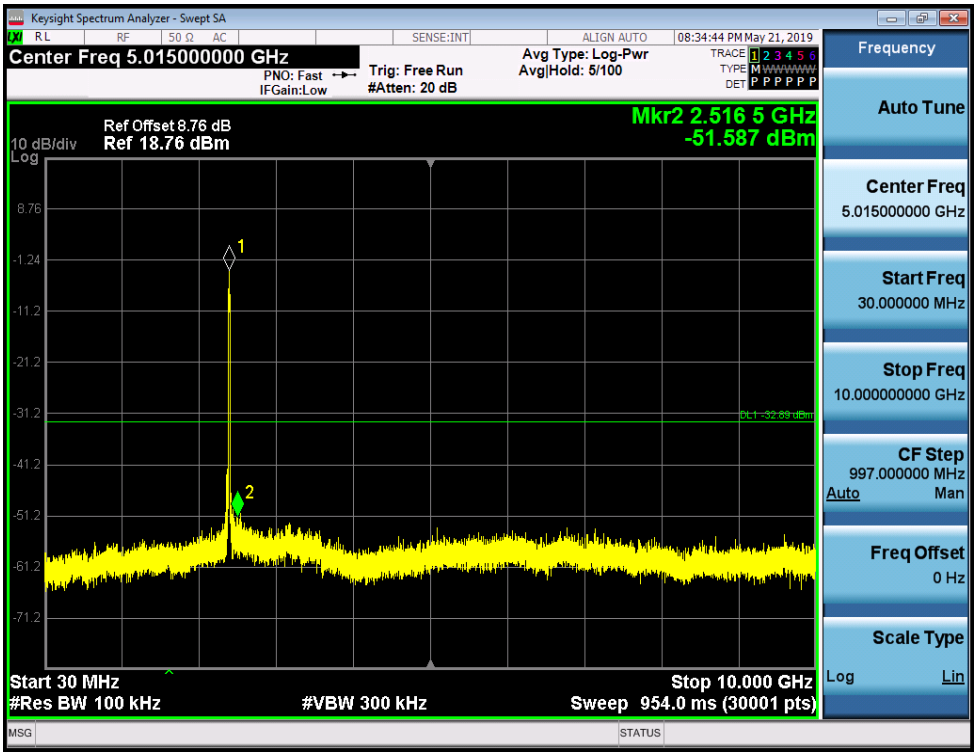
11B_HCH_Graphs
Pref/11B/HCH

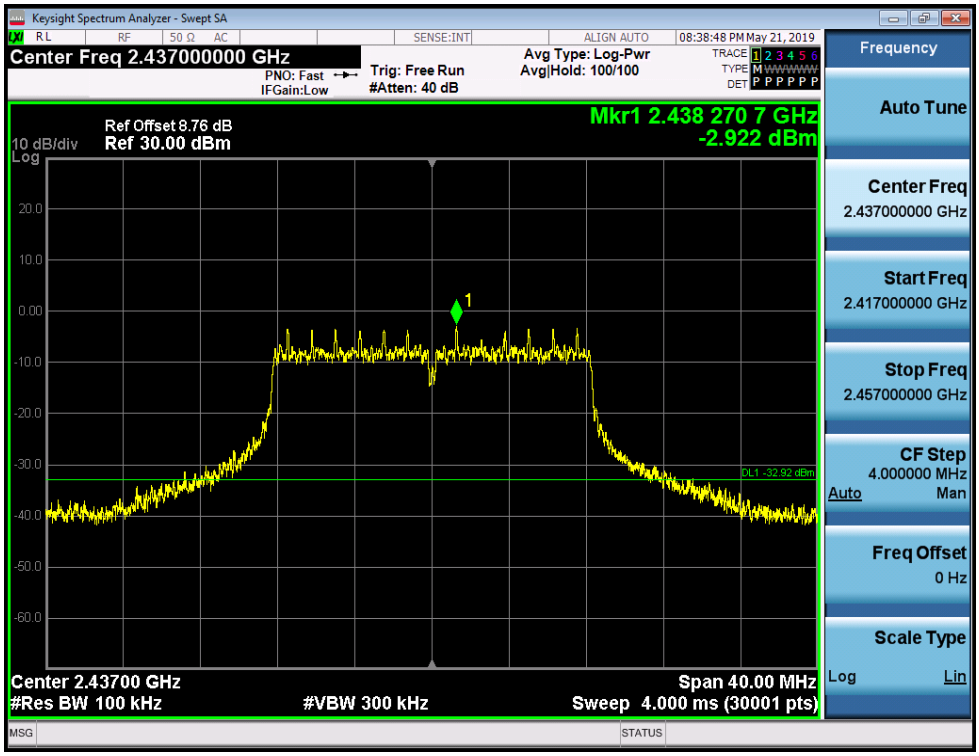


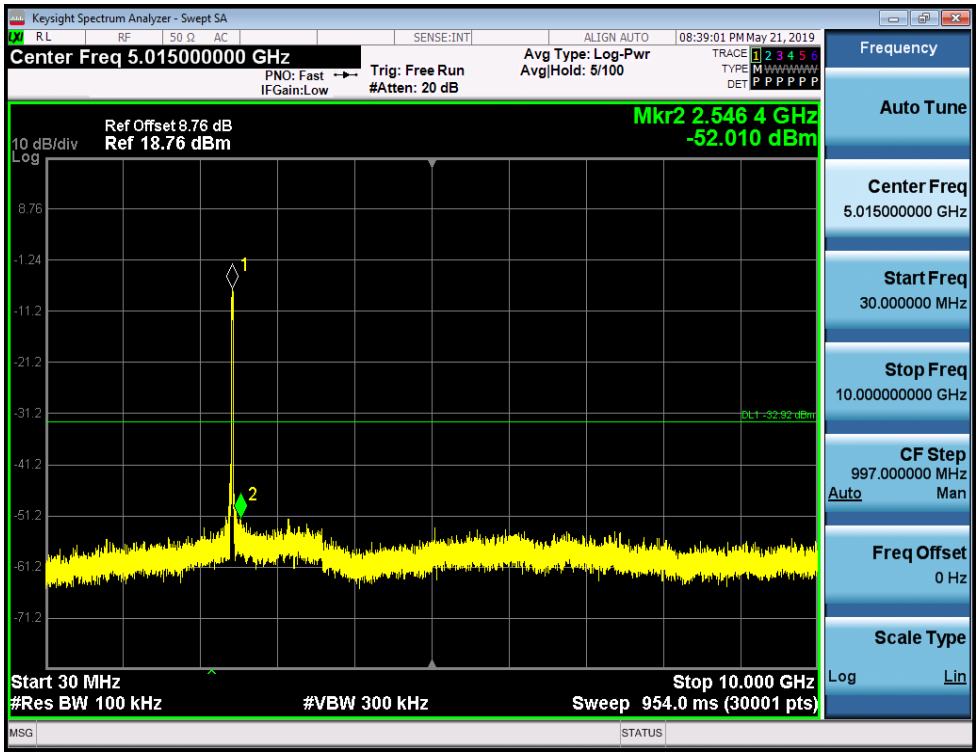
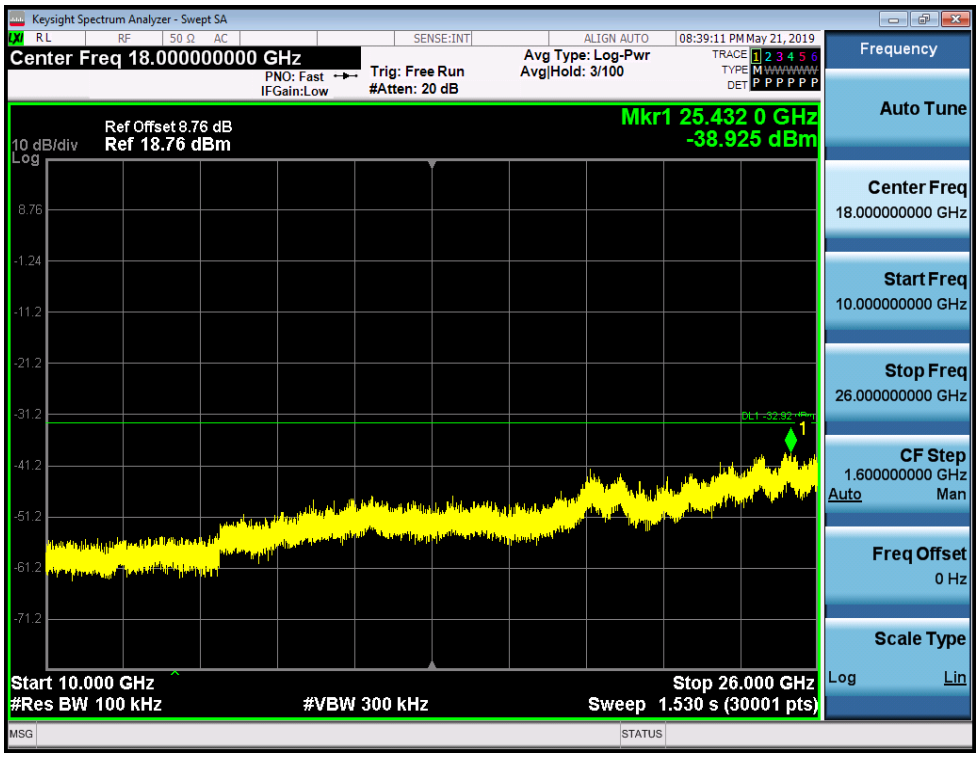
Puw/11B/HCH

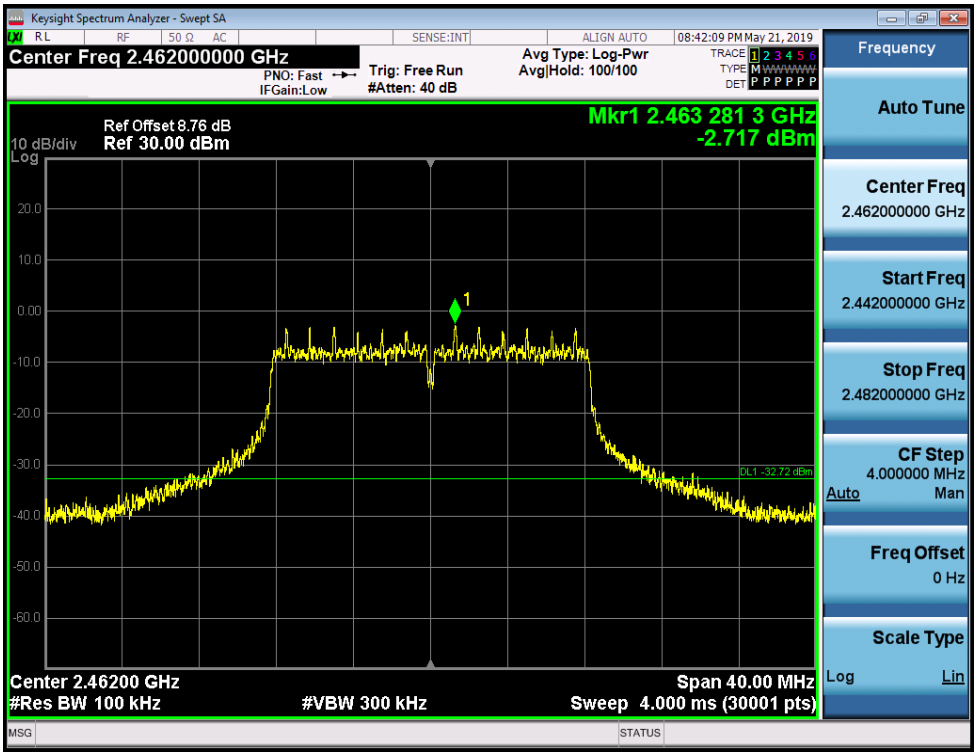
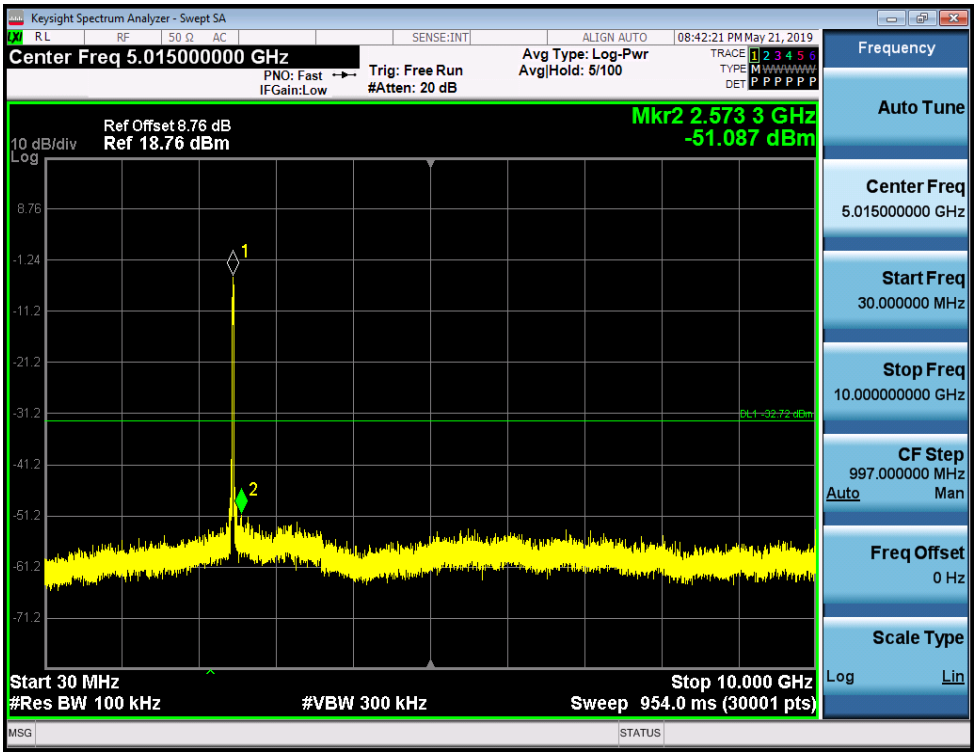

Keysight Spectrum Analyzer - Swept SA
Center Freq 5.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 5/100
08:31:14 PM May 21, 2019
Ref Offset 8.76 dB
10 dB/div
Ref 18.76 dBm
Log
Mkr2 2.564 7 GHz
-52.283 dBm
DL1 -30.39 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 954.0 ms (30001 pts)
Frequency
Auto Tune
Center Freq
5.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
10.000000000 GHz
CF Step
997.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

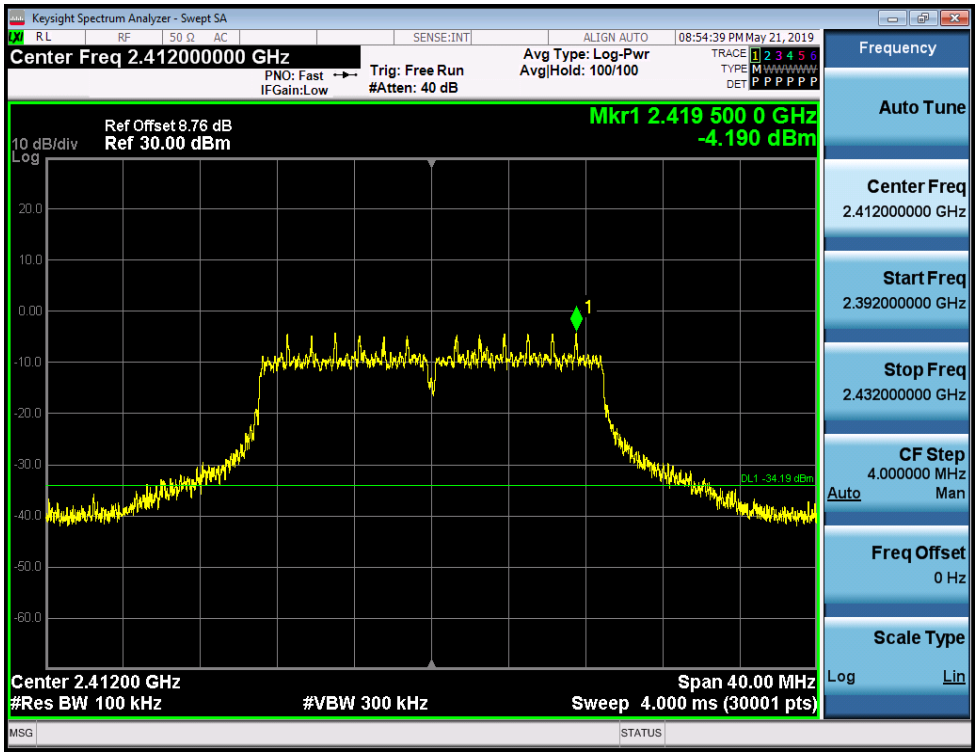

Keysight Spectrum Analyzer - Swept SA
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 3/100
08:31:24 PM May 21, 2019
Ref Offset 8.76 dB
10 dB/div
Ref 18.76 dBm
Log
Mkr1 25.371 2 GHz
-38.903 dBm
DL1 -30.39 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

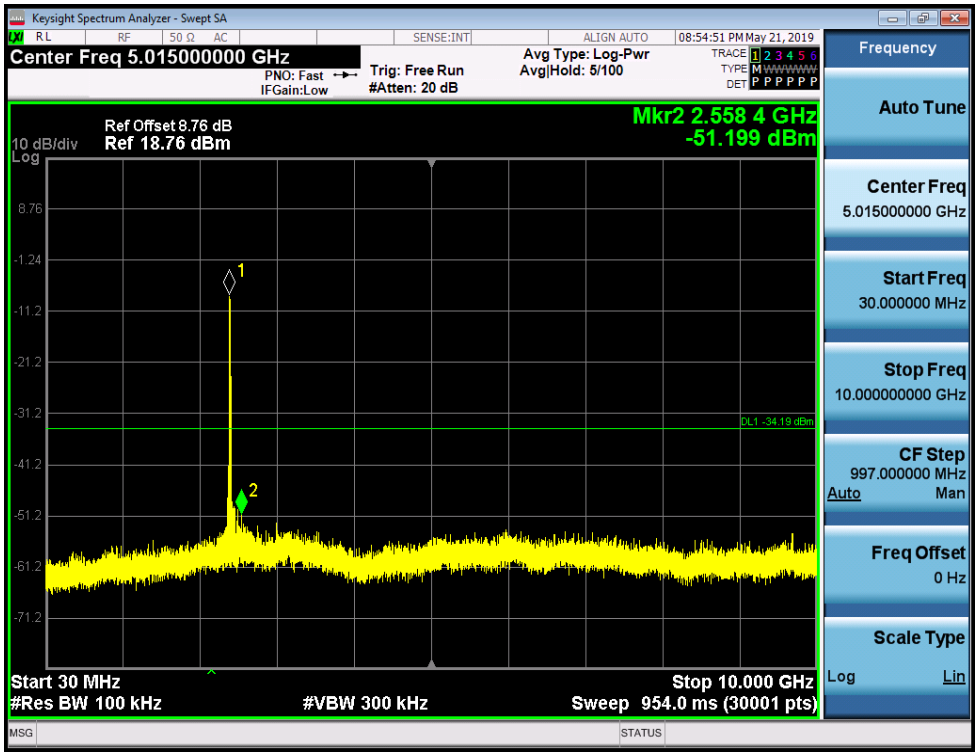
11G_LCH_Graphs	
Pref/11G/LCH	
Puw/11G/LCH	

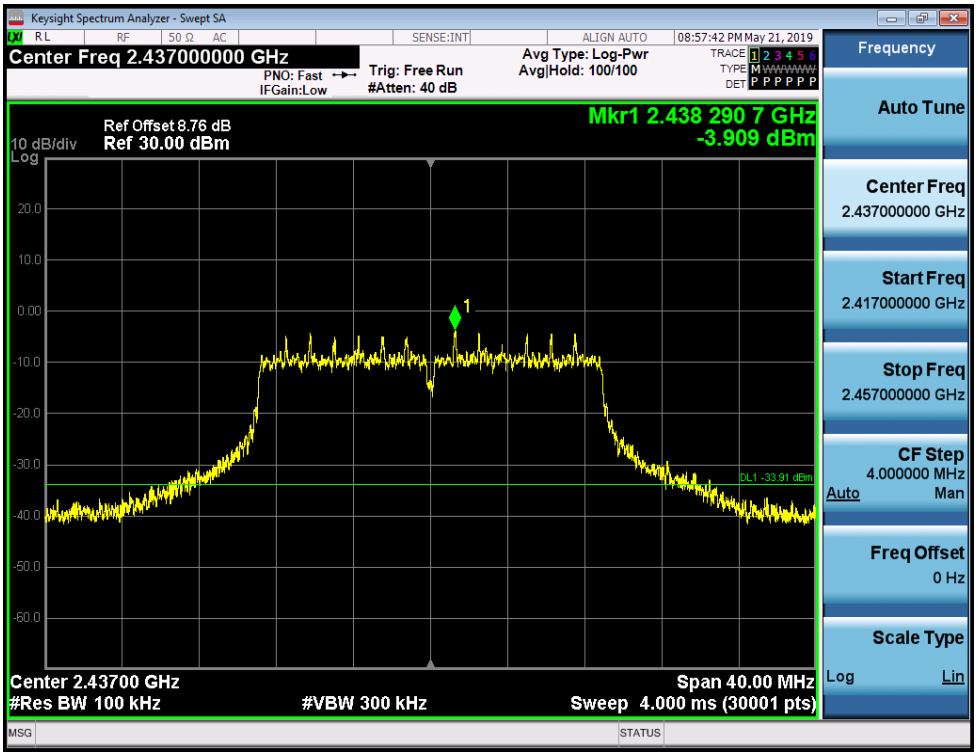
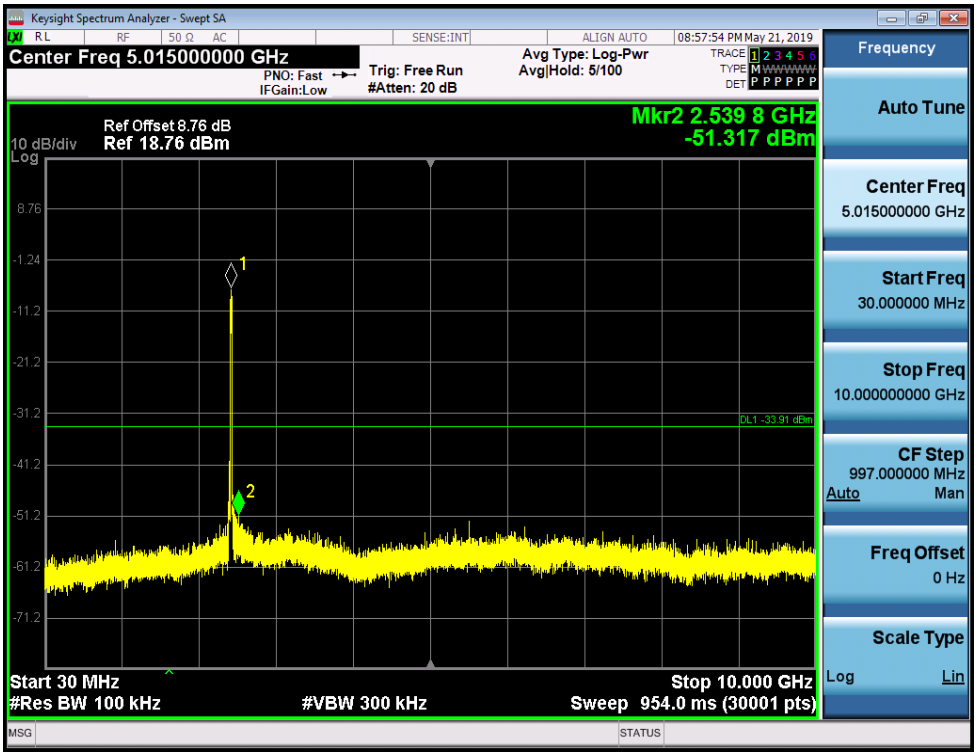
11G_MCH_Graphs	
Pref/11G/MCH	

Puw/11G/MCH	 

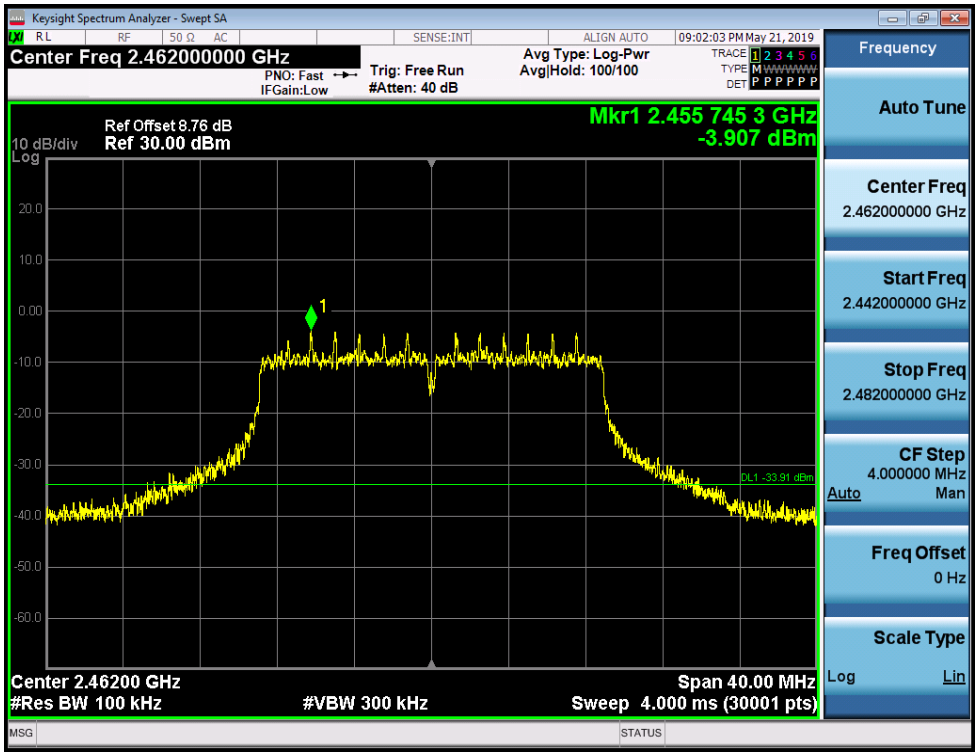
11G_HCH_Graphs	
Pref/11G/HCH	
Puw/11G/HCH	

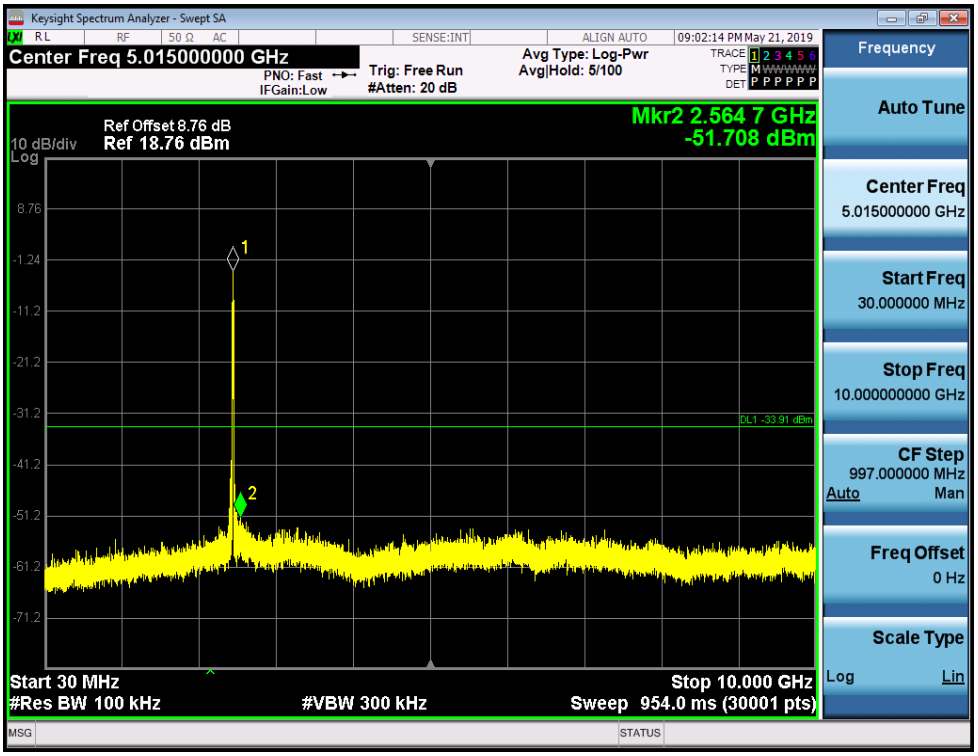
11N20_LCH_Graphs	
Pref/11N20/LCH	

Puw/11N20/LCH	 

11N20_MCH_Graphs	
Pref/11N20/MCH	
Puw/11N20/MCH	

11N20_HCH_Graphs	
Pref/11N20/HCH	

Puw/11N20/HCH	 

4.5 Radiated Band Edges and Spurious Emission Measurement

4.5.1 Limit of Radiated Band Edges and Spurious Emission

FCC §15.247 (d)

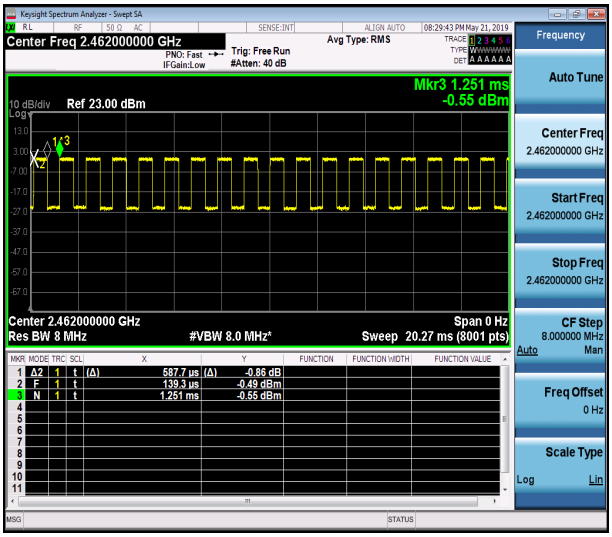
In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

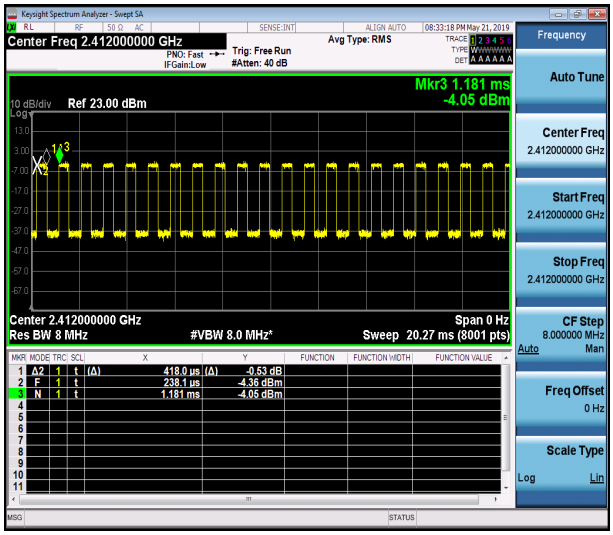
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

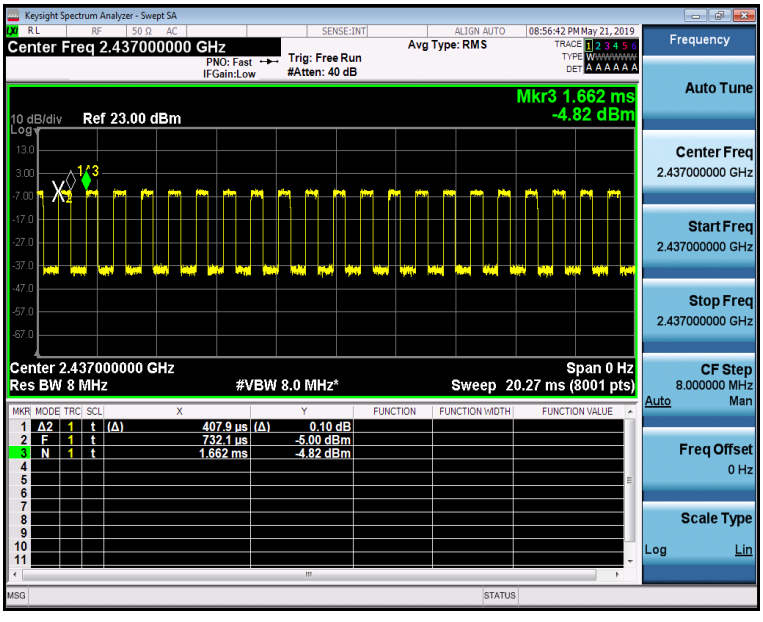
4.5.2 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The measurement distance is 3 meter.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. 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 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.

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	52.85%	0.5877	1.7	3kHz
802.11g	44.35%	0.418	2.39	3kHz
2.4GHz 802.11n HT20	43.87%	0.4079	2.45	3kHz







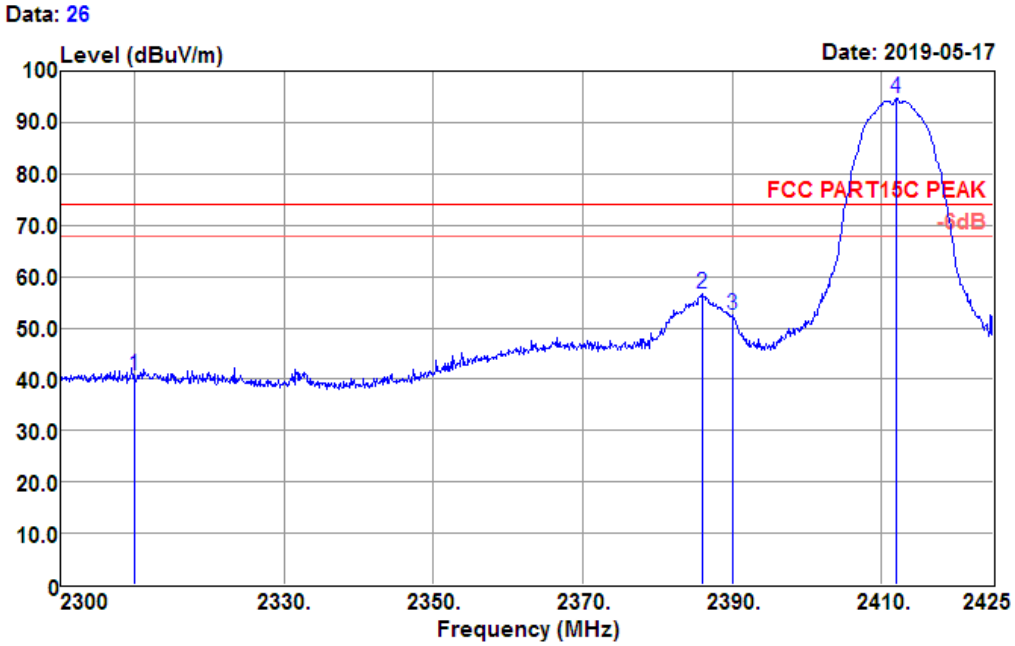
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

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.

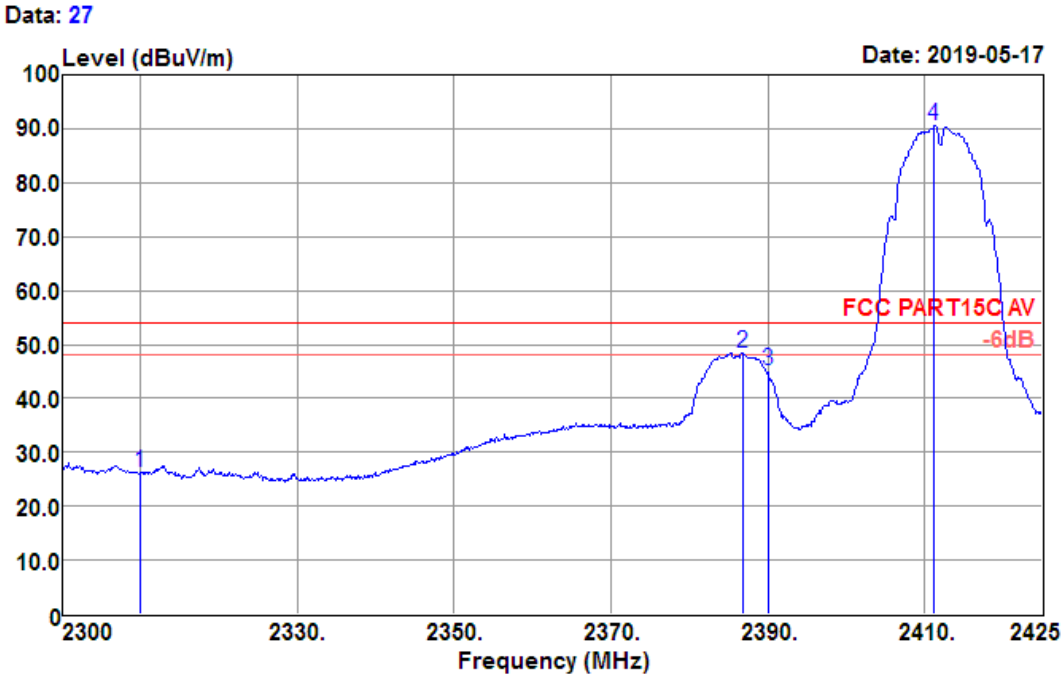
4.5.4 Test Result of Radiated Spurious at Band Edges

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



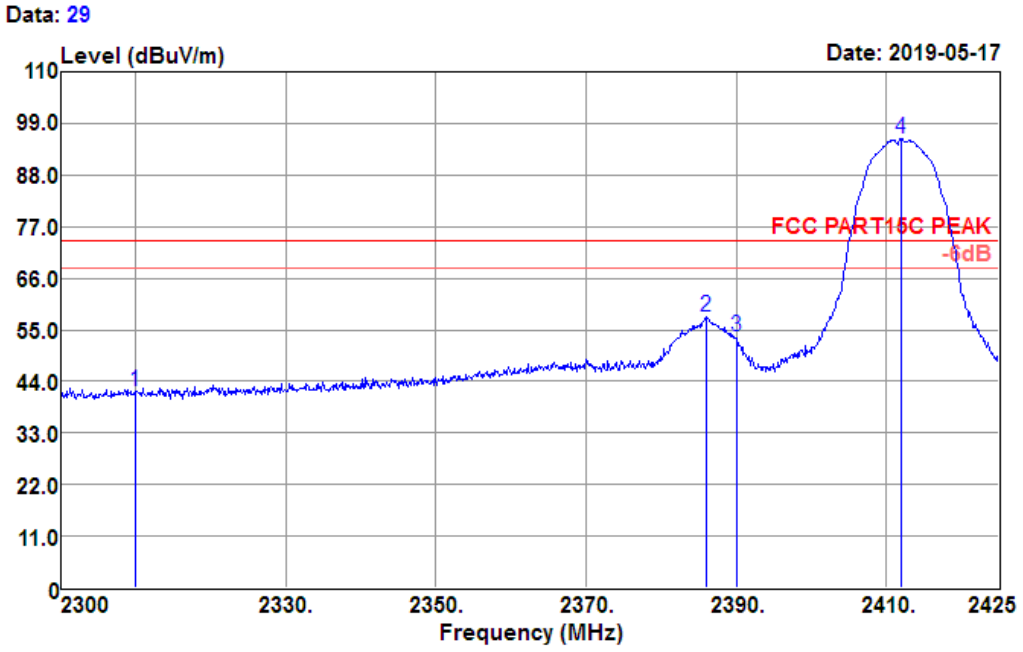
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	46.20	26.91	3.56	35.87	40.80	74.00	-33.20	Peak
2386.125	61.90	27.10	3.64	36.07	56.57	74.00	-17.43	Peak
2390.000	57.98	27.11	3.64	36.08	52.65	74.00	-21.35	Peak
2412.000	99.93	27.17	3.65	36.14	94.61	74.00	20.61	Peak

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



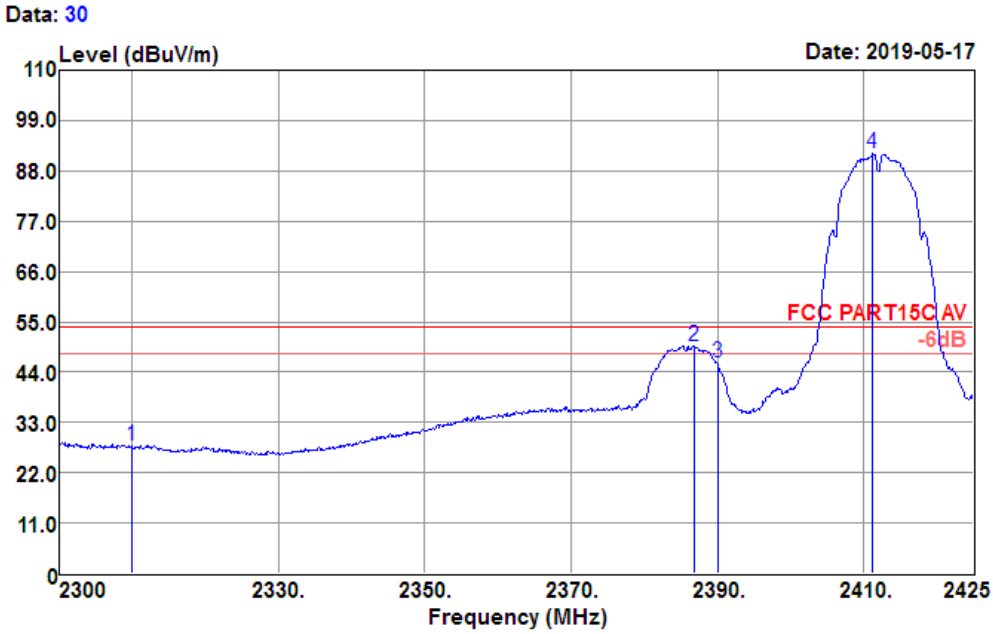
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	31.62	26.91	3.56	35.87	26.22	54.00	-27.78	Average
2386.750	53.79	27.11	3.64	36.07	48.47	54.00	-5.53	Average
2390.000	50.50	27.11	3.64	36.08	45.17	54.00	-8.83	Average
2411.250	95.83	27.17	3.65	36.14	90.51	54.00	36.51	Average

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



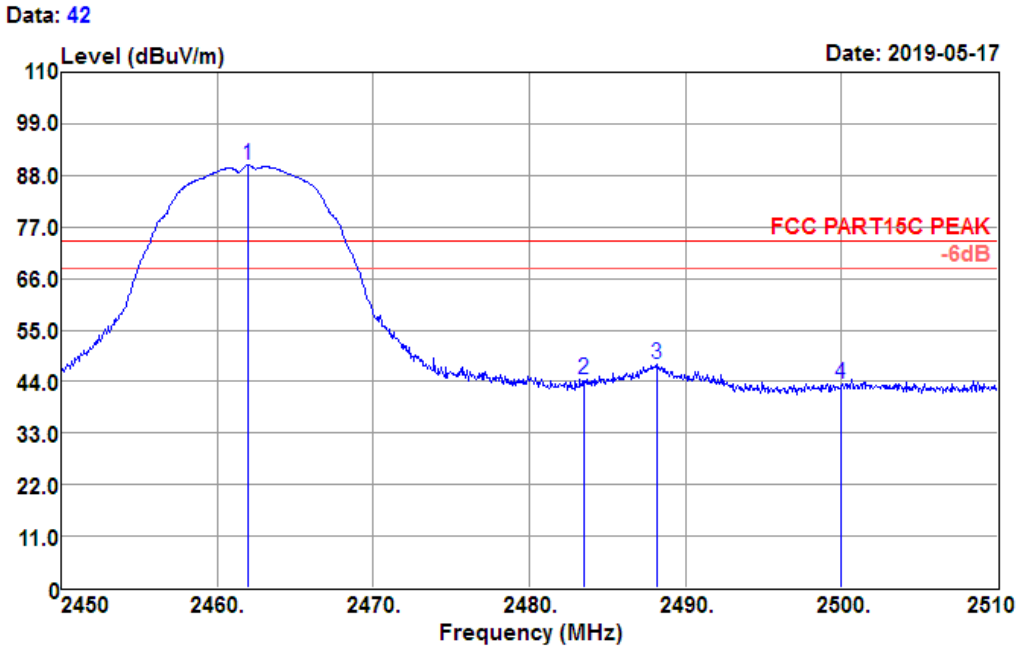
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	47.24	26.91	3.56	35.87	41.84	74.00	-32.16	Peak
2386.000	63.08	27.10	3.64	36.07	57.75	74.00	-16.25	Peak
2390.000	59.00	27.11	3.64	36.08	53.67	74.00	-20.33	Peak
2412.000	101.07	27.17	3.65	36.14	95.75	74.00	21.75	Peak

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



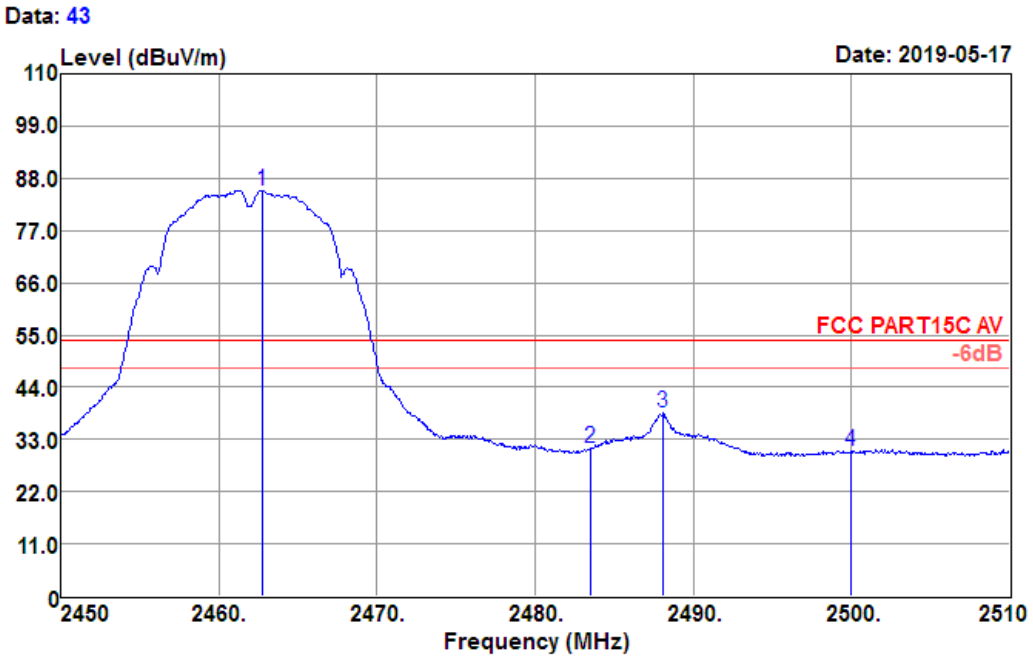
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	33.35	26.91	3.56	35.87	27.95	54.00	-26.05	Average
2386.875	55.13	27.11	3.64	36.07	49.81	54.00	-4.19	Average
2390.000	51.53	27.11	3.64	36.08	46.20	54.00	-7.80	Average
2411.250	97.01	27.17	3.65	36.14	91.69	54.00	37.69	Average

Test Mode :	802.11b CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



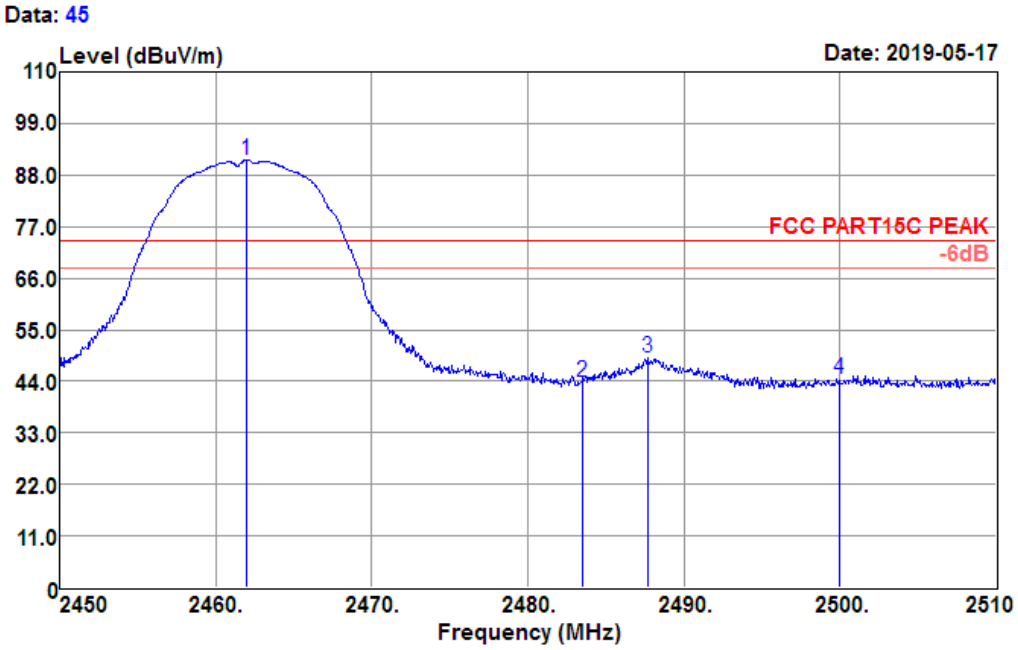
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2462.000	95.44	27.30	3.67	36.27	90.14	74.00	16.14	Peak
2483.500	49.91	27.36	3.68	36.33	44.62	74.00	-29.38	Peak
2488.220	52.86	27.37	3.68	36.34	47.57	74.00	-26.43	Peak
2500.000	48.79	27.40	3.68	36.37	43.50	74.00	-30.50	Peak

Test Mode :	802.11b CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



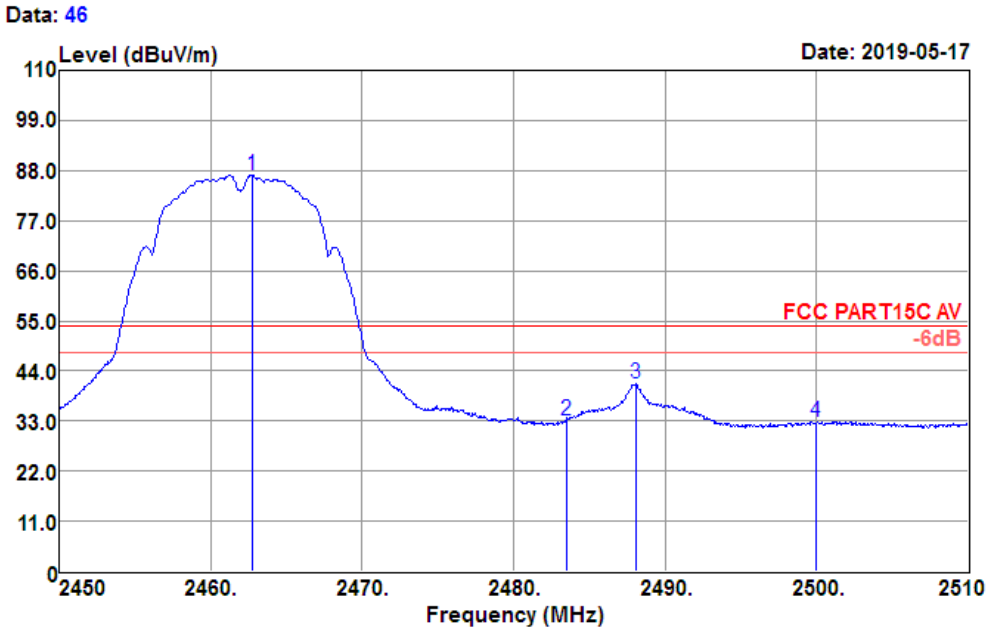
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2462.720	90.75	27.30	3.67	36.27	85.45	54.00	31.45	Average
2483.500	36.38	27.36	3.68	36.33	31.09	54.00	-22.91	Average
2488.100	43.78	27.37	3.68	36.34	38.49	54.00	-15.51	Average
2500.000	35.80	27.40	3.68	36.37	30.51	54.00	-23.49	Average

Test Mode :	802.11b CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



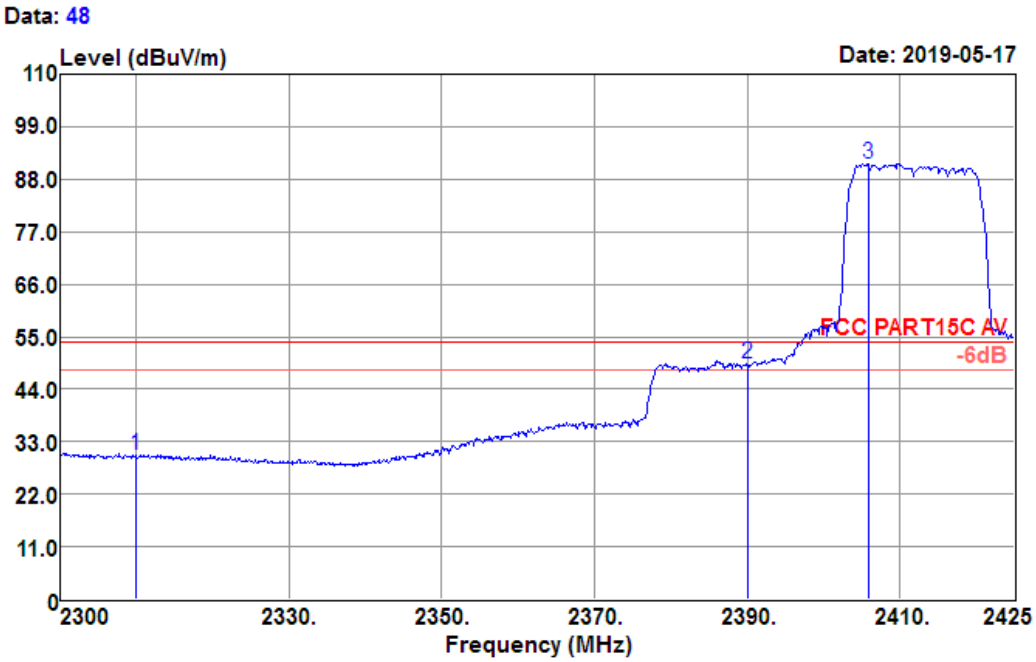
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2462.000	96.62	27.30	3.67	36.27	91.32	74.00	17.32	Peak
2483.500	49.18	27.36	3.68	36.33	43.89	74.00	-30.11	Peak
2487.680	54.44	27.37	3.68	36.34	49.15	74.00	-24.85	Peak
2500.000	49.67	27.40	3.68	36.37	44.38	74.00	-29.62	Peak

Test Mode :	802.11b CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



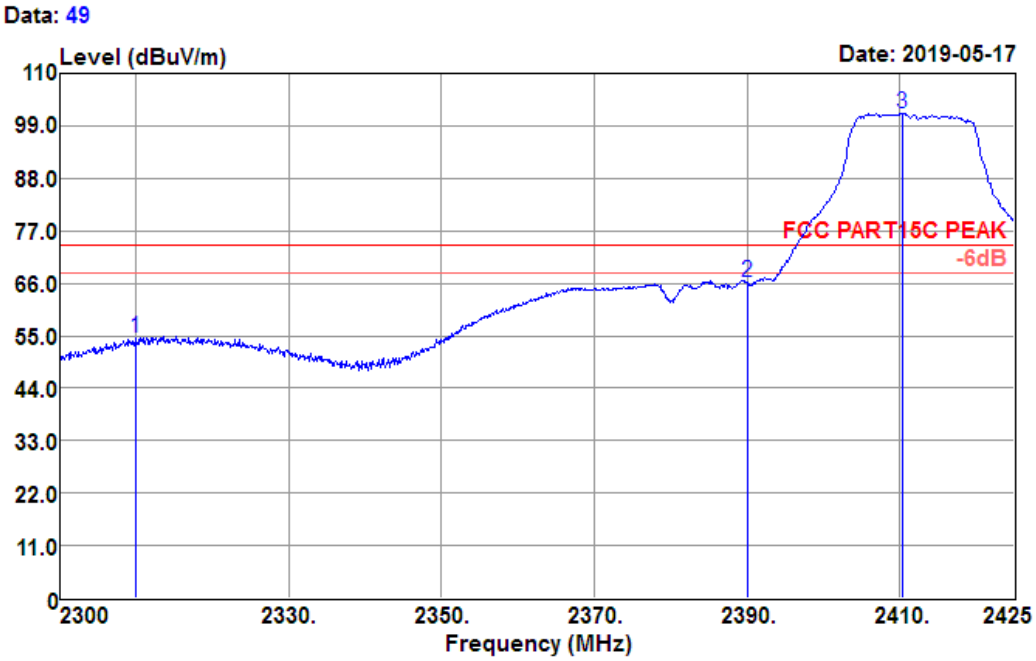
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2462.720	92.28	27.30	3.67	36.27	86.98	54.00	32.98	Average
2483.500	38.31	27.36	3.68	36.33	33.02	54.00	-20.98	Average
2488.040	46.35	27.37	3.68	36.34	41.06	54.00	-12.94	Average
2500.000	38.08	27.40	3.68	36.37	32.79	54.00	-21.21	Average

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



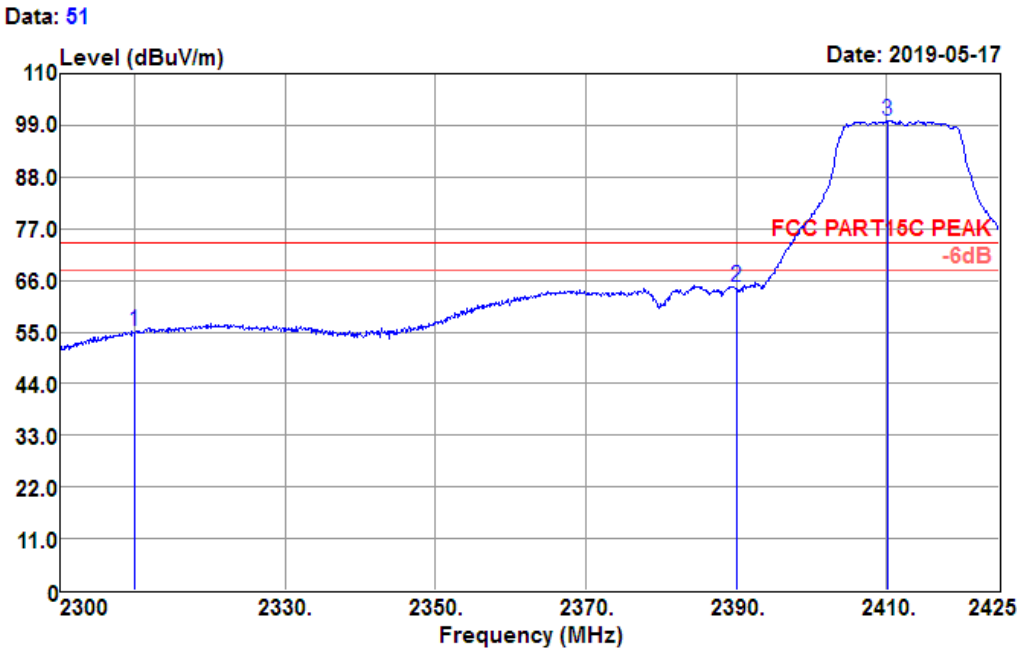
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	35.49	26.91	3.56	35.87	30.09	54.00	-23.91	Average
2390.000	54.61	27.11	3.64	36.08	49.28	54.00	-4.72	Average
2405.875	96.63	27.16	3.65	36.12	91.32	54.00	37.32	Average

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



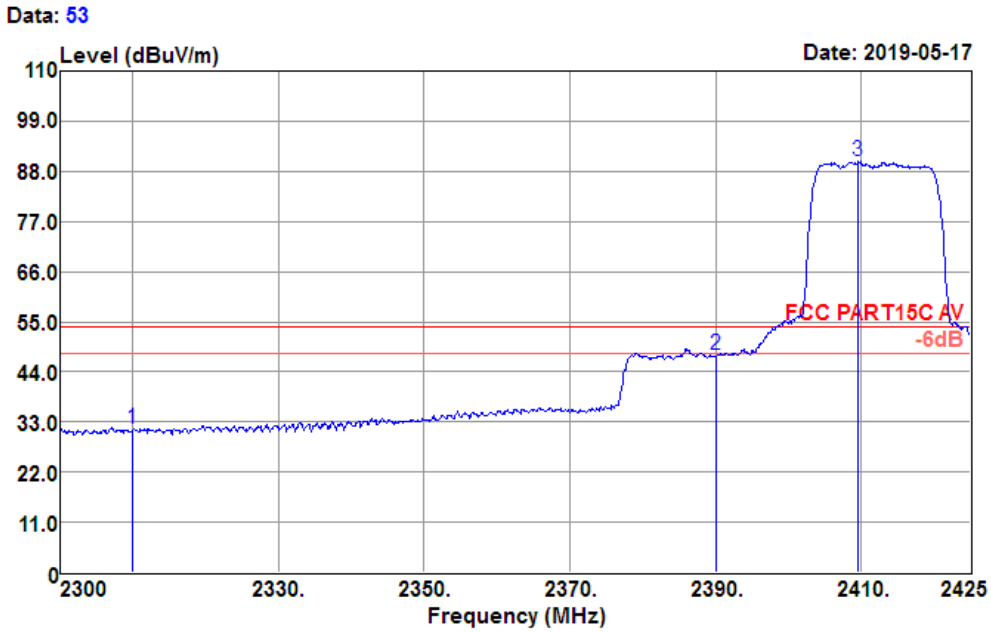
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	59.82	26.91	3.56	35.87	54.42	74.00	-19.58	Peak
2390.000	71.61	27.11	3.64	36.08	66.28	74.00	-7.72	Peak
2410.375	106.93	27.17	3.65	36.13	101.62	74.00	27.62	Peak

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



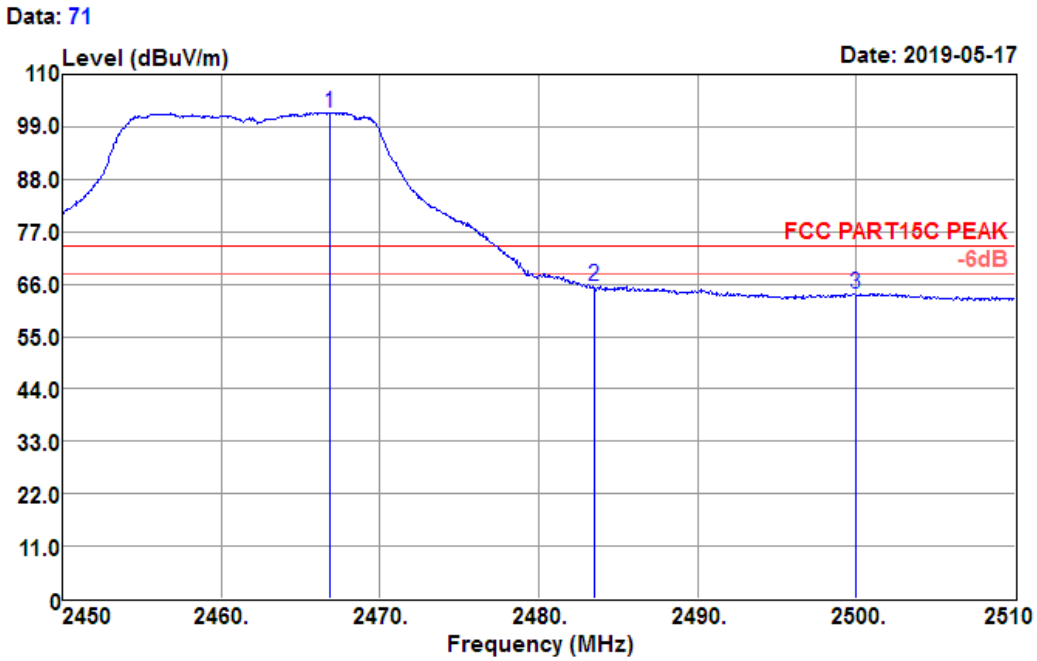
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	60.67	26.91	3.56	35.87	55.27	74.00	-18.73	Peak
2390.000	69.82	27.11	3.64	36.08	64.49	74.00	-9.51	Peak
2410.250	105.40	27.17	3.65	36.13	100.09	74.00	26.09	Peak

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



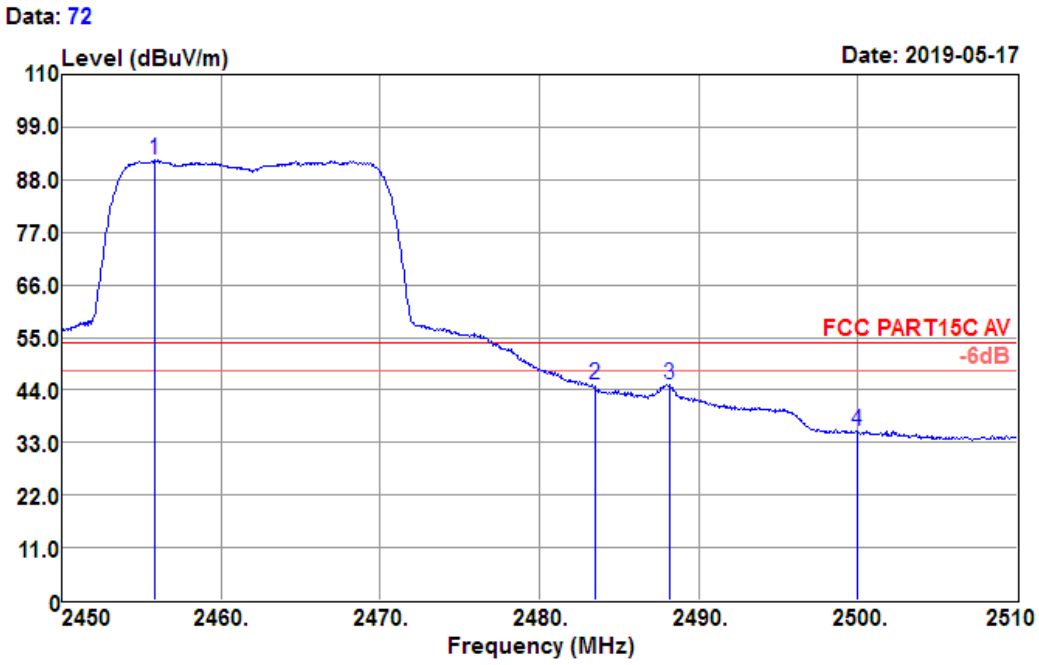
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	36.73	26.91	3.56	35.87	31.33	54.00	-22.67	Average
2390.000	52.99	27.11	3.64	36.08	47.66	54.00	-6.34	Average
2409.625	95.43	27.17	3.65	36.13	90.12	54.00	36.12	Average

Test Mode :	802.11g CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



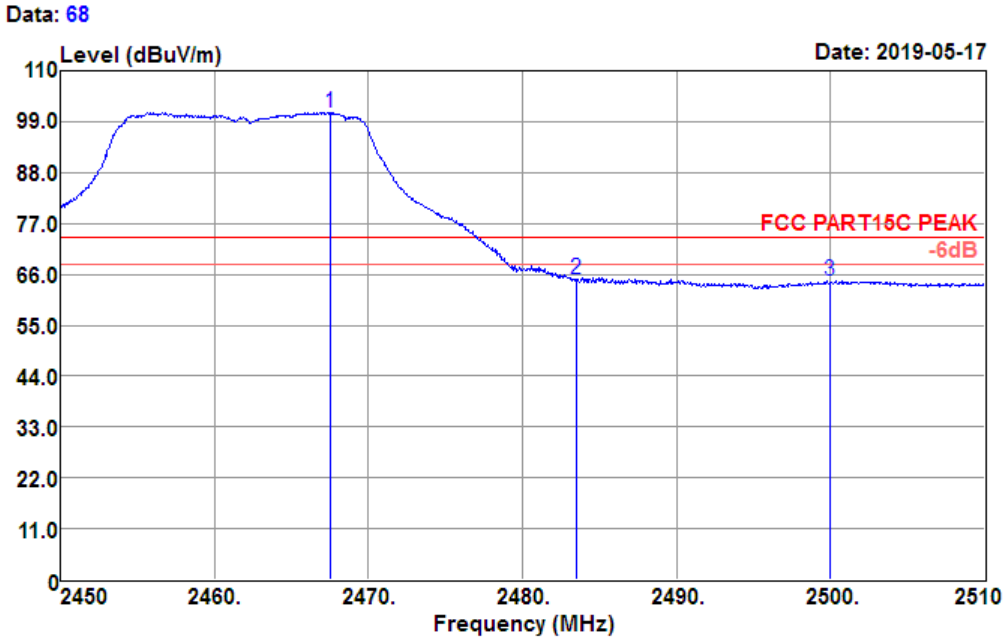
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2466.860	107.24	27.31	3.67	36.28	101.94	74.00	27.94	Peak
2483.500	70.84	27.36	3.68	36.33	65.55	74.00	-8.45	Peak
2500.000	69.29	27.40	3.68	36.37	64.00	74.00	-10.00	Peak

Test Mode :	802.11g CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Horizontal



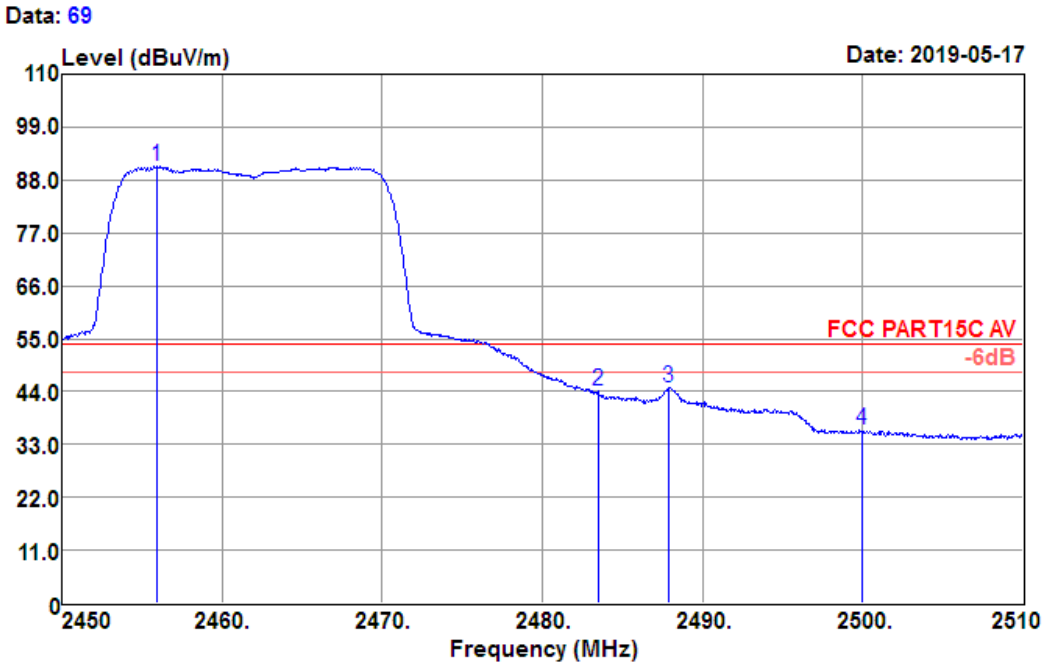
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2455.880	97.38	27.29	3.67	36.25	92.09	54.00	38.09	Average
2483.500	50.39	27.36	3.68	36.33	45.10	54.00	-8.90	Average
2488.160	50.57	27.37	3.68	36.34	45.28	54.00	-8.72	Average
2500.000	40.70	27.40	3.68	36.37	35.41	54.00	-18.59	Average

Test Mode :	802.11g CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



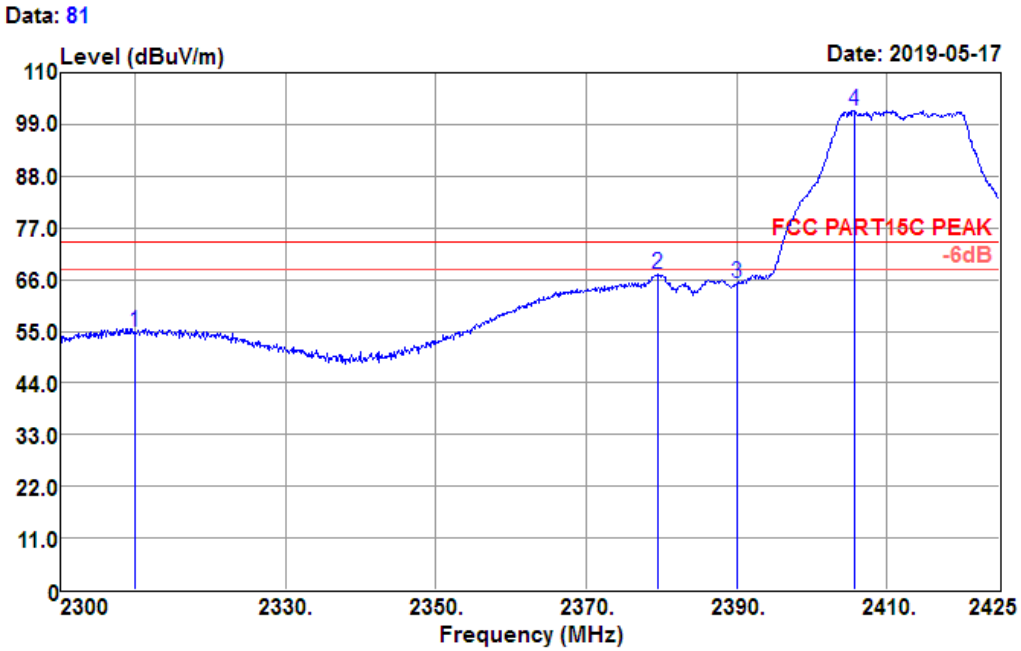
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2467.520	106.14	27.32	3.67	36.28	100.85	74.00	26.85	Peak
2483.500	70.35	27.36	3.68	36.33	65.06	74.00	-8.94	Peak
2500.000	69.80	27.40	3.68	36.37	64.51	74.00	-9.49	Peak

Test Mode :	802.11g CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



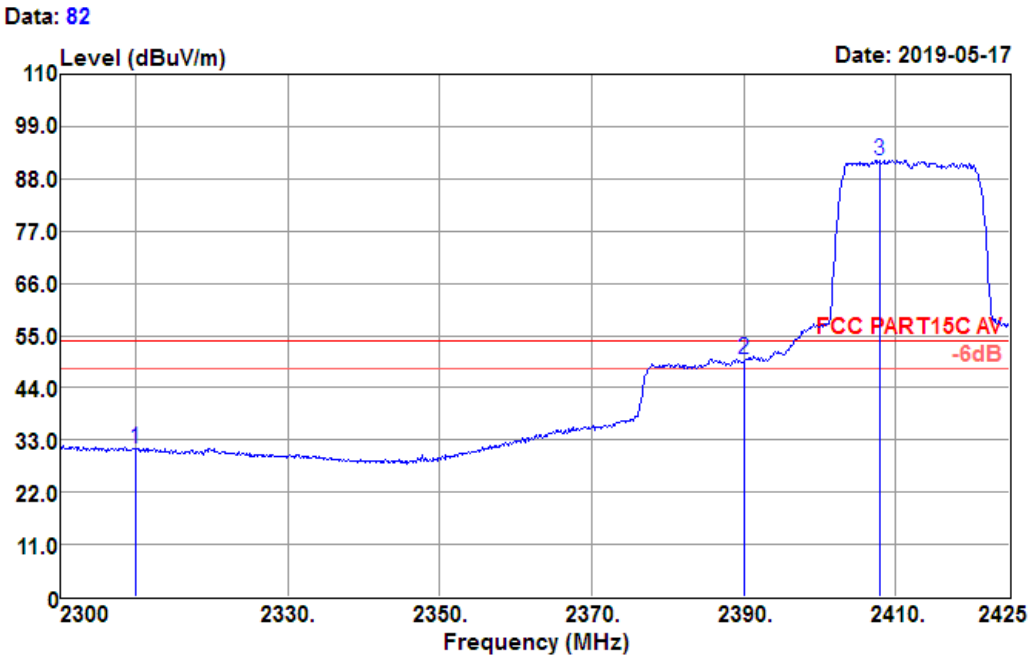
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2455.940	96.13	27.29	3.67	36.25	90.84	54.00	36.84	Average
2483.500	49.34	27.36	3.68	36.33	44.05	54.00	-9.95	Average
2487.860	49.98	27.37	3.68	36.34	44.69	54.00	-9.31	Average
2500.000	41.28	27.40	3.68	36.37	35.99	54.00	-18.01	Average

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



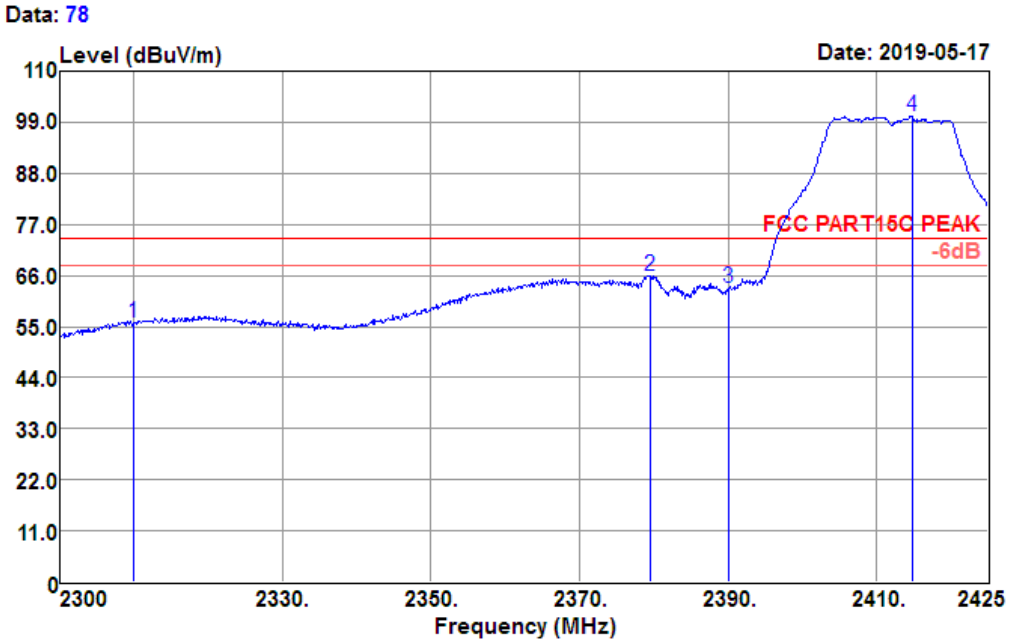
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	60.36	26.91	3.56	35.87	54.96	74.00	-19.04	Peak
2379.500	72.62	27.09	3.63	36.05	67.29	74.00	-6.71	Peak
2390.000	70.53	27.11	3.64	36.08	65.20	74.00	-8.80	Peak
2405.625	107.25	27.15	3.65	36.12	101.93	74.00	27.93	Peak

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



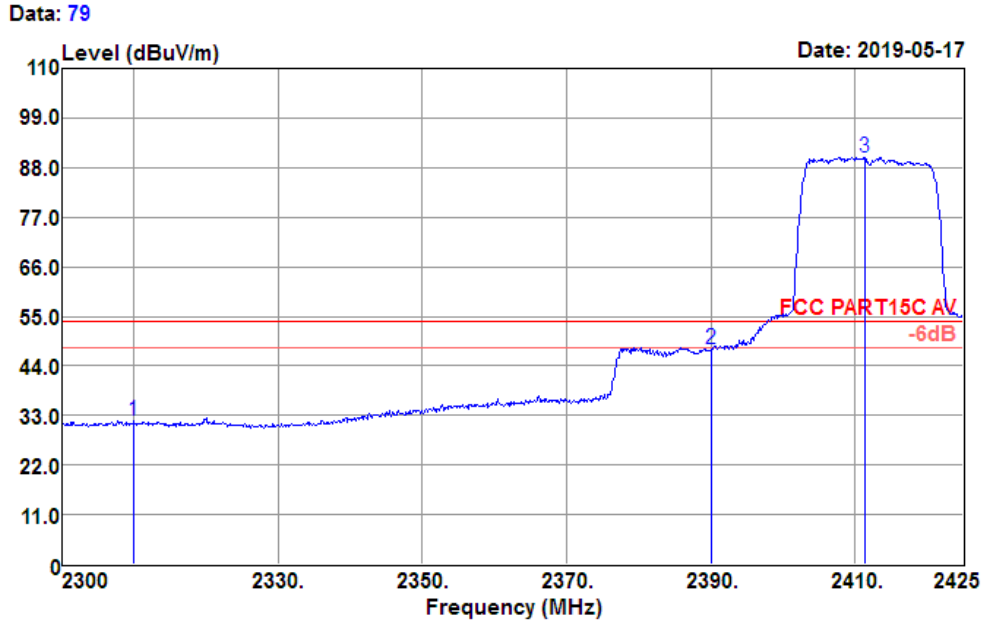
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	36.59	26.91	3.56	35.87	31.19	54.00	-22.81	Average
2390.000	55.25	27.11	3.64	36.08	49.92	54.00	-4.08	Average
2408.000	97.14	27.16	3.65	36.13	91.82	54.00	37.82	Average

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



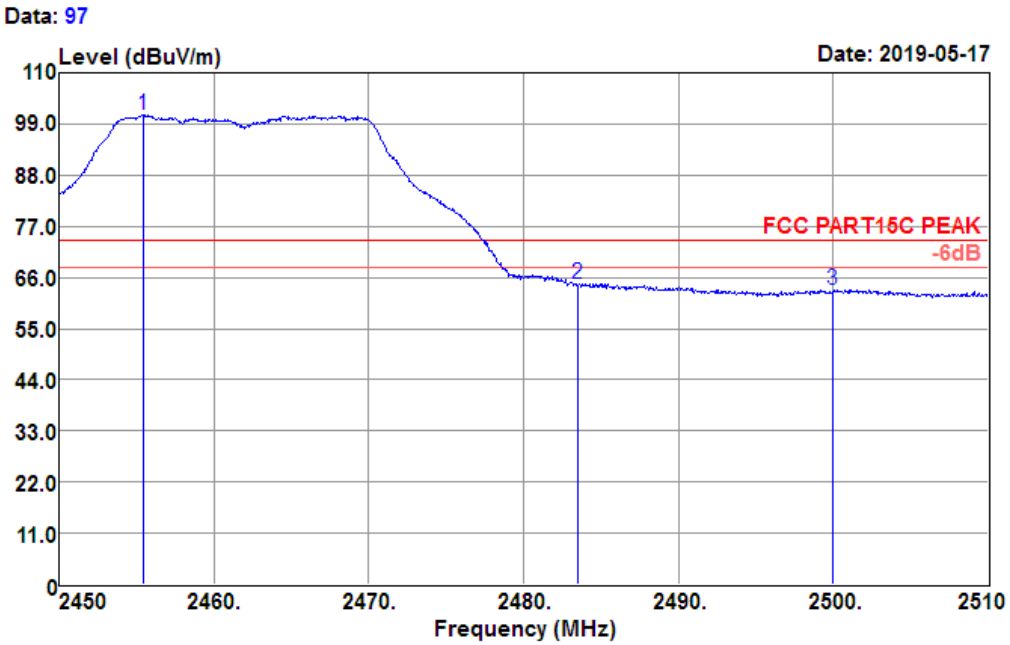
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	61.37	26.91	3.56	35.87	55.97	74.00	-18.03	Peak
2379.625	71.26	27.09	3.63	36.05	65.93	74.00	-8.07	Peak
2390.000	68.57	27.11	3.64	36.08	63.24	74.00	-10.76	Peak
2414.750	105.54	27.18	3.66	36.14	100.24	74.00	26.24	Peak

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



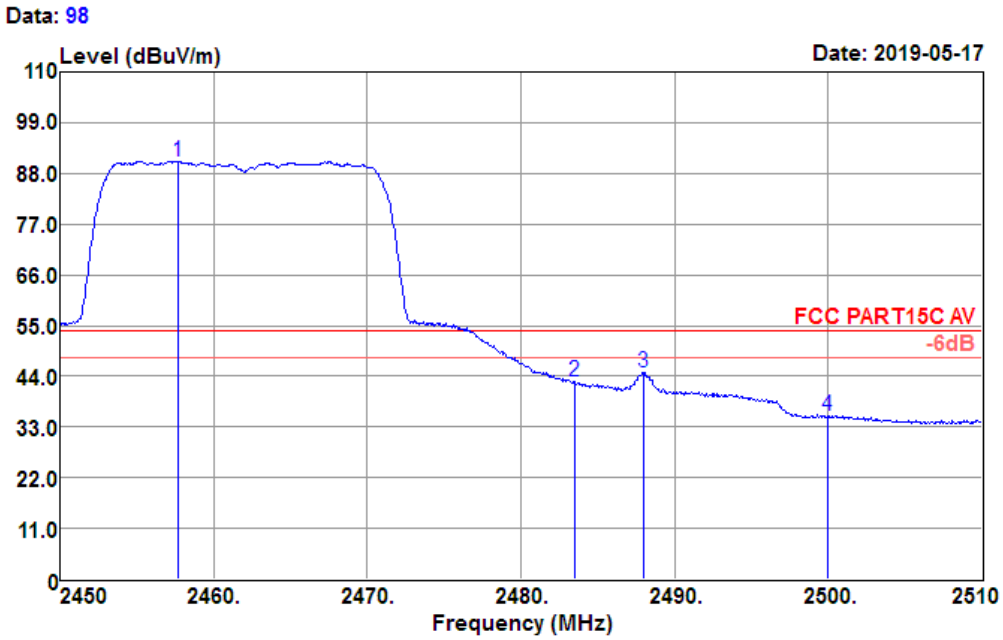
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2310.000	37.14	26.91	3.56	35.87	31.74	54.00	-22.26	Average
2390.000	53.02	27.11	3.64	36.08	47.69	54.00	-6.31	Average
2411.375	95.55	27.17	3.65	36.14	90.23	54.00	36.23	Average

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



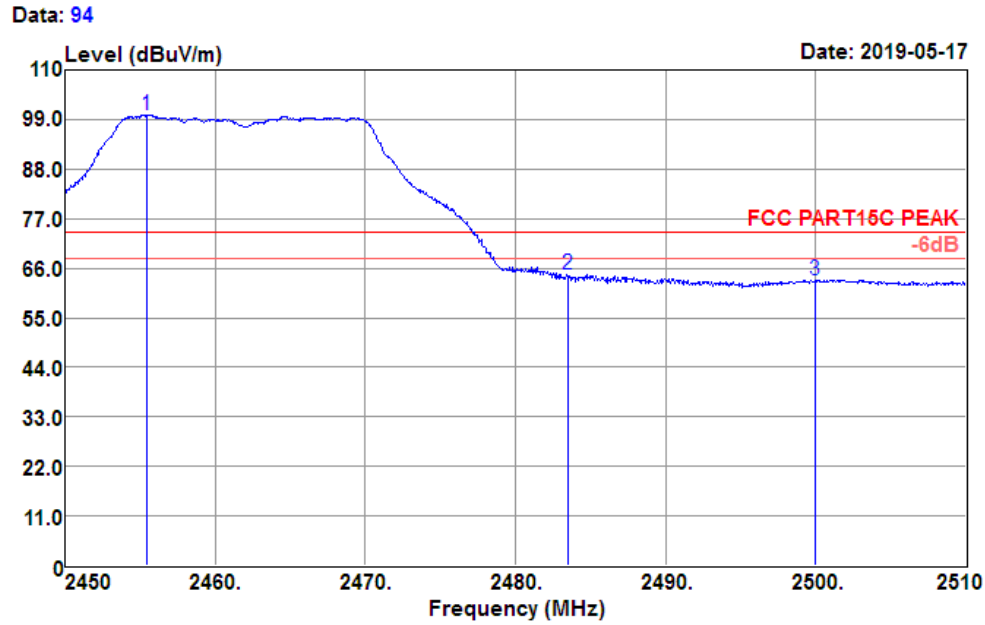
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2455.460	106.22	27.28	3.67	36.25	100.92	74.00	26.92	Peak
2483.500	69.94	27.36	3.68	36.33	64.65	74.00	-9.35	Peak
2500.000	68.49	27.40	3.68	36.37	63.20	74.00	-10.80	Peak

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



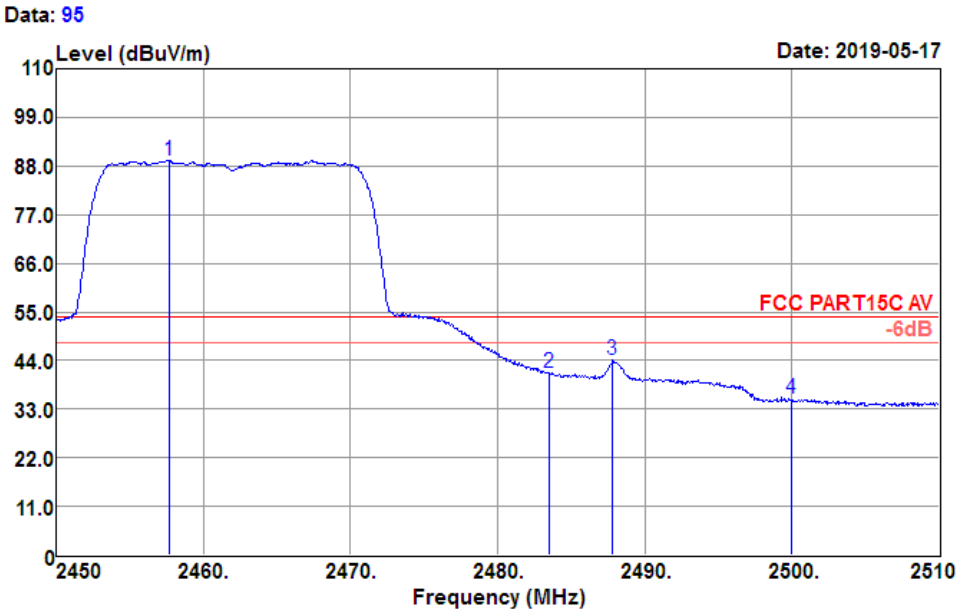
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2457.680	95.95	27.29	3.67	36.26	90.65	54.00	36.65	Average
2483.500	48.22	27.36	3.68	36.33	42.93	54.00	-11.07	Average
2487.980	50.10	27.37	3.68	36.34	44.81	54.00	-9.19	Average
2500.000	40.58	27.40	3.68	36.37	35.29	54.00	-18.71	Average

Test Mode :	802.11n HT20 CH11 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	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	
2455.460	105.41	27.28	3.67	36.25	100.11	74.00	26.11	Peak
2483.500	69.85	27.36	3.68	36.33	64.56	74.00	-9.44	Peak
2500.000	68.67	27.40	3.68	36.37	63.38	74.00	-10.62	Peak

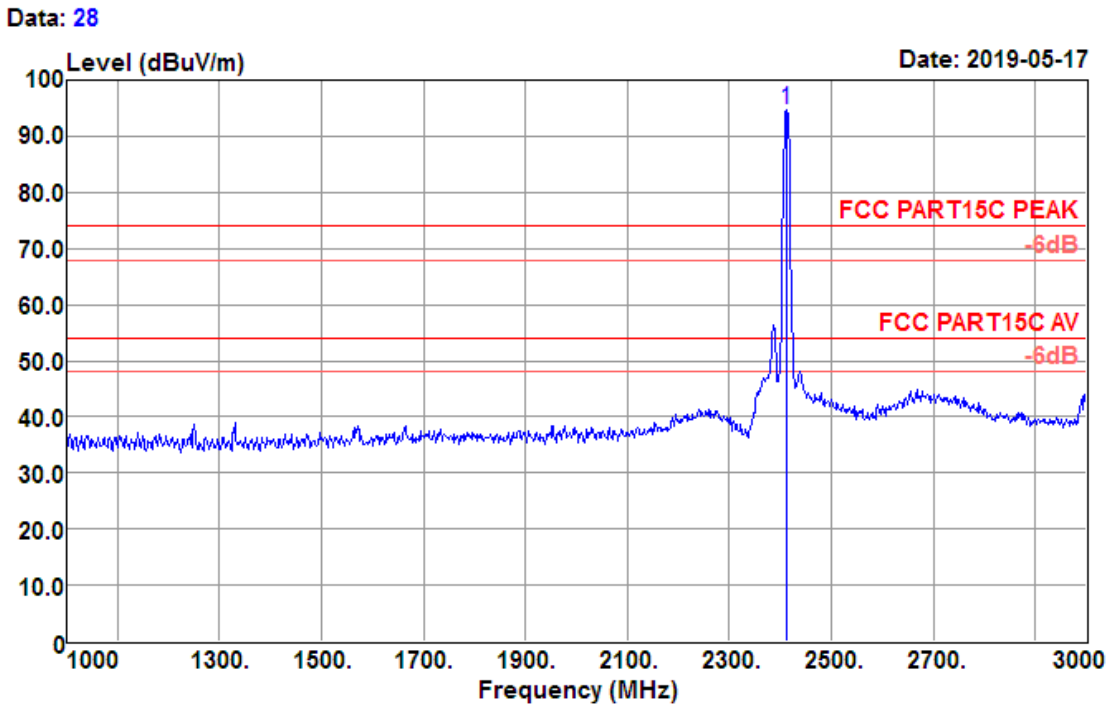
Test Mode :	802.11n HT20 CH11 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	2.45GHz~2.51GHz	Polarization :	Vertical



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	
2457.680	94.52	27.29	3.67	36.26	89.22	54.00	35.22	Average
2483.500	46.65	27.36	3.68	36.33	41.36	54.00	-12.64	Average
2487.800	49.34	27.37	3.68	36.34	44.05	54.00	-9.95	Average
2500.000	40.73	27.40	3.68	36.37	35.44	54.00	-18.56	Average

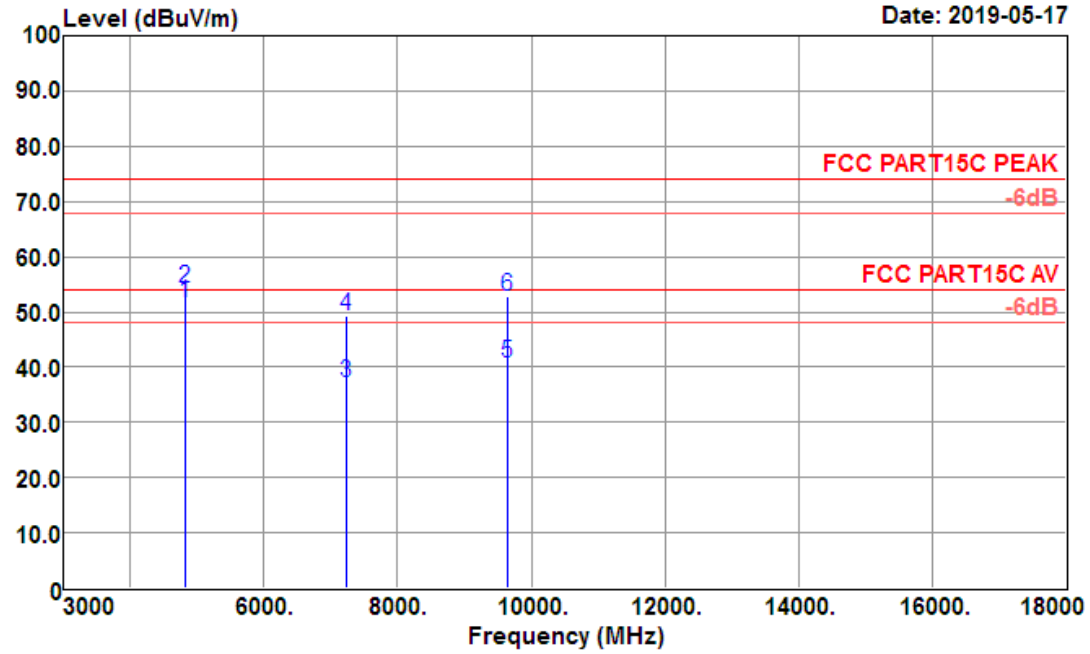
4.5.5 Test Result of Radiated Spurious Emission (1GHz ~ 10th Harmonic)

Test Mode :	802.11b CH01 (2412MHz)	**Temperature :**	21~23℃
Test Engineer :	Julie Deng	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~18GHz	**Polarization :**	Horizontal

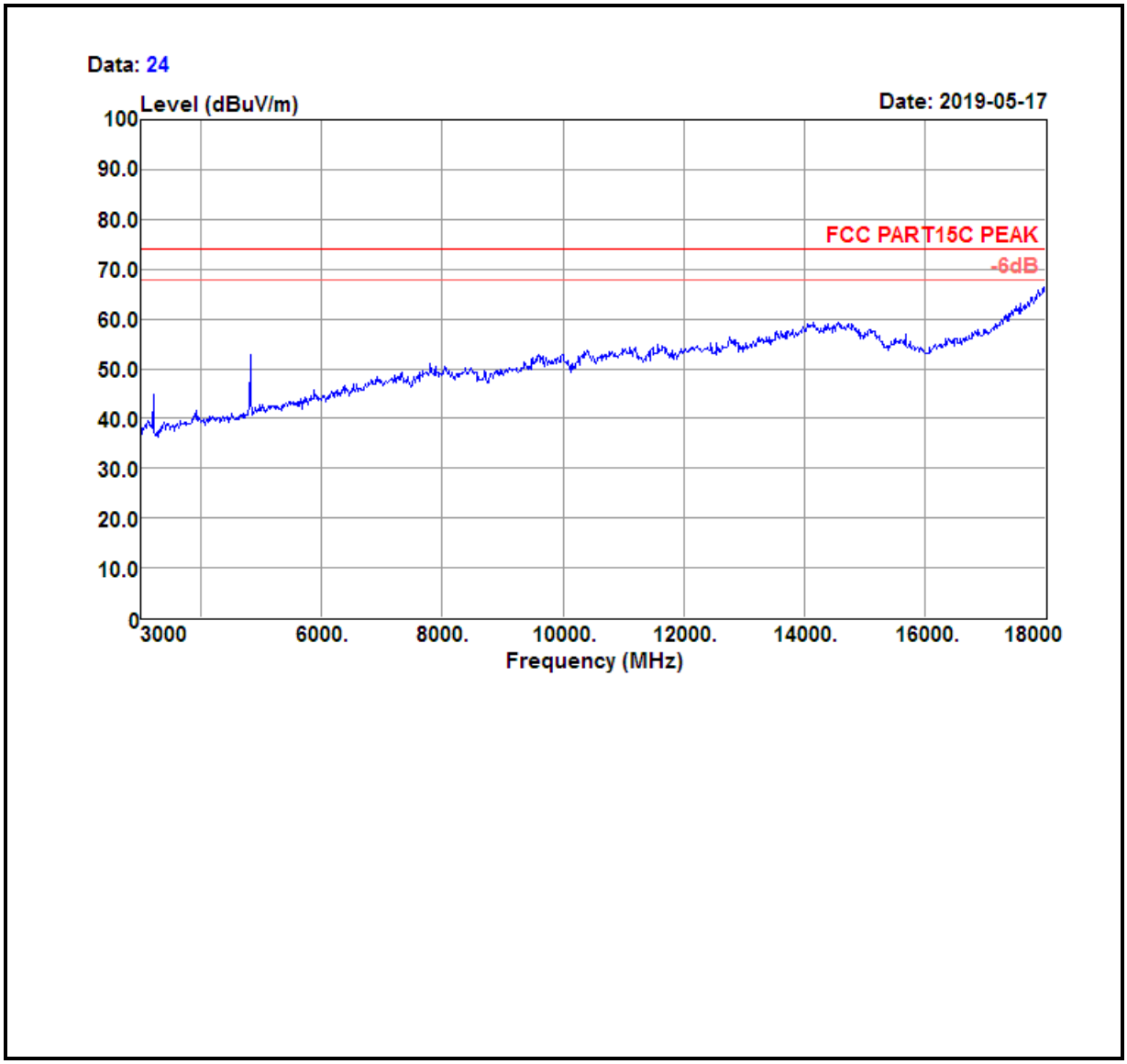


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2412.000	99.88	27.17	3.65	36.14	94.56	74.00	20.56	Peak

Data: 25

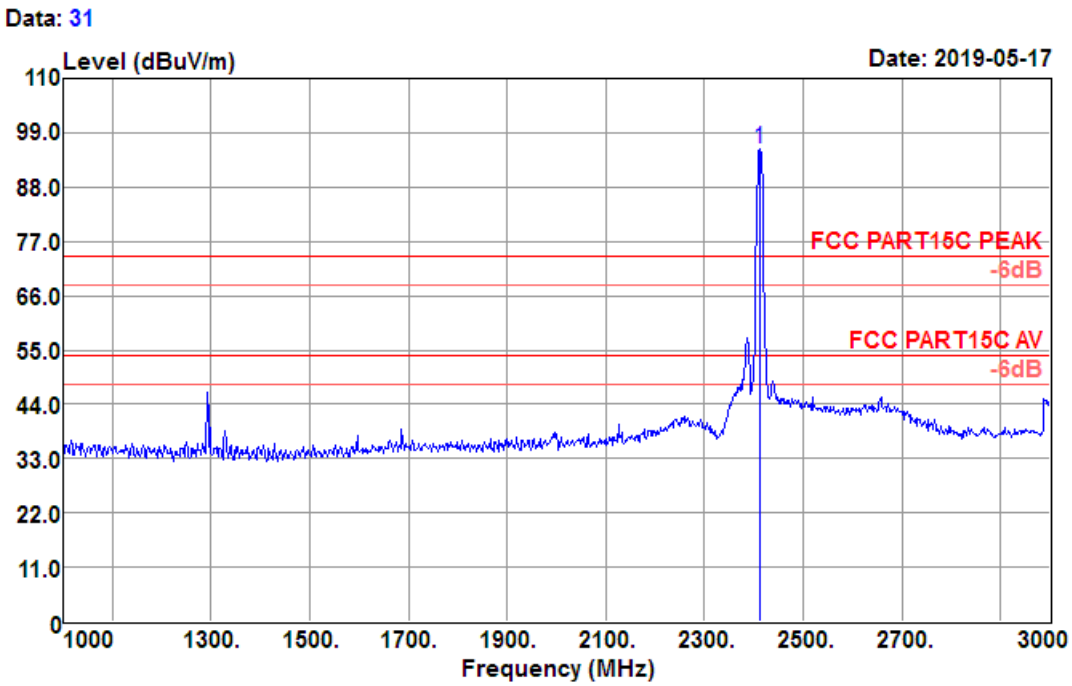


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4824.000	51.22	31.28	5.44	36.26	51.68	54.00	-2.32	Average
4824.000	53.77	31.28	5.44	36.26	54.23	74.00	-19.77	Peak
7236.000	28.54	35.94	7.02	34.27	37.23	54.00	-16.77	Average
7236.000	40.48	35.94	7.02	34.27	49.17	74.00	-24.83	Peak
9648.000	29.29	37.87	7.82	34.15	40.83	54.00	-13.17	Average
9648.000	41.31	37.87	7.82	34.15	52.85	74.00	-21.15	Peak



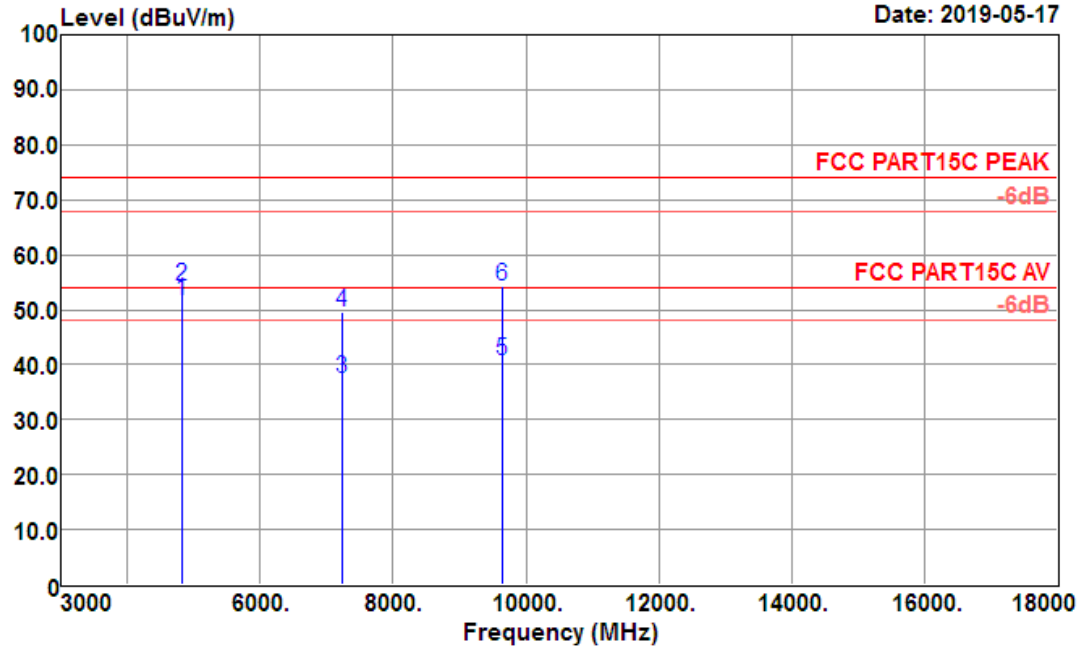
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11b CH01(2412MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Vertical

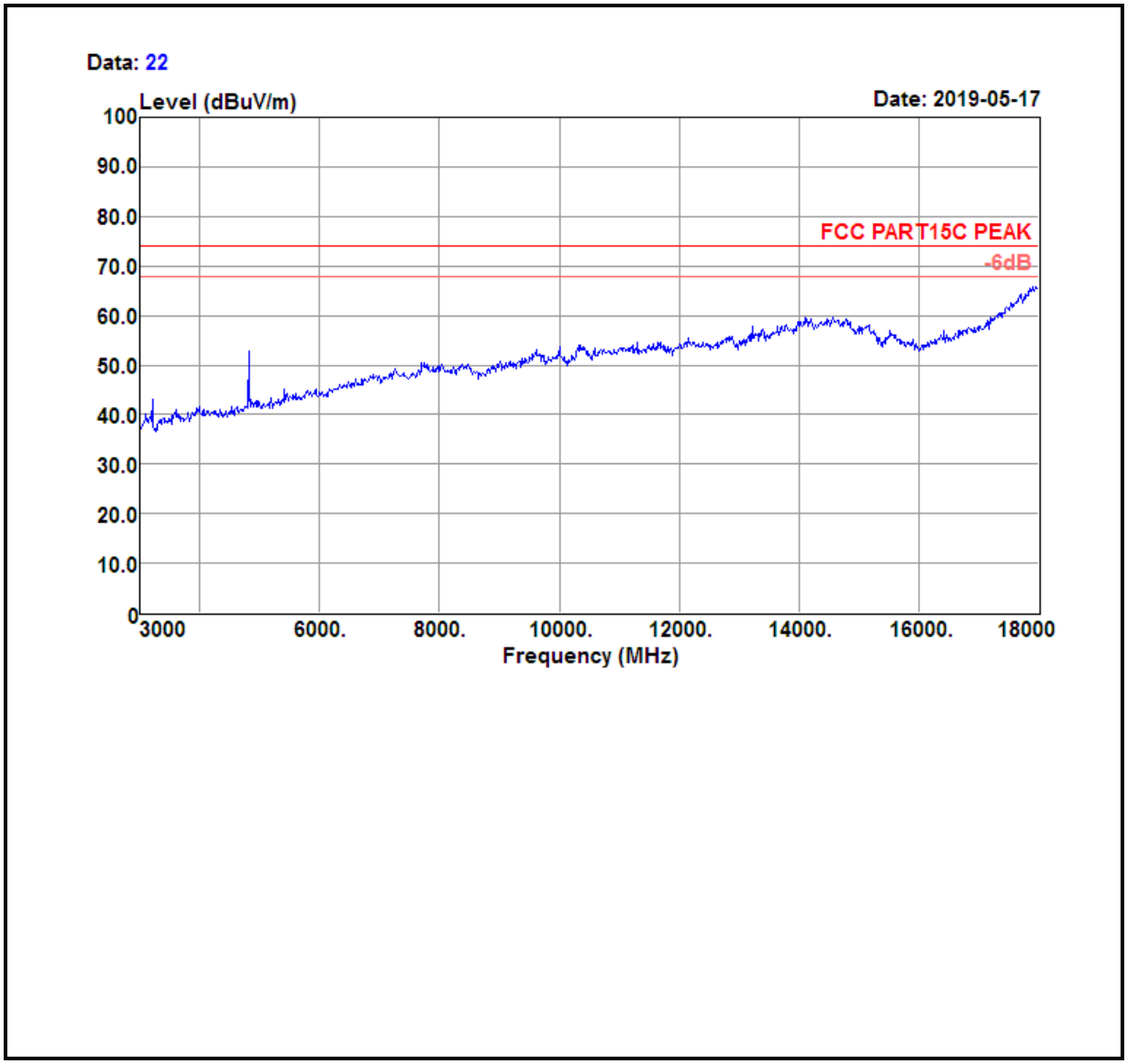


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2412.000	101.08	27.17	3.65	36.14	95.76	74.00	21.76	Peak

Data: 23

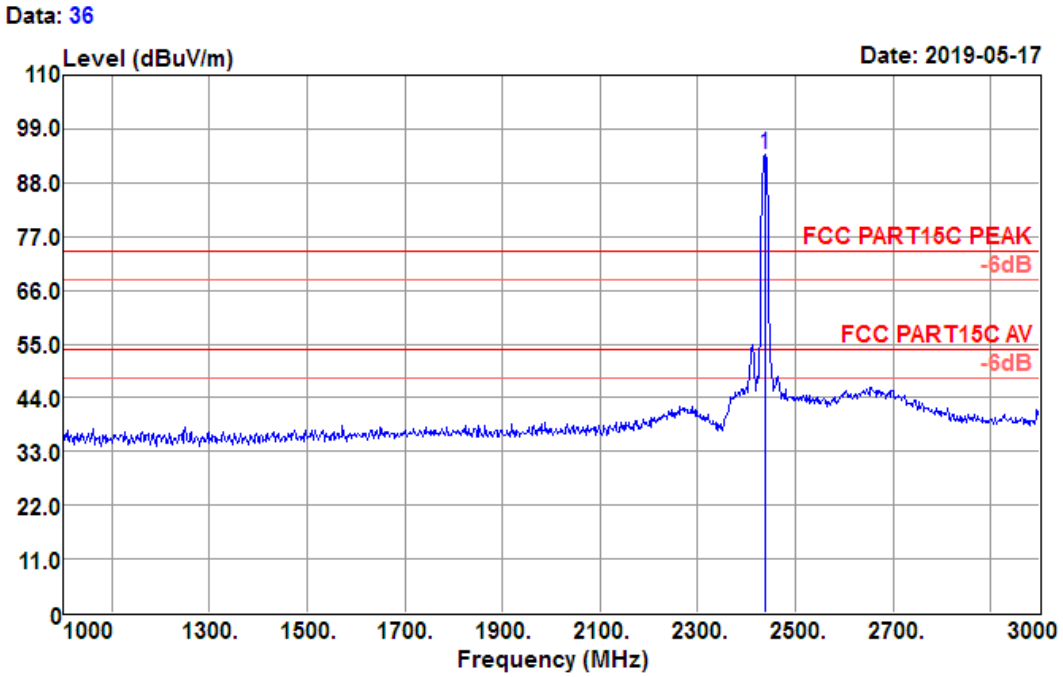


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4824.000	51.17	31.28	5.44	36.26	51.63	54.00	-2.37	Average
4824.000	53.70	31.28	5.44	36.26	54.16	74.00	-19.84	Peak
7236.000	28.89	35.94	7.02	34.27	37.58	54.00	-16.42	Average
7236.000	40.77	35.94	7.02	34.27	49.46	74.00	-24.54	Peak
9648.000	29.32	37.87	7.82	34.15	40.86	54.00	-13.14	Average
9648.000	42.81	37.87	7.82	34.15	54.35	74.00	-19.65	Peak



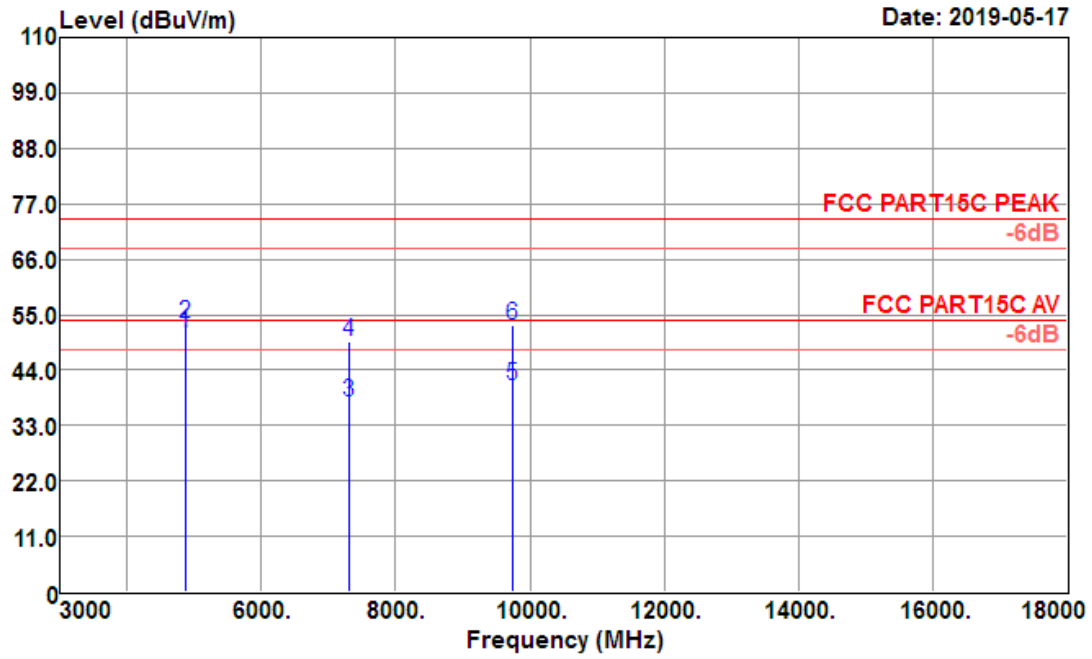
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11b CH06 (2437MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Horizontal

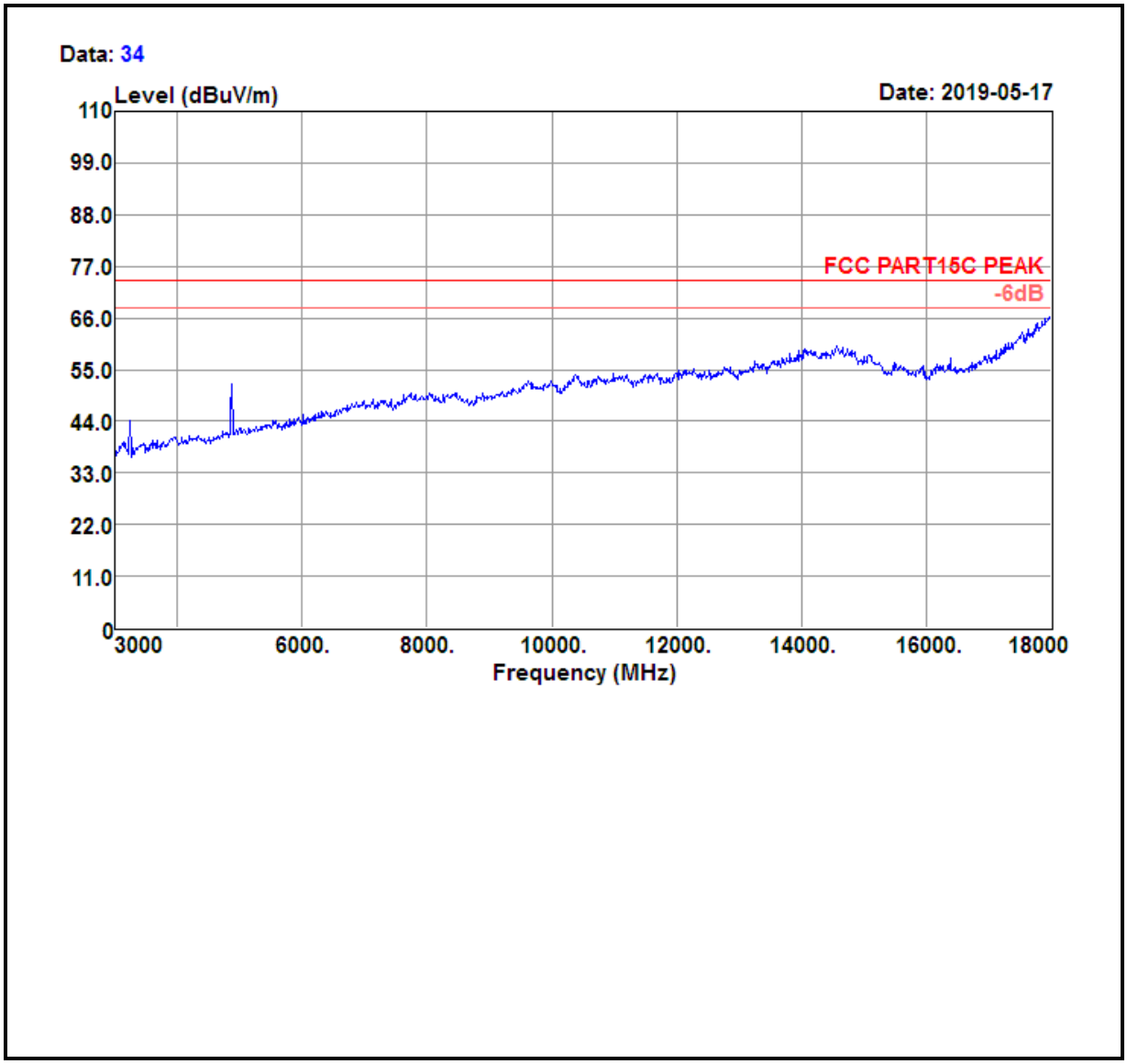


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2438.000	99.01	27.24	3.66	36.21	93.70	74.00	19.70	Peak

Data: 35

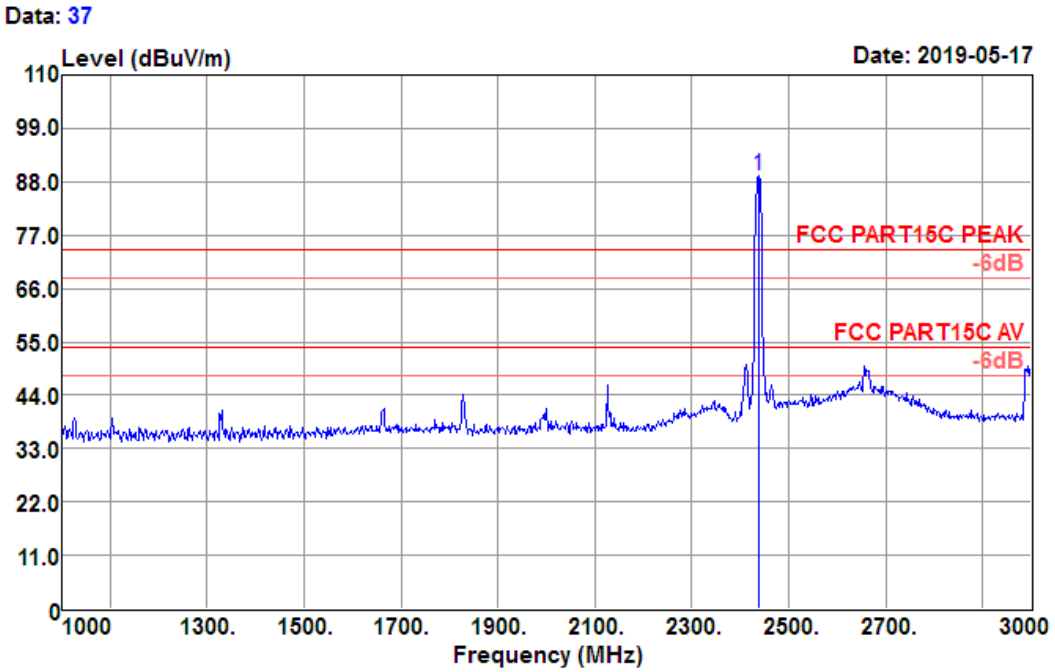


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4874.000	50.64	31.40	5.41	36.24	51.21	54.00	-2.79	Average
4874.000	52.70	31.40	5.41	36.24	53.27	74.00	-20.73	Peak
7311.000	28.70	36.12	7.24	34.35	37.71	54.00	-16.29	Average
7311.000	40.74	36.12	7.24	34.35	49.75	74.00	-24.25	Peak
9748.000	29.12	38.05	7.96	34.19	40.94	54.00	-13.06	Average
9748.000	41.02	38.05	7.96	34.19	52.84	74.00	-21.16	Peak

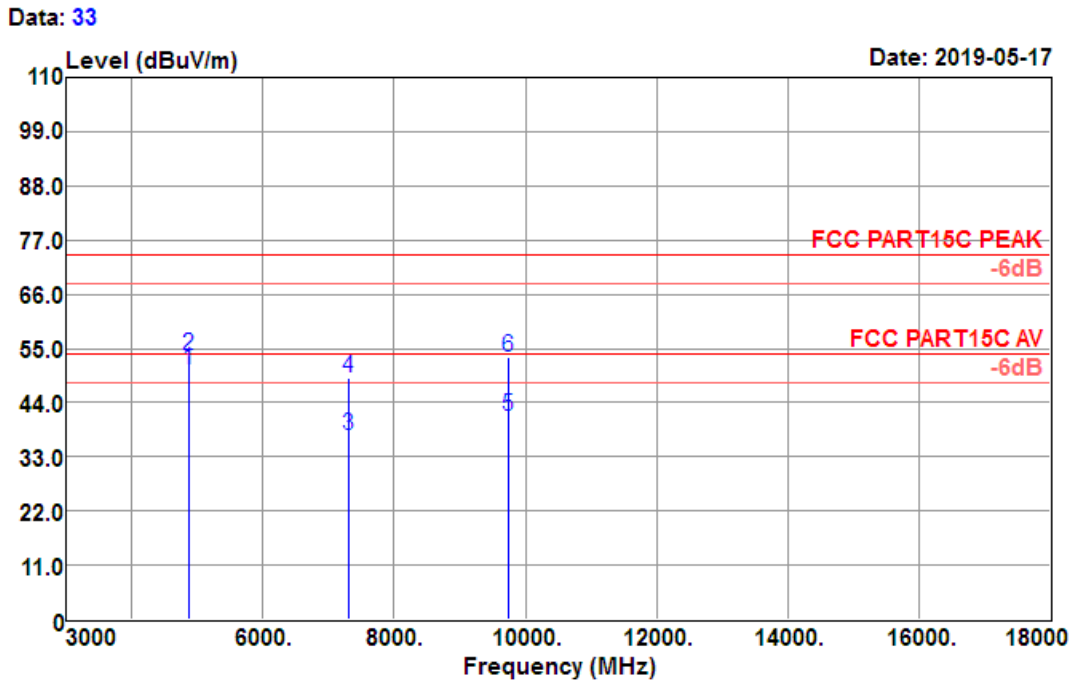


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

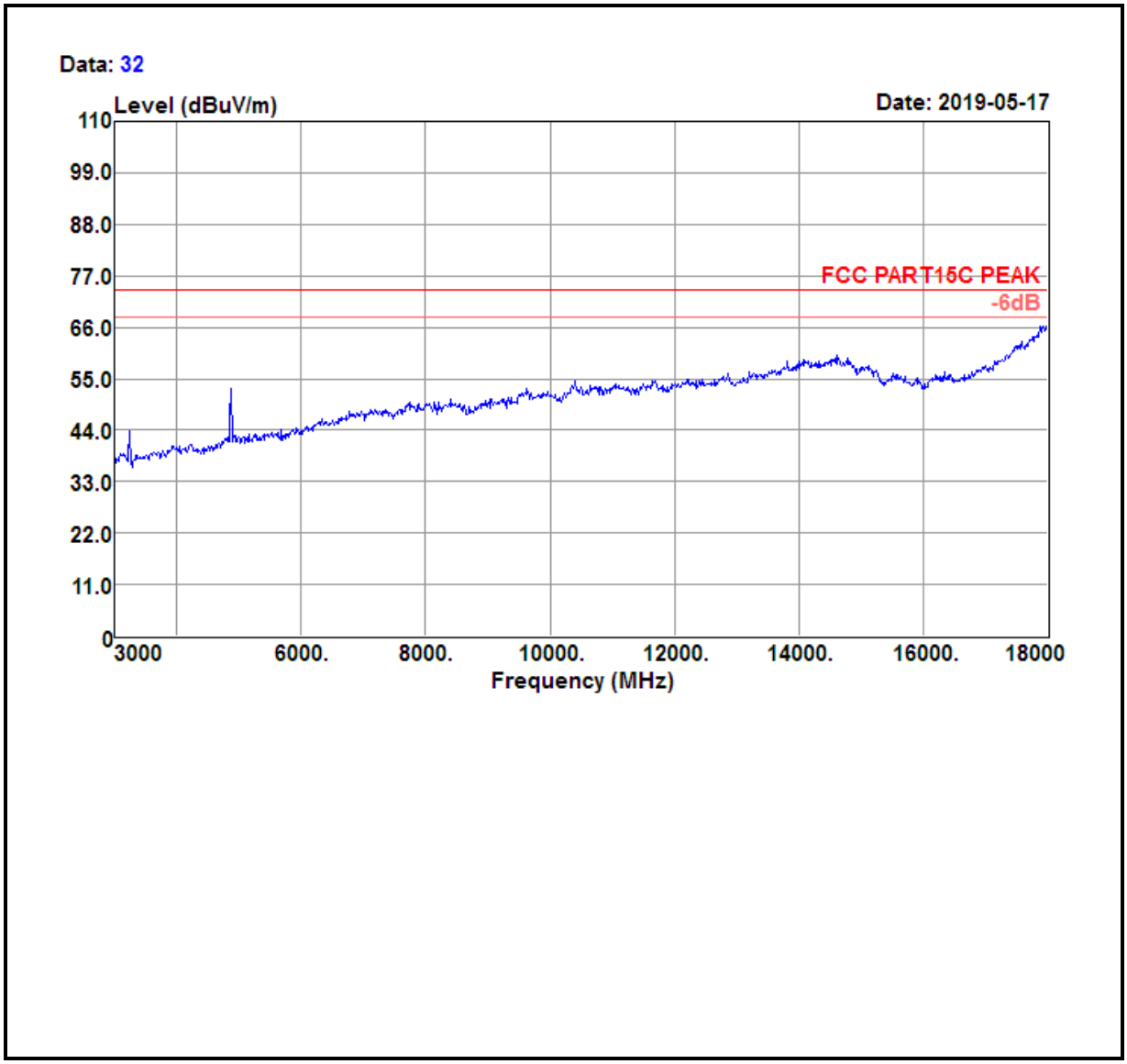
Test Mode :	802.11b CH06 (2437MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Vertical



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
2438.000	94.69	27.24	3.66	36.21	89.38	74.00	15.38	Peak

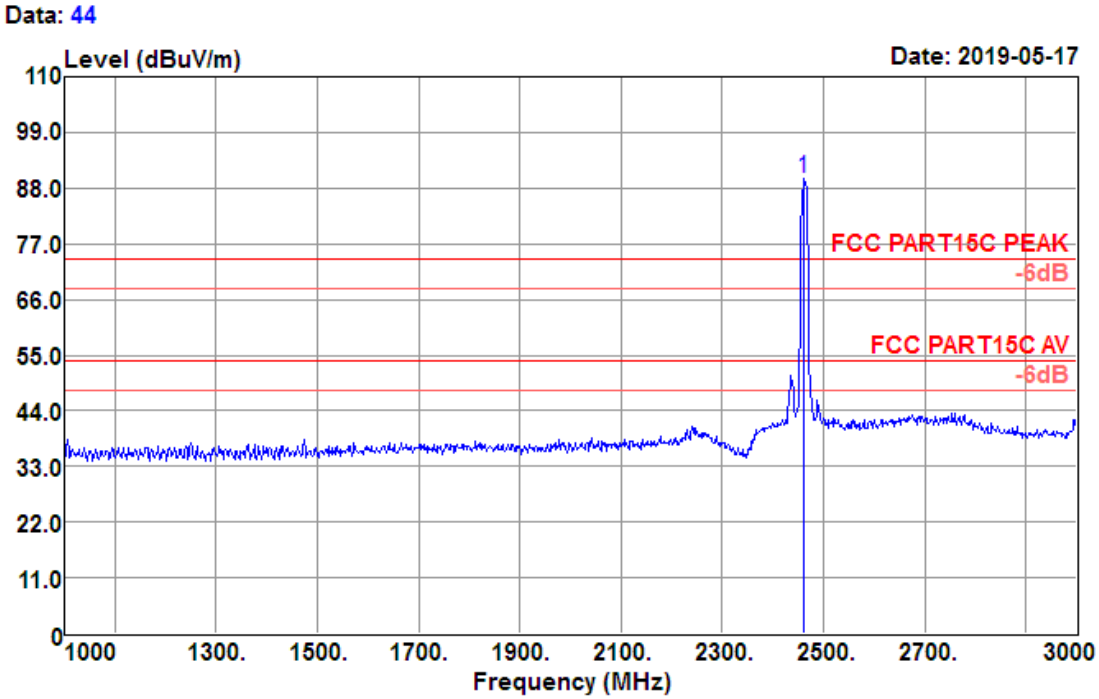


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4874.000	50.02	31.40	5.41	36.24	50.59	54.00	-3.41	Average
4874.000	52.94	31.40	5.41	36.24	53.51	74.00	-20.49	Peak
7311.000	28.42	36.12	7.24	34.35	37.43	54.00	-16.57	Average
7311.000	40.10	36.12	7.24	34.35	49.11	74.00	-24.89	Peak
9748.000	29.36	38.05	7.96	34.19	41.18	54.00	-12.82	Average
9748.000	41.26	38.05	7.96	34.19	53.08	74.00	-20.92	Peak



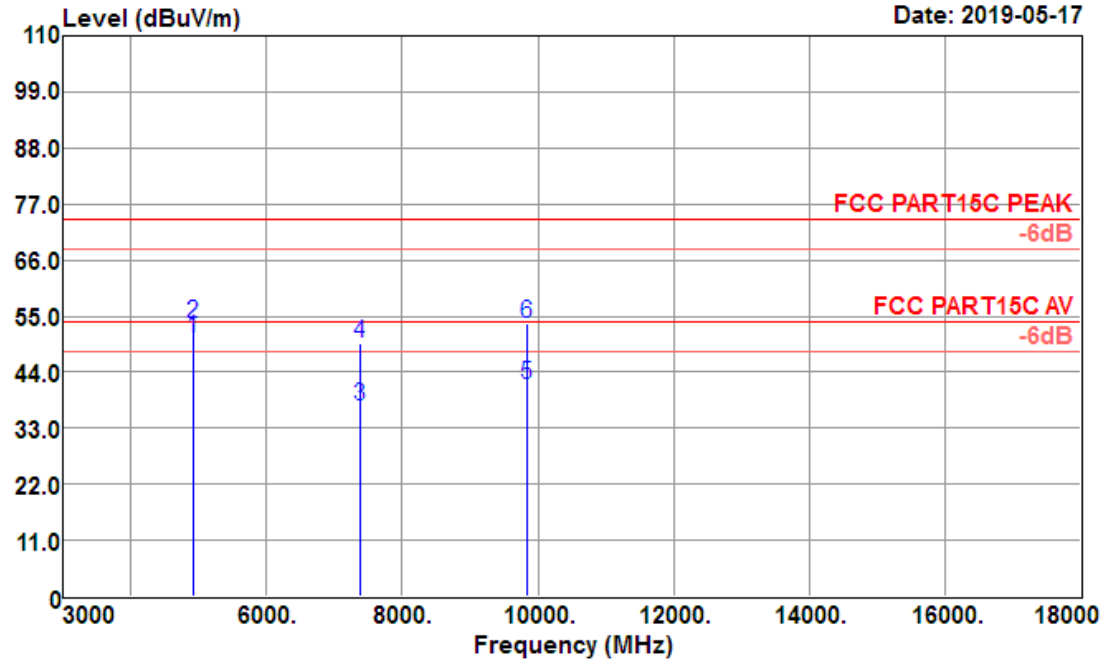
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11b CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Horizontal

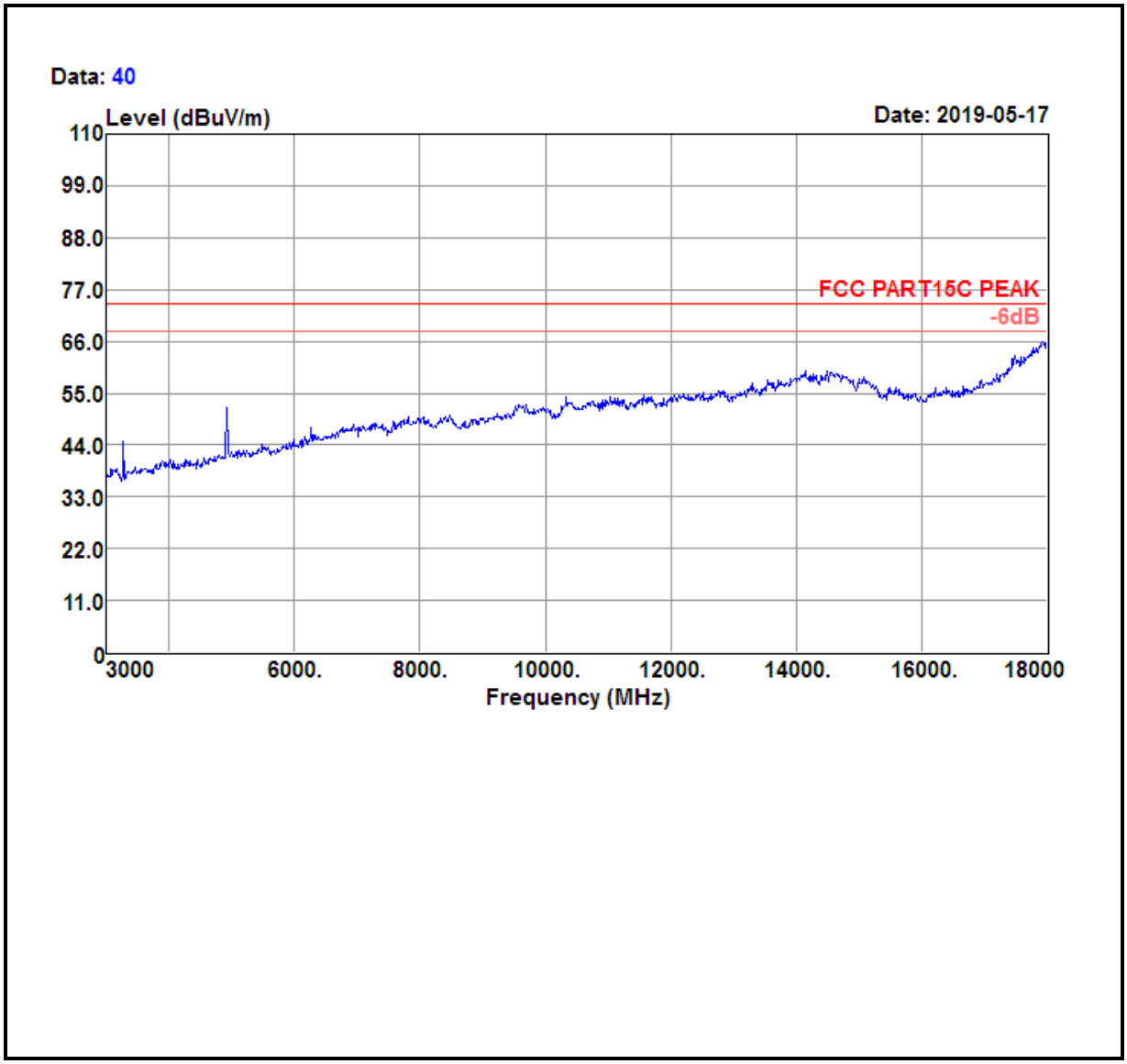


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2462.000	95.07	27.30	3.67	36.27	89.77	74.00	15.77	Peak

Data: 41

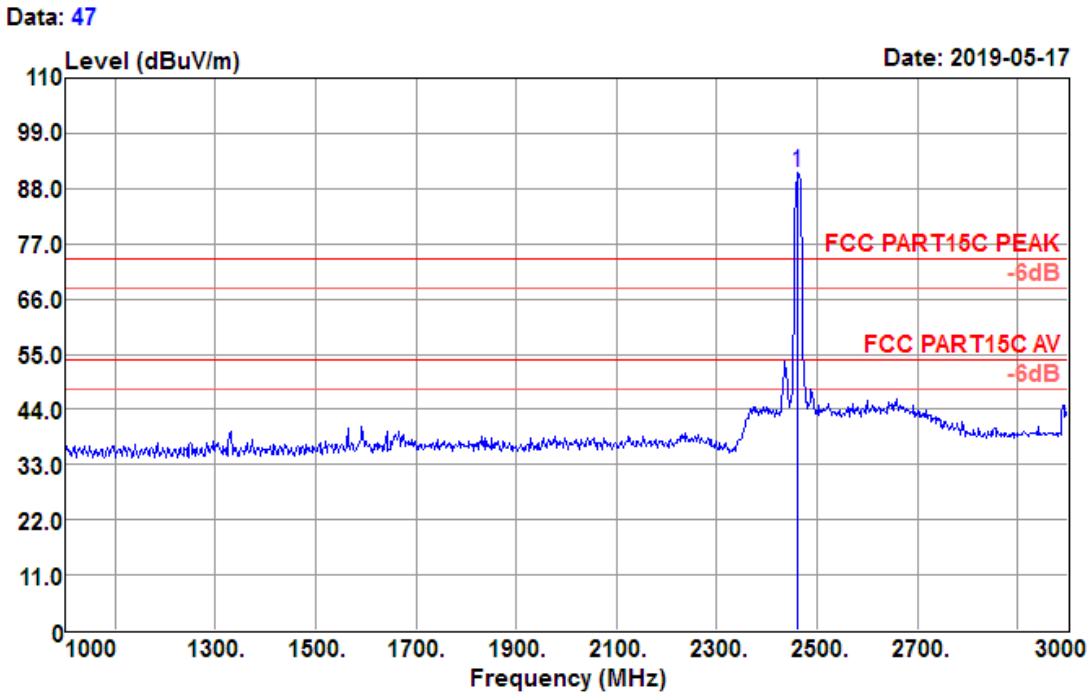


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4924.000	50.06	31.52	5.38	36.23	50.73	54.00	-3.27	Average
4924.000	53.02	31.52	5.38	36.23	53.69	74.00	-20.31	Peak
7386.000	28.09	36.29	7.46	34.42	37.42	54.00	-16.58	Average
7386.000	40.43	36.29	7.46	34.42	49.76	74.00	-24.24	Peak
9848.000	29.59	38.23	8.04	34.23	41.63	54.00	-12.37	Average
9848.000	41.50	38.23	8.04	34.23	53.54	74.00	-20.46	Peak

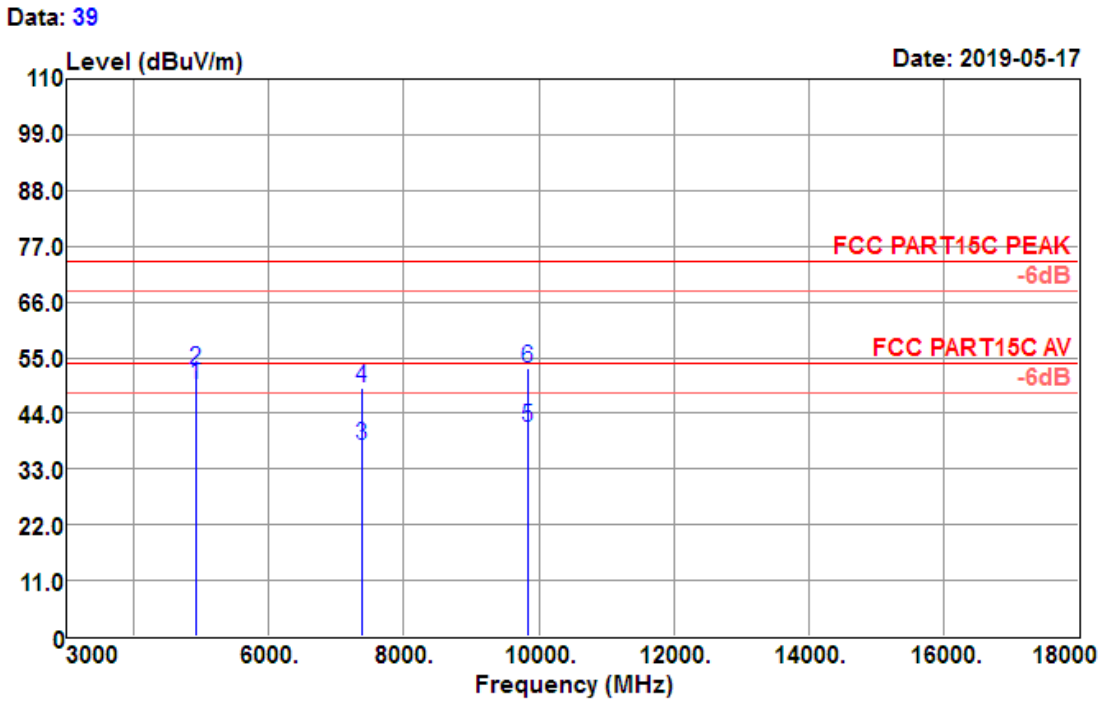


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

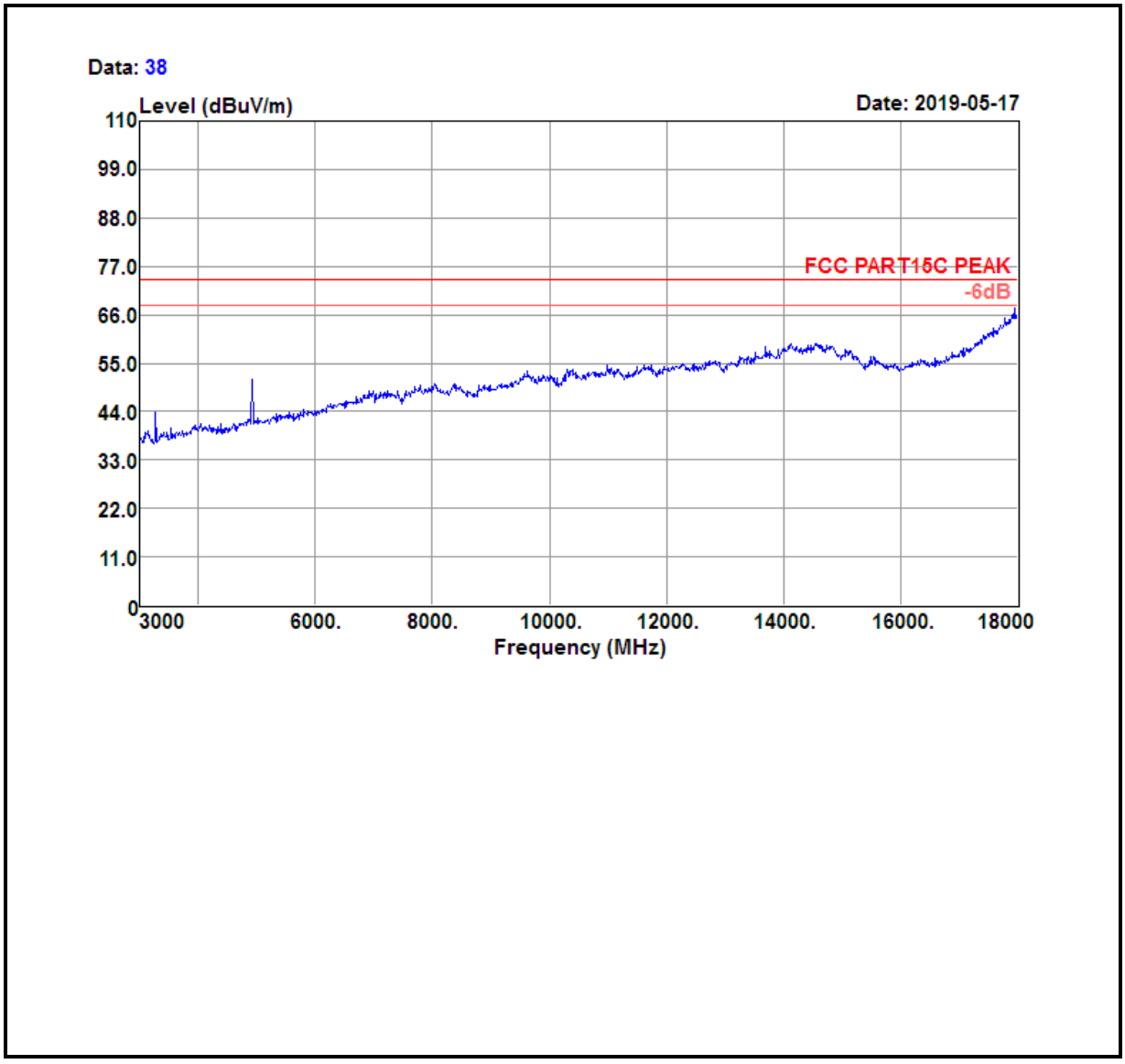
Test Mode :	802.11b CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Vertical



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	
2462.000	96.62	27.30	3.67	36.27	91.32	74.00	17.32	Peak

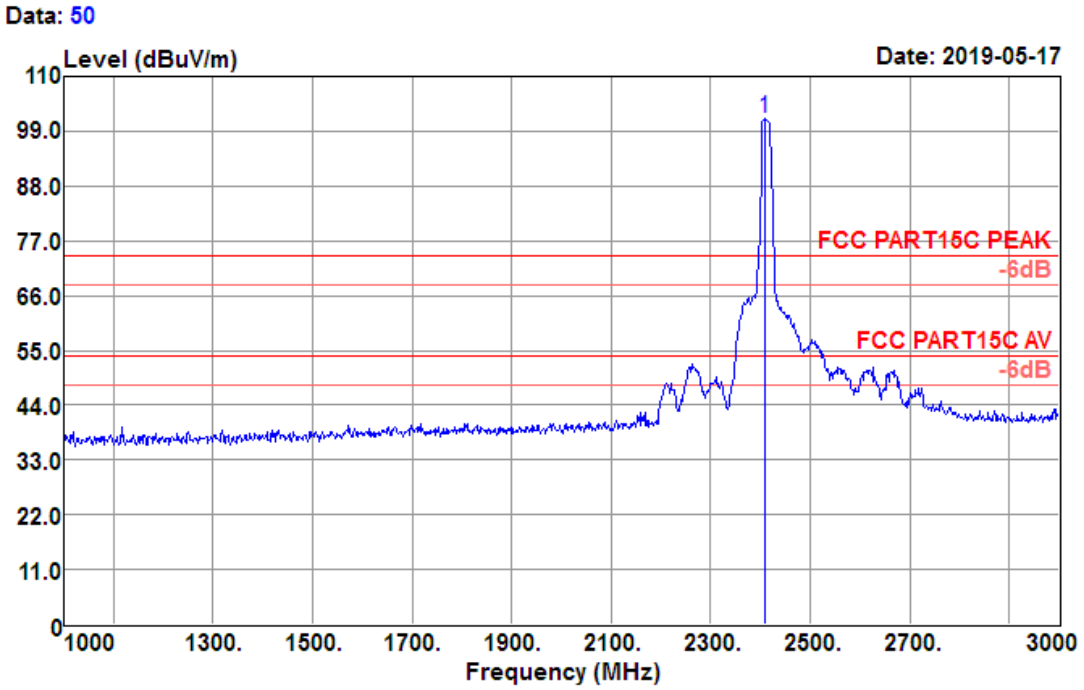


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4924.000	48.83	31.52	5.38	36.23	49.50	54.00	-4.50	Average
4924.000	51.86	31.52	5.38	36.23	52.53	74.00	-21.47	Peak
7386.000	28.36	36.29	7.46	34.42	37.69	54.00	-16.31	Average
7386.000	39.73	36.29	7.46	34.42	49.06	74.00	-24.94	Peak
9848.000	29.15	38.23	8.04	34.23	41.19	54.00	-12.81	Average
9848.000	40.85	38.23	8.04	34.23	52.89	74.00	-21.11	Peak

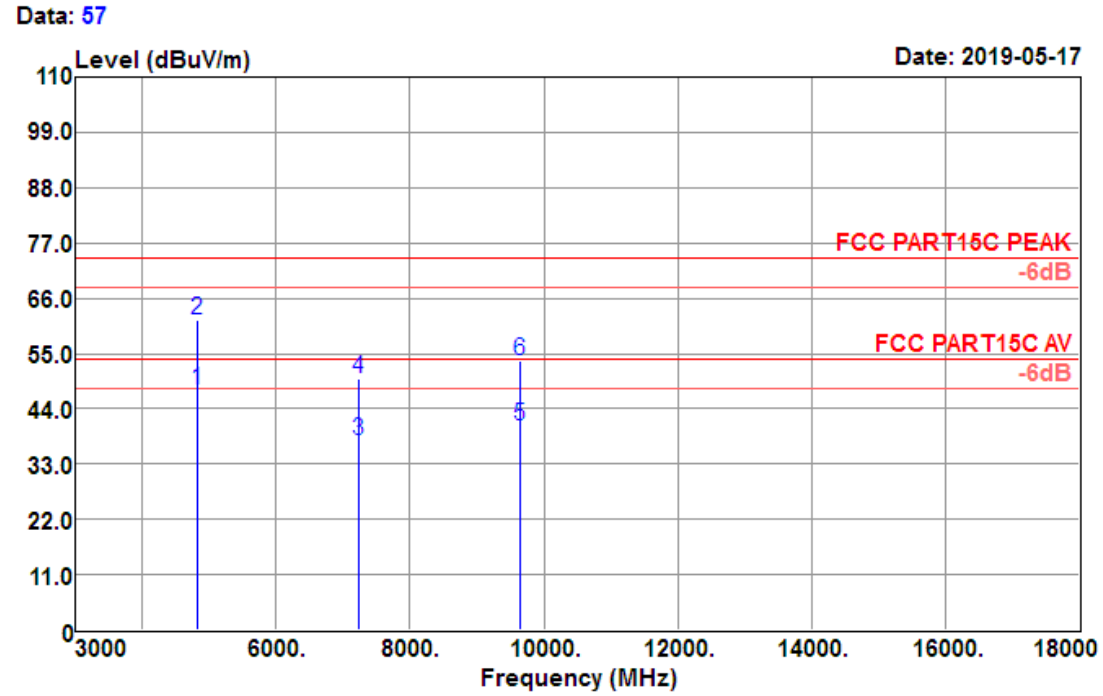


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

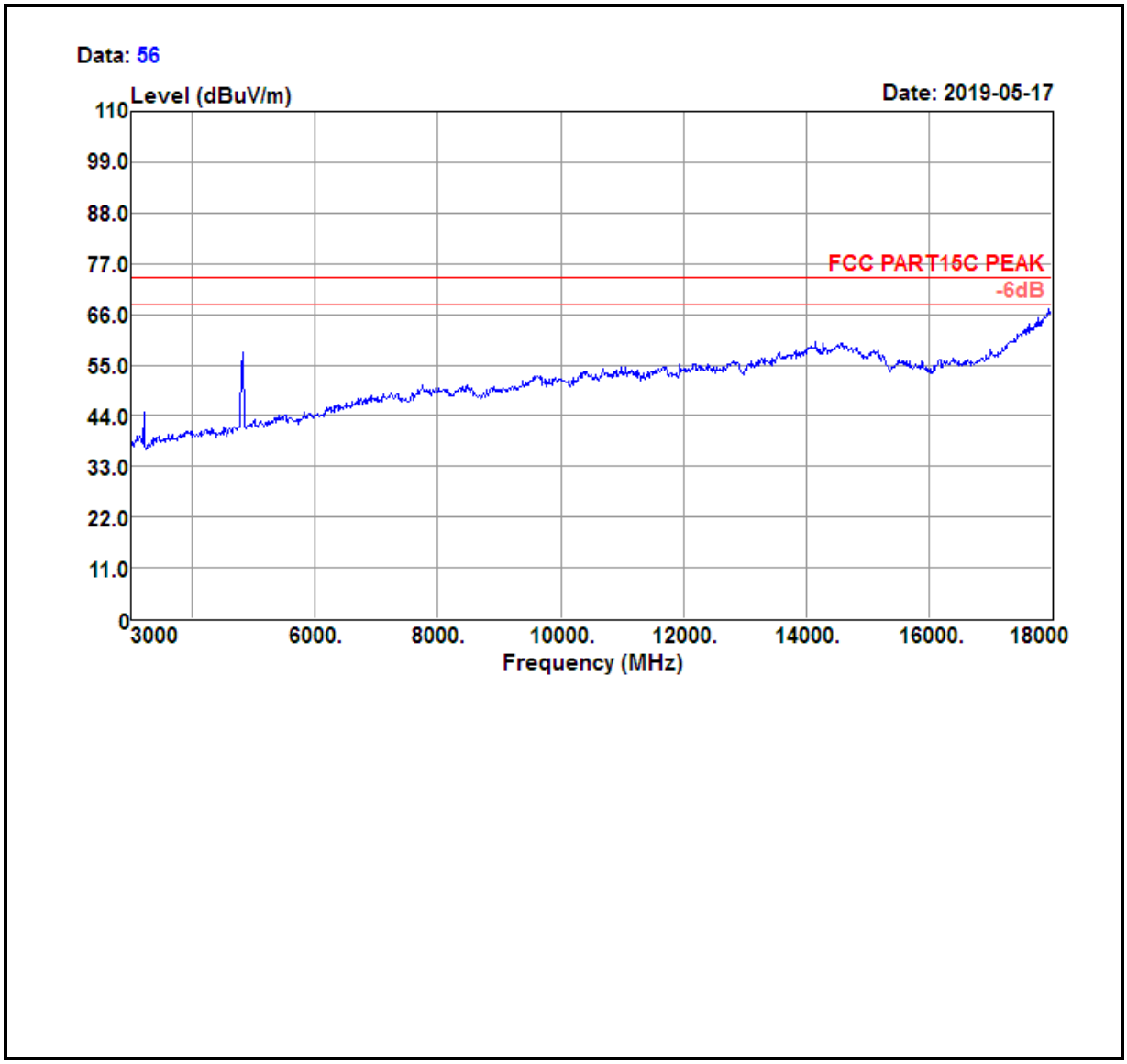
Test Mode :	802.11g CH01 (2412MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Horizontal



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	
2410.000	106.85	27.17	3.65	36.13	101.54	74.00	27.54	Peak

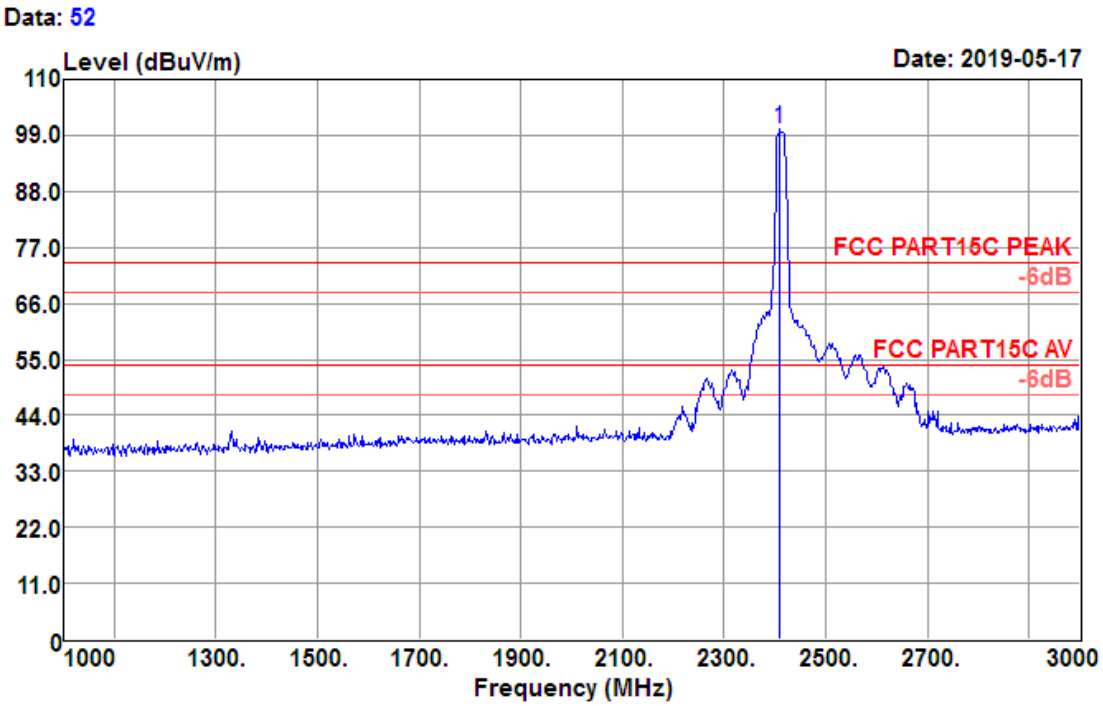


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4824.000	47.30	31.28	5.44	36.26	47.76	54.00	-6.24	Average
4824.000	61.17	31.28	5.44	36.26	61.63	74.00	-12.37	Peak
7236.000	28.86	35.94	7.02	34.27	37.55	54.00	-16.45	Average
7236.000	41.34	35.94	7.02	34.27	50.03	74.00	-23.97	Peak
9648.000	29.18	37.87	7.82	34.15	40.72	54.00	-13.28	Average
9648.000	42.16	37.87	7.82	34.15	53.70	74.00	-20.30	Peak

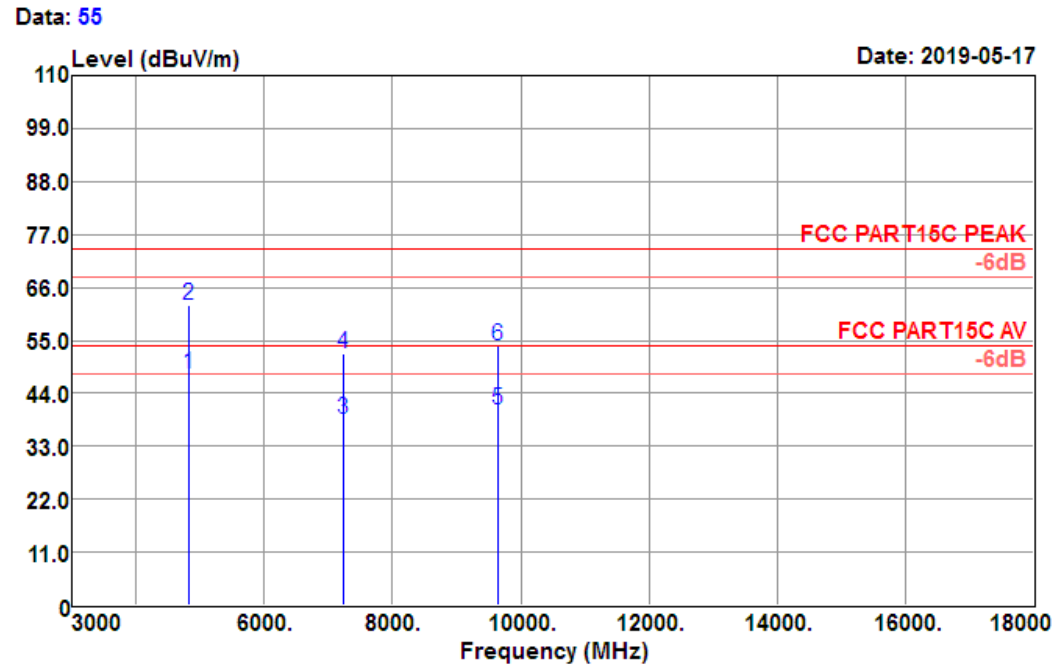


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

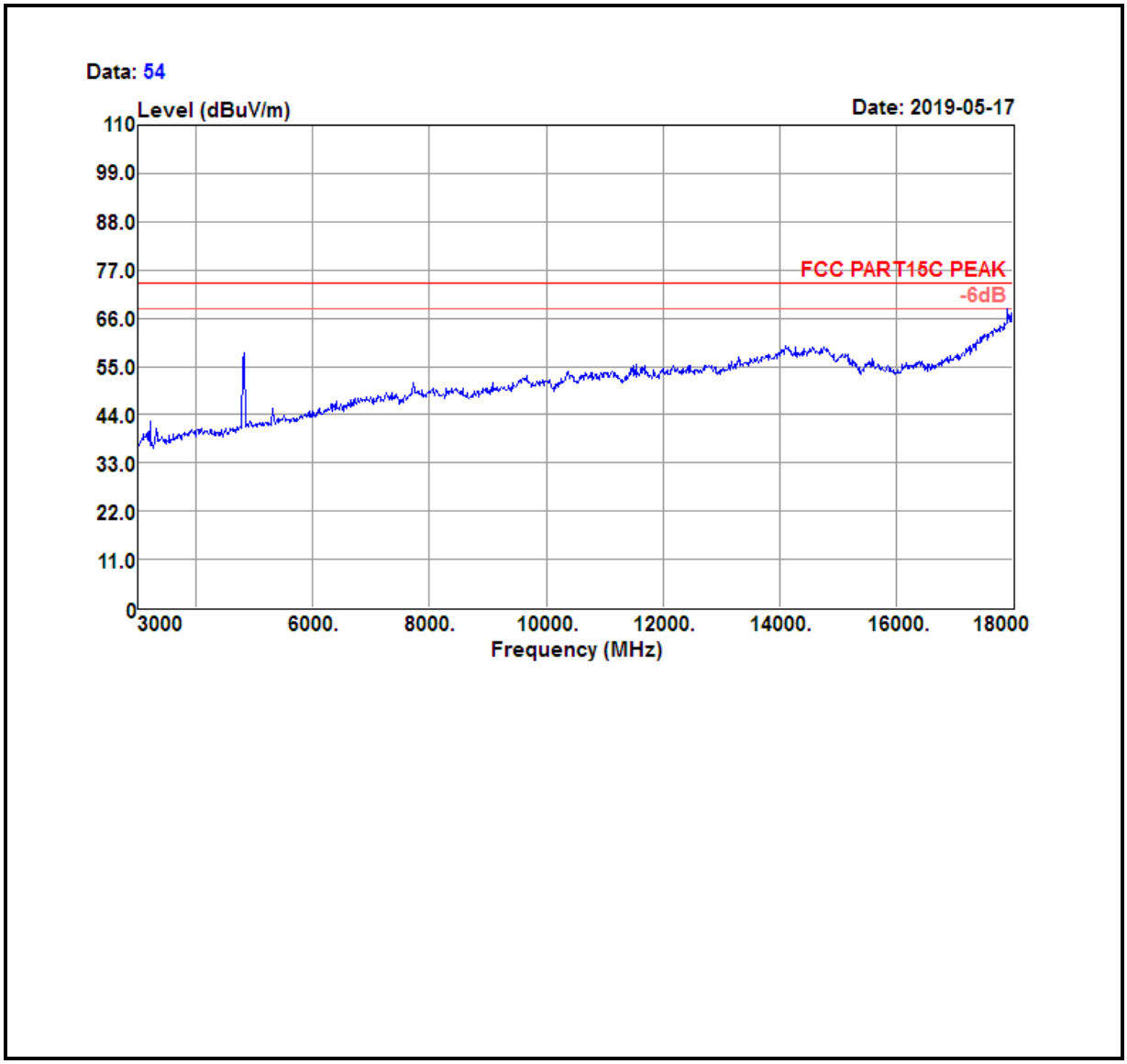
Test Mode :	802.11g CH01 (2412MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Vertical



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	
2410.000	105.46	27.17	3.65	36.13	100.15	74.00	26.15	Peak

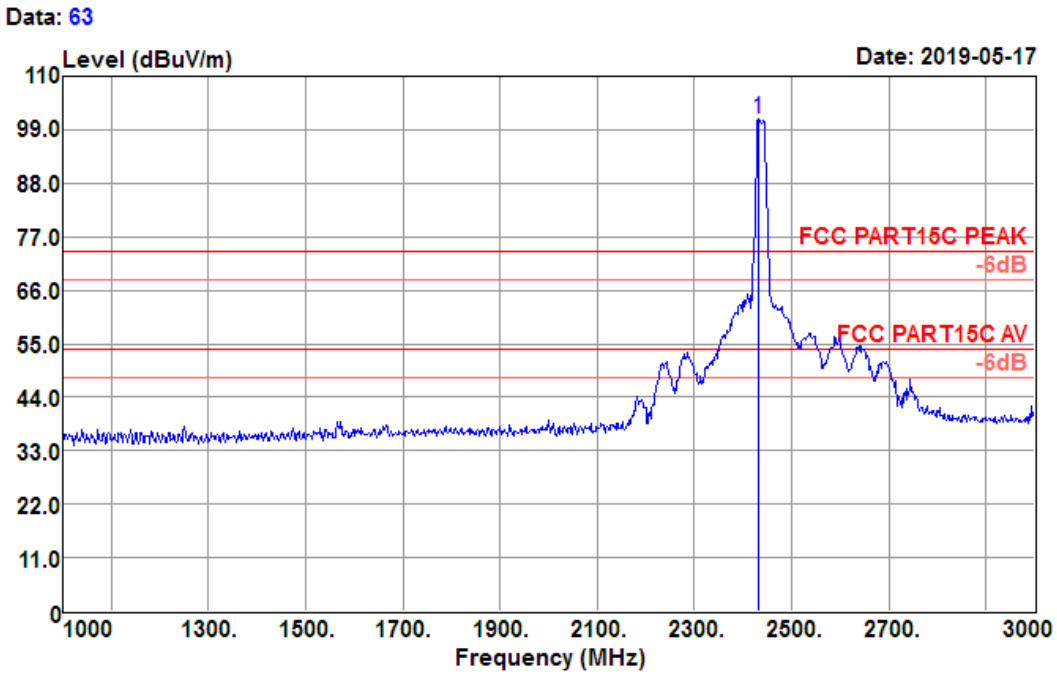


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4824.000	47.60	31.28	5.44	36.26	48.06	54.00	-5.94	Average
4824.000	61.73	31.28	5.44	36.26	62.19	74.00	-11.81	Peak
7236.000	29.98	35.94	7.02	34.27	38.67	54.00	-15.33	Average
7236.000	43.68	35.94	7.02	34.27	52.37	74.00	-21.63	Peak
9648.000	29.11	37.87	7.82	34.15	40.65	54.00	-13.35	Average
9648.000	42.23	37.87	7.82	34.15	53.77	74.00	-20.23	Peak

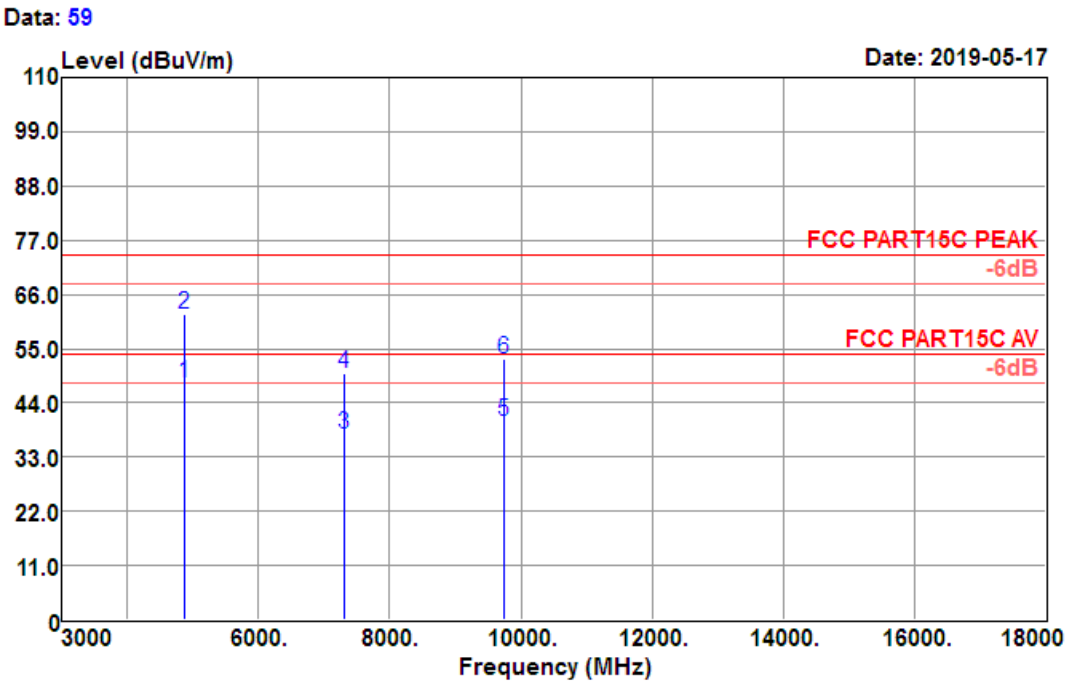


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

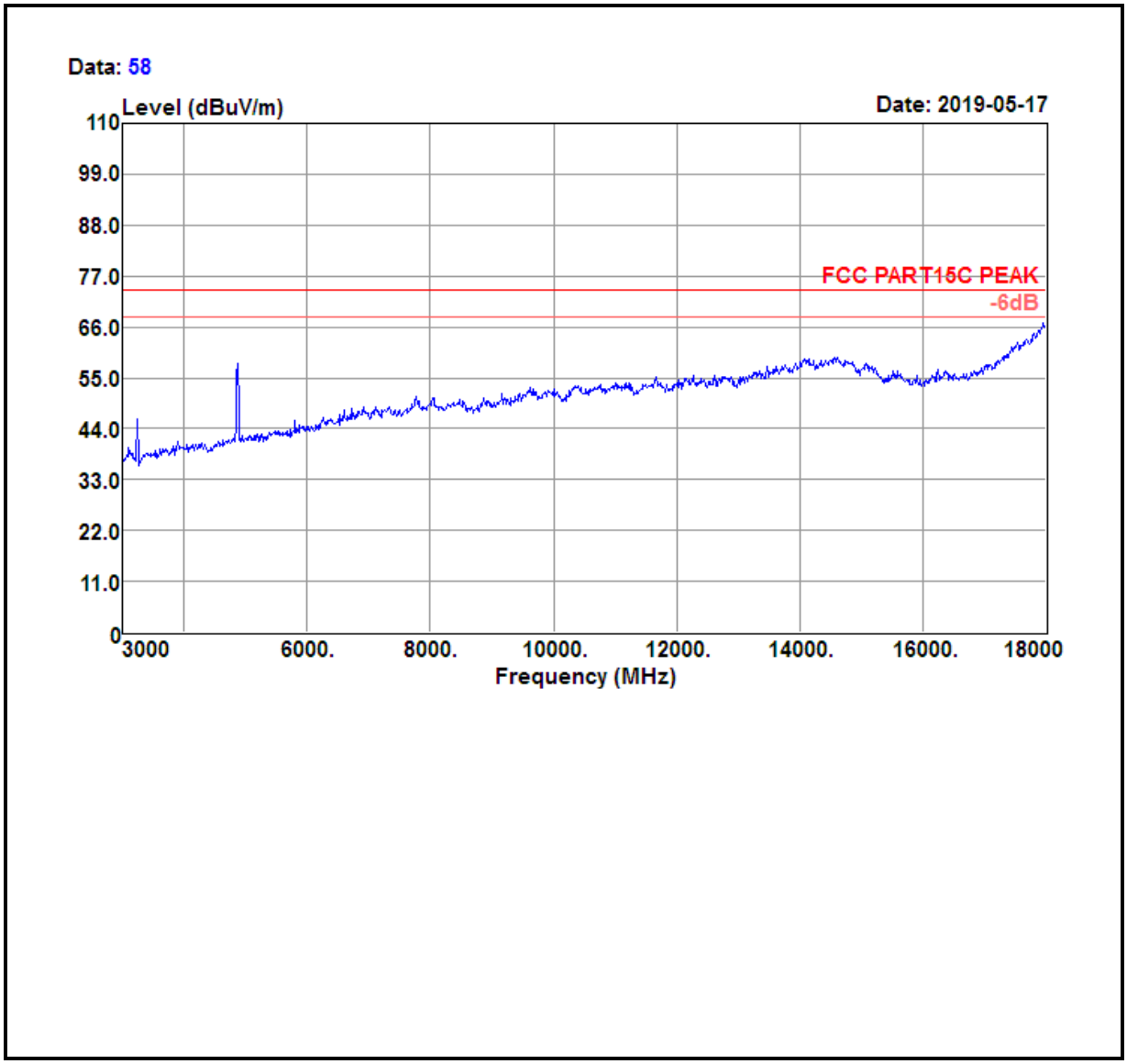
Test Mode :	802.11g CH06 (2437MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Horizontal



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	
2432.000	106.52	27.22	3.66	36.19	101.21	74.00	27.21	Peak

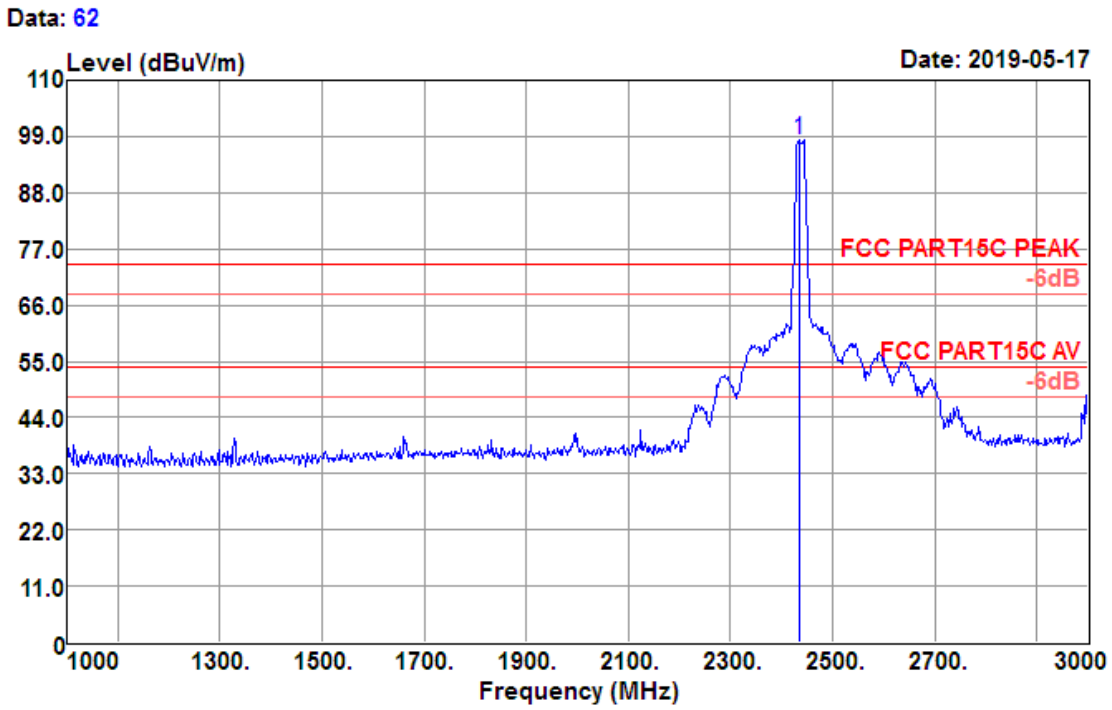


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4874.000	47.43	31.40	5.41	36.24	48.00	54.00	-6.00	Average
4874.000	61.55	31.40	5.41	36.24	62.12	74.00	-11.88	Peak
7311.000	28.62	36.12	7.24	34.35	37.63	54.00	-16.37	Average
7311.000	40.87	36.12	7.24	34.35	49.88	74.00	-24.12	Peak
9748.000	28.33	38.05	7.96	34.19	40.15	54.00	-13.85	Average
9748.000	41.05	38.05	7.96	34.19	52.87	74.00	-21.13	Peak

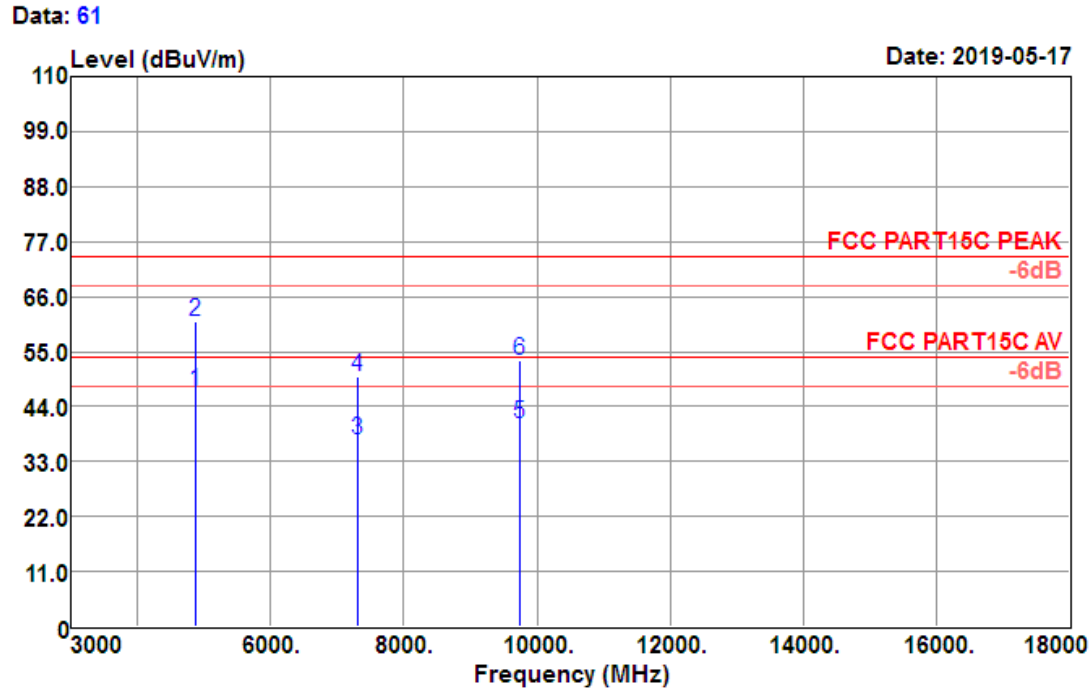


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

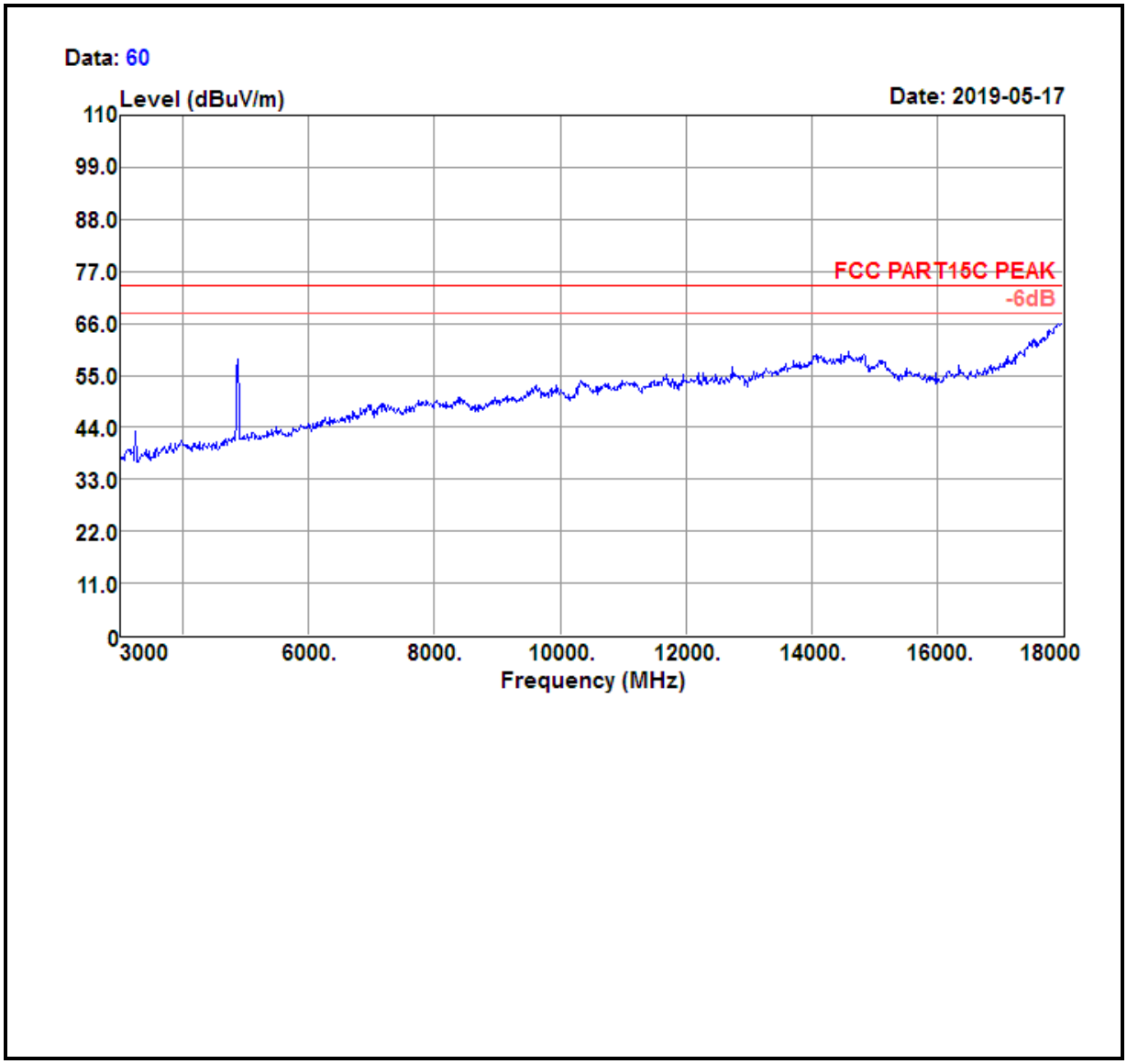
Test Mode :	802.11g CH06 (2437MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Vertical



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	
2436.000	103.73	27.23	3.66	36.20	98.42	74.00	24.42	Peak

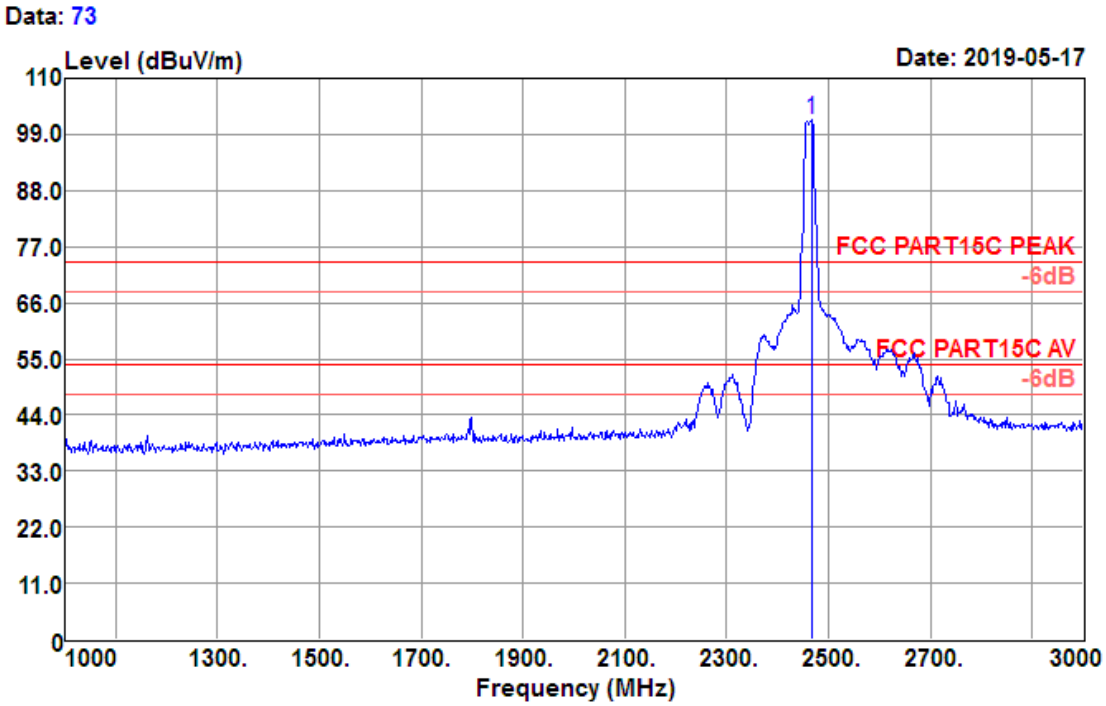


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4874.000	46.56	31.40	5.41	36.24	47.13	54.00	-6.87	Average
4874.000	60.59	31.40	5.41	36.24	61.16	74.00	-12.84	Peak
7311.000	28.16	36.12	7.24	34.35	37.17	54.00	-16.83	Average
7311.000	41.05	36.12	7.24	34.35	50.06	74.00	-23.94	Peak
9748.000	28.64	38.05	7.96	34.19	40.46	54.00	-13.54	Average
9748.000	41.51	38.05	7.96	34.19	53.33	74.00	-20.67	Peak

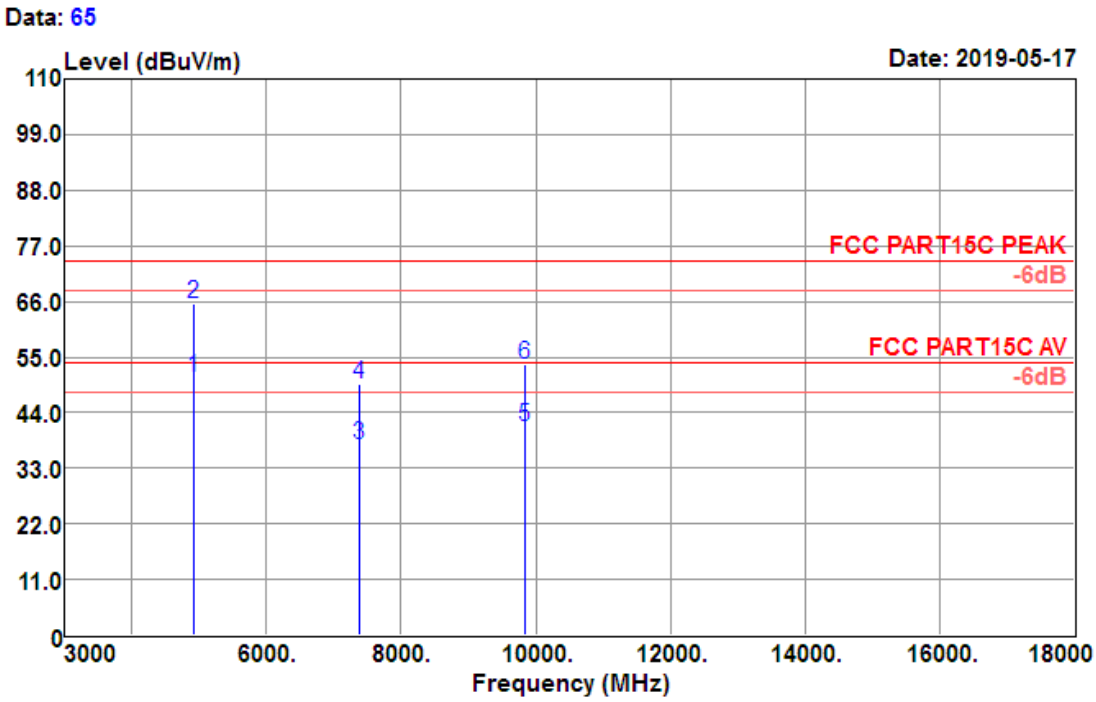


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

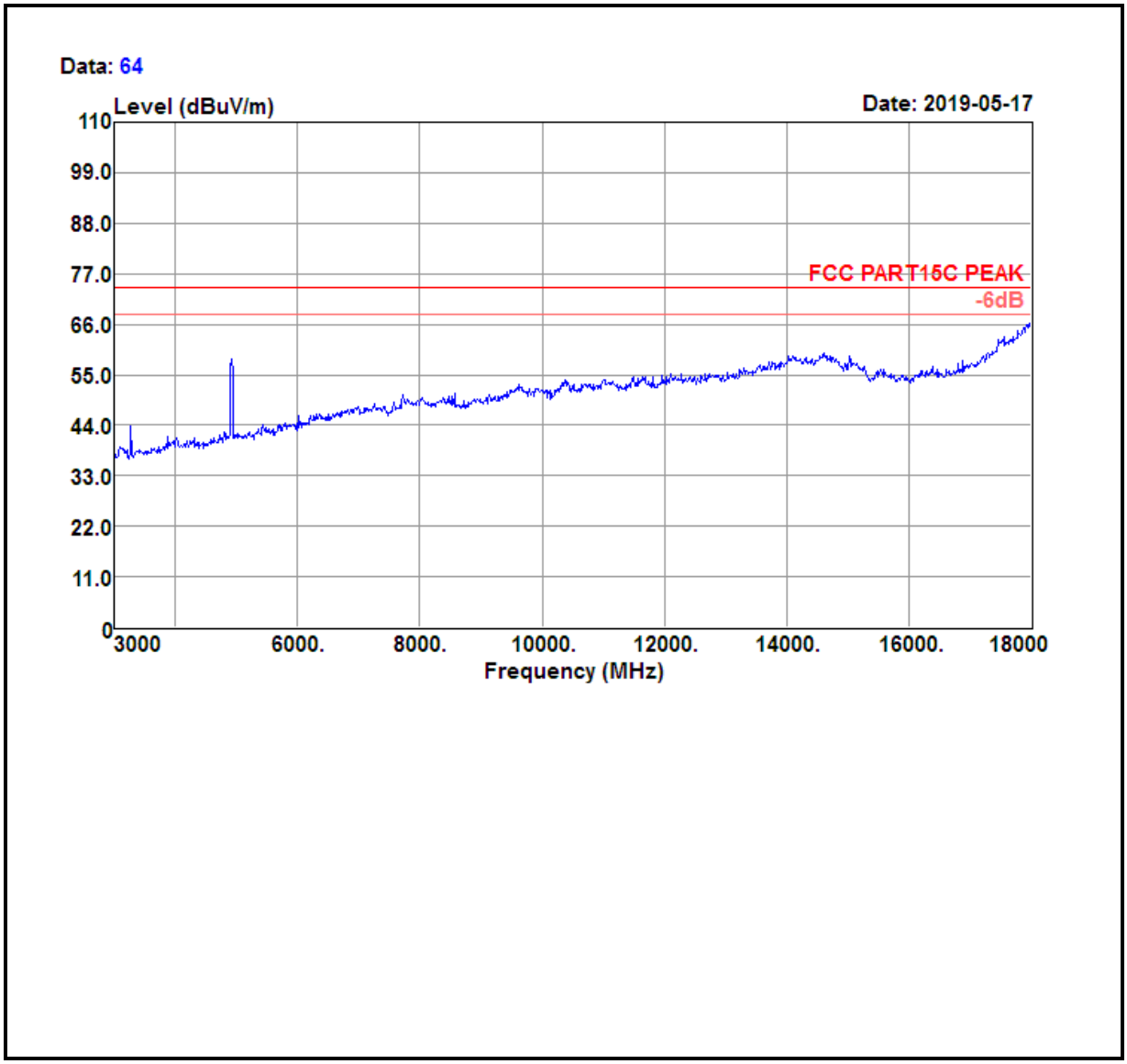
Test Mode :	802.11g CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Horizontal



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	
2466.000	107.18	27.31	3.67	36.28	101.88	74.00	27.88	Peak

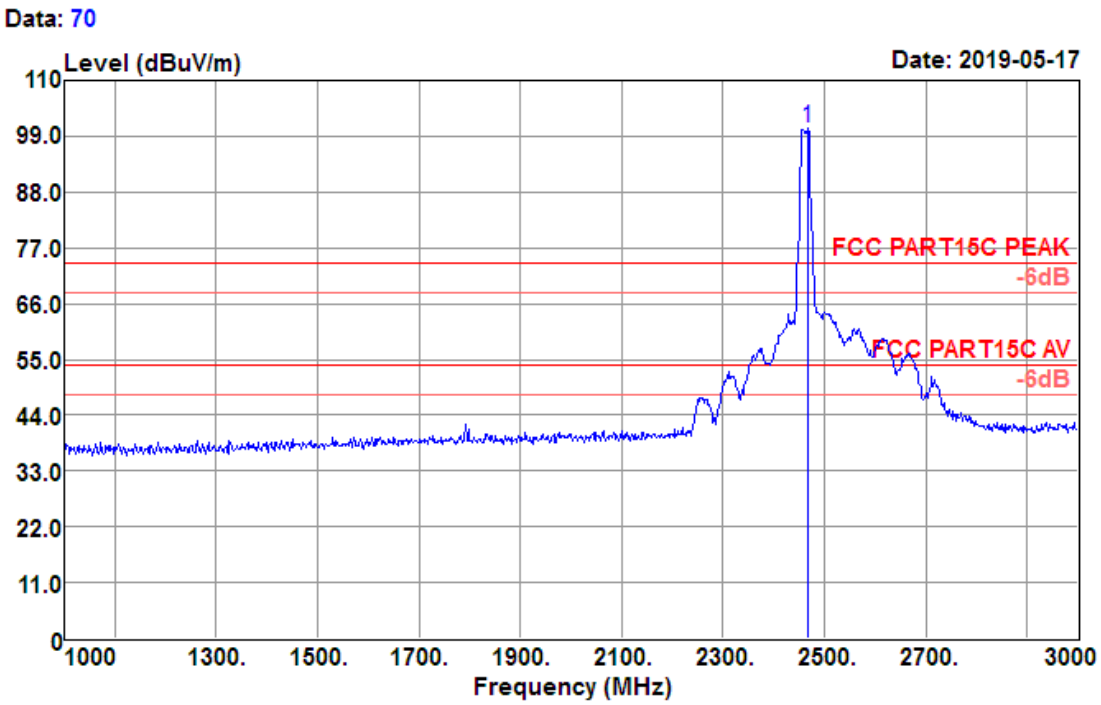


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4924.000	50.43	31.52	5.38	36.23	51.10	54.00	-2.90	Average
4924.000	64.87	31.52	5.38	36.23	65.54	74.00	-8.46	Peak
7386.000	28.32	36.29	7.46	34.42	37.65	54.00	-16.35	Average
7386.000	40.23	36.29	7.46	34.42	49.56	74.00	-24.44	Peak
9848.000	29.11	38.23	8.04	34.23	41.15	54.00	-12.85	Average
9848.000	41.56	38.23	8.04	34.23	53.60	74.00	-20.40	Peak

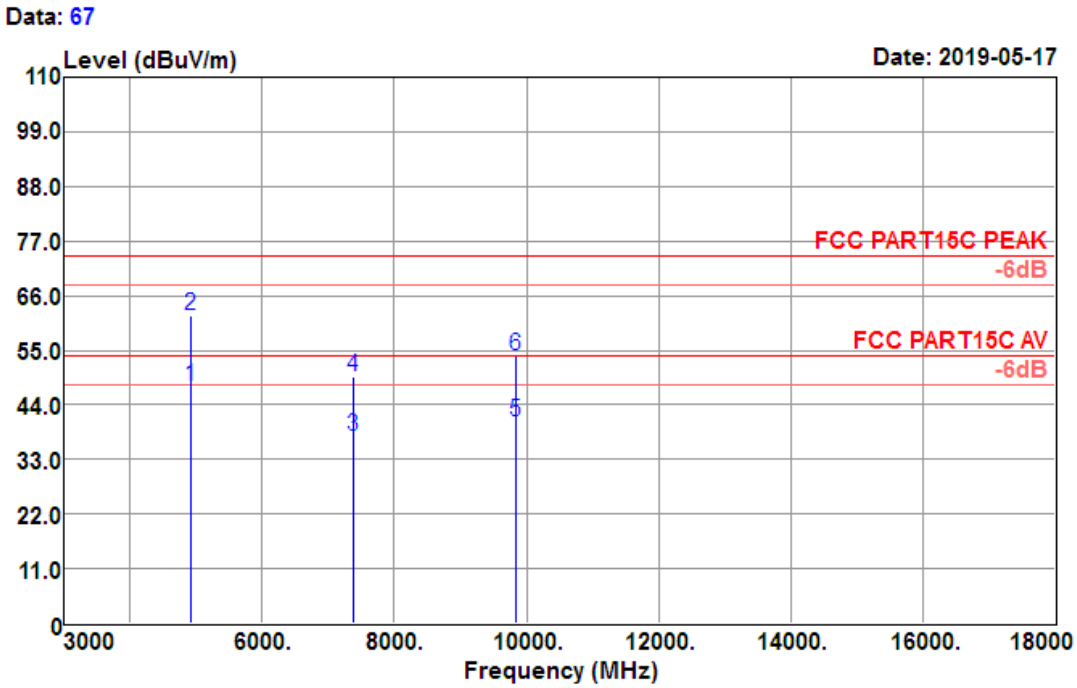


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

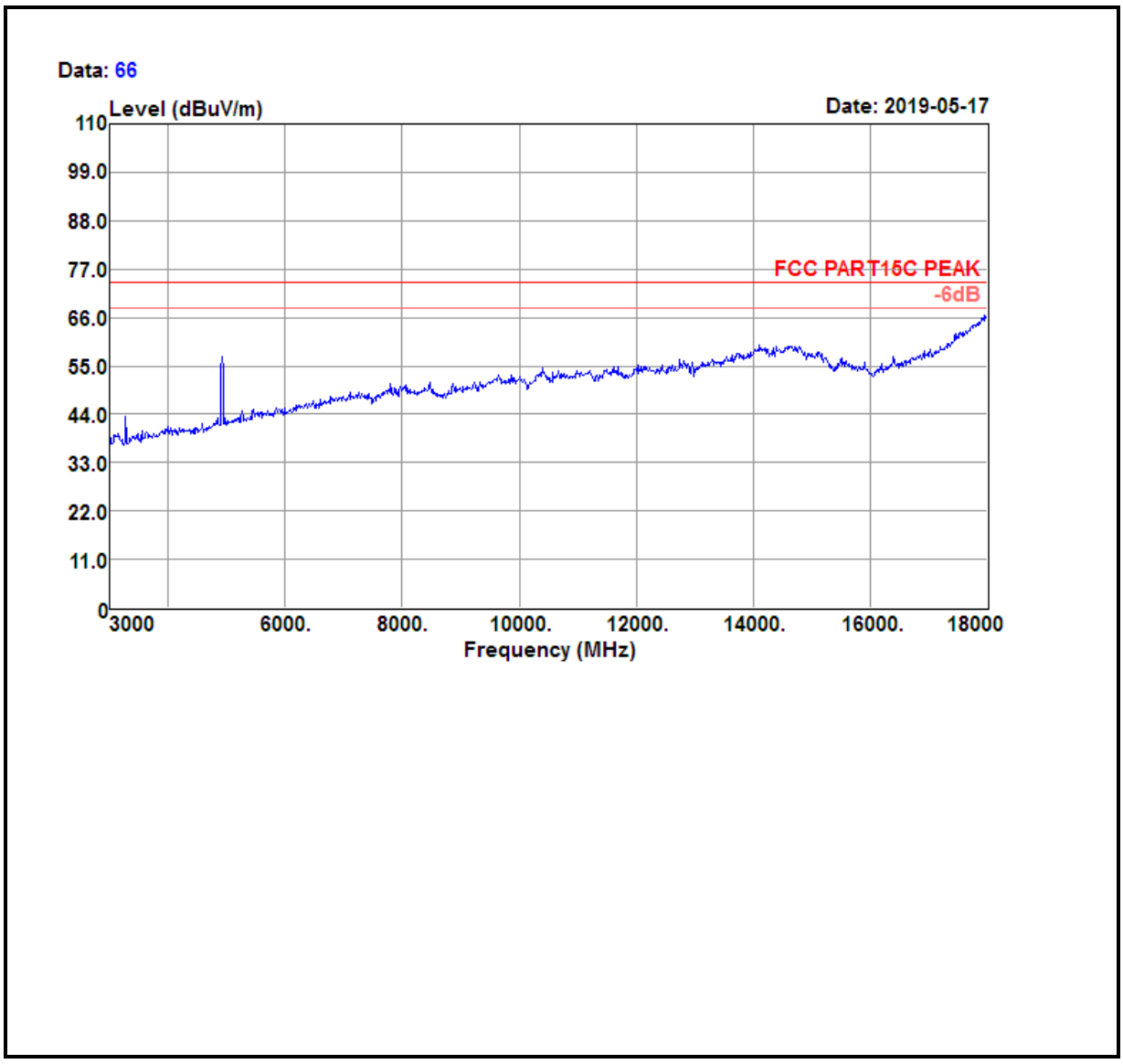
Test Mode :	802.11g CH011 (2462MHz)	**Temperature :**	21~23℃
Test Engineer :	Julie Deng	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~18GHz	**Polarization :**	Vertical



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	
2468.000	105.93	27.32	3.67	36.29	100.63	74.00	26.63	Peak

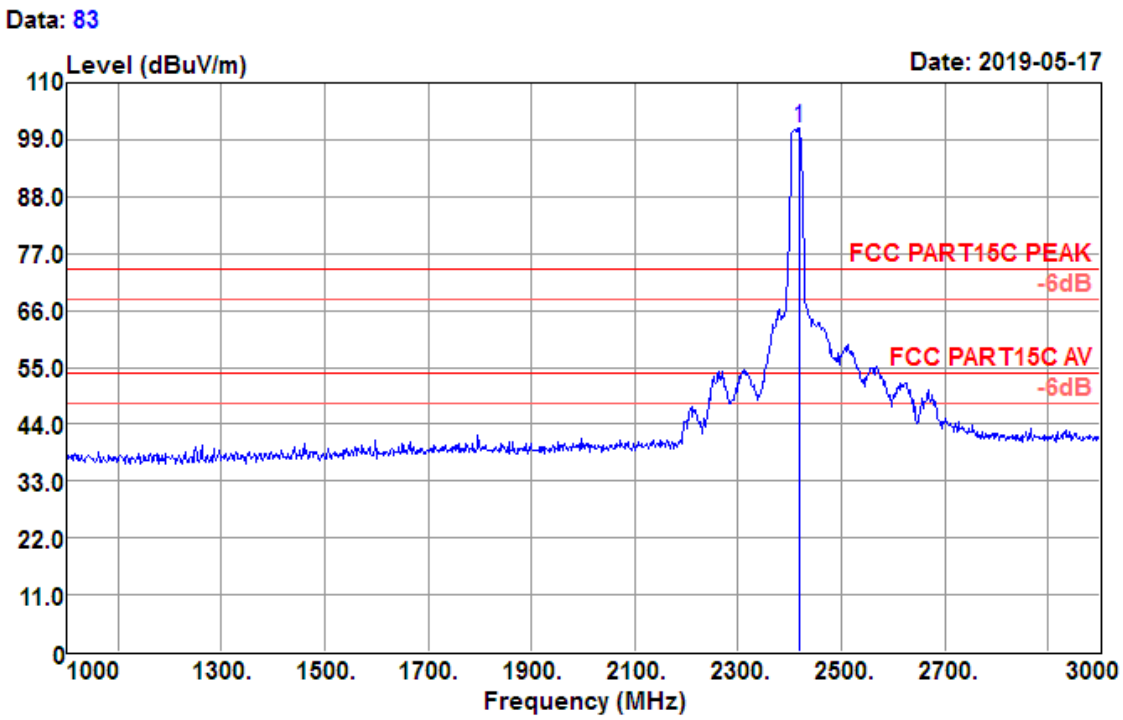


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4924.000	47.19	31.52	5.38	36.23	47.86	54.00	-6.14	Average
4924.000	61.39	31.52	5.38	36.23	62.06	74.00	-11.94	Peak
7386.000	28.35	36.29	7.46	34.42	37.68	54.00	-16.32	Average
7386.000	40.47	36.29	7.46	34.42	49.80	74.00	-24.20	Peak
9848.000	28.46	38.23	8.04	34.23	40.50	54.00	-13.50	Average
9848.000	41.76	38.23	8.04	34.23	53.80	74.00	-20.20	Peak



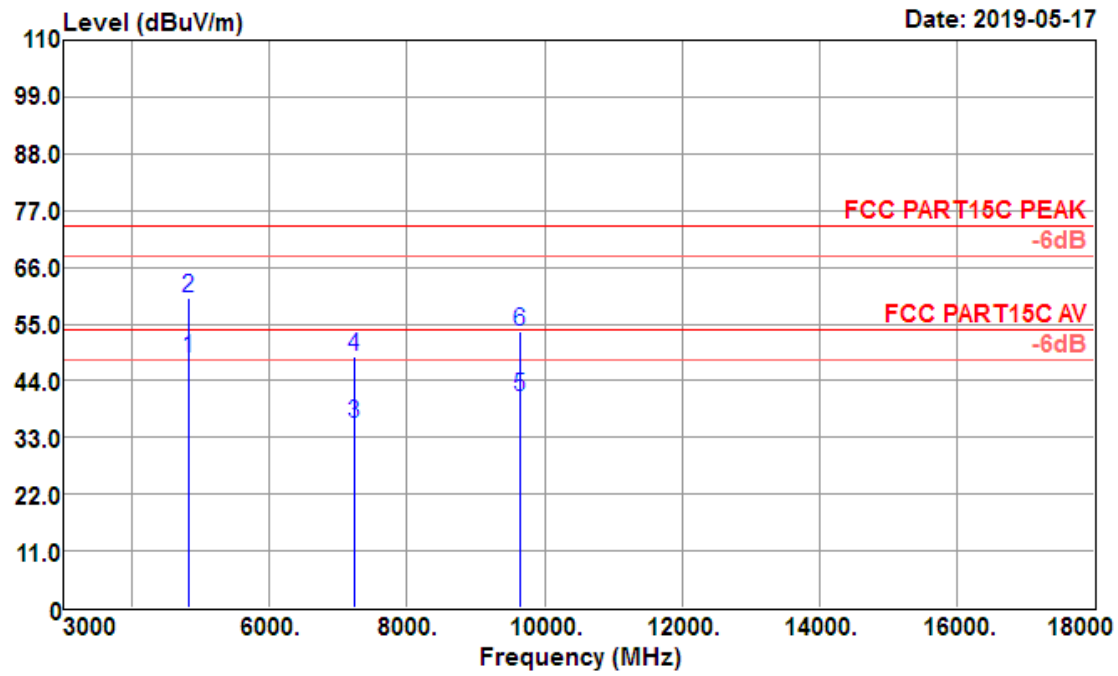
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT20 CH01 (2412MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Horizontal

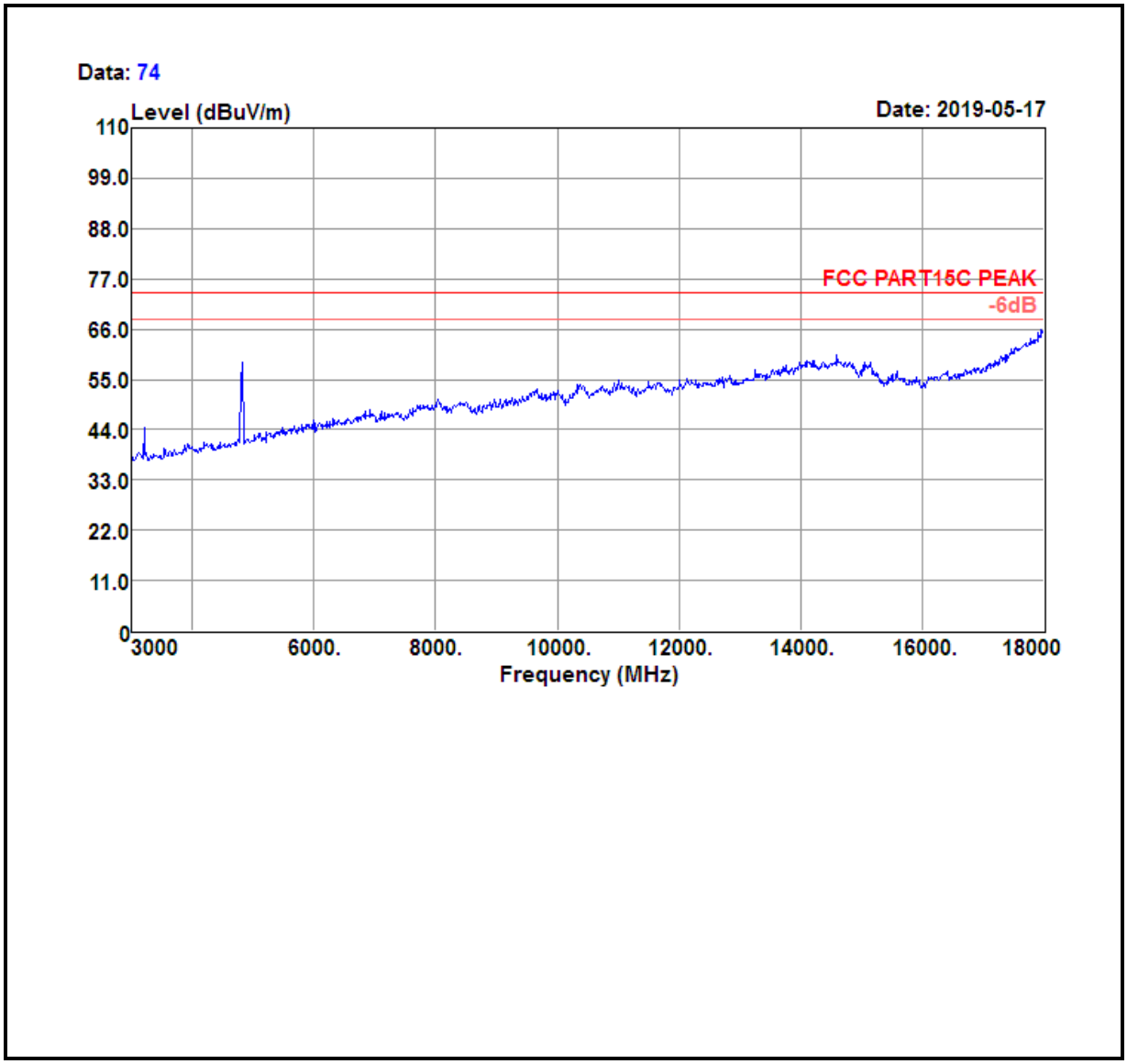


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2420.000	106.59	27.19	3.66	36.16	101.28	74.00	27.28	Peak

Data: 75

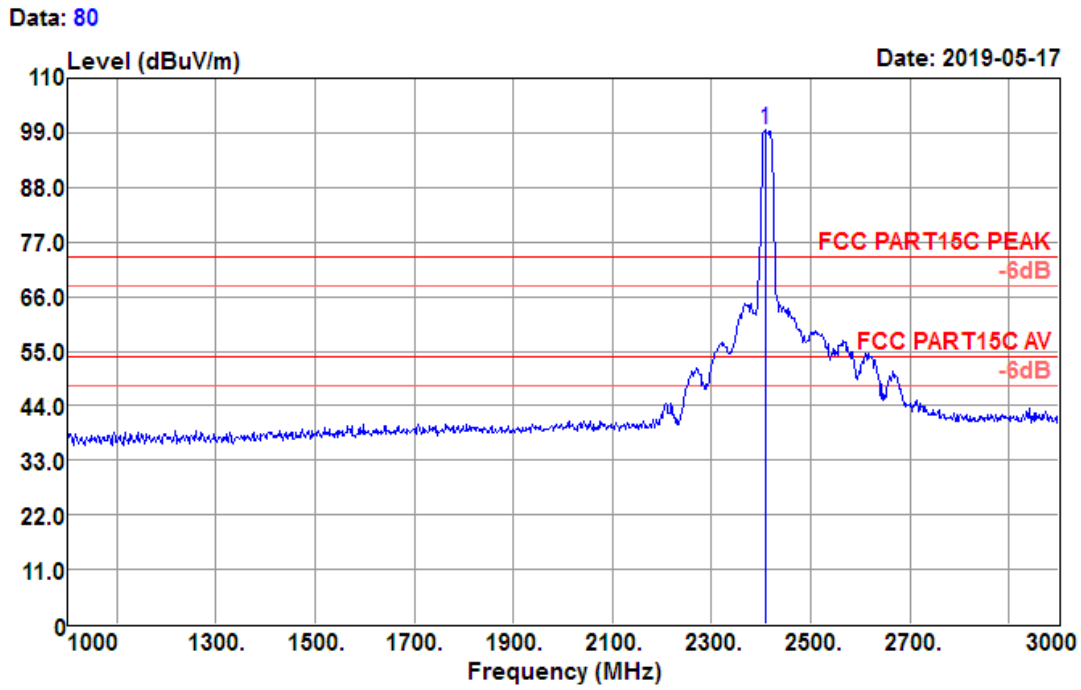


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4824.000	47.91	31.28	5.44	36.26	48.37	54.00	-5.63	Average
4824.000	59.43	31.28	5.44	36.26	59.89	74.00	-14.11	Peak
7236.000	27.16	35.94	7.02	34.27	35.85	54.00	-18.15	Average
7236.000	40.08	35.94	7.02	34.27	48.77	74.00	-25.23	Peak
9648.000	29.40	37.87	7.82	34.15	40.94	54.00	-13.06	Average
9648.000	42.10	37.87	7.82	34.15	53.64	74.00	-20.36	Peak

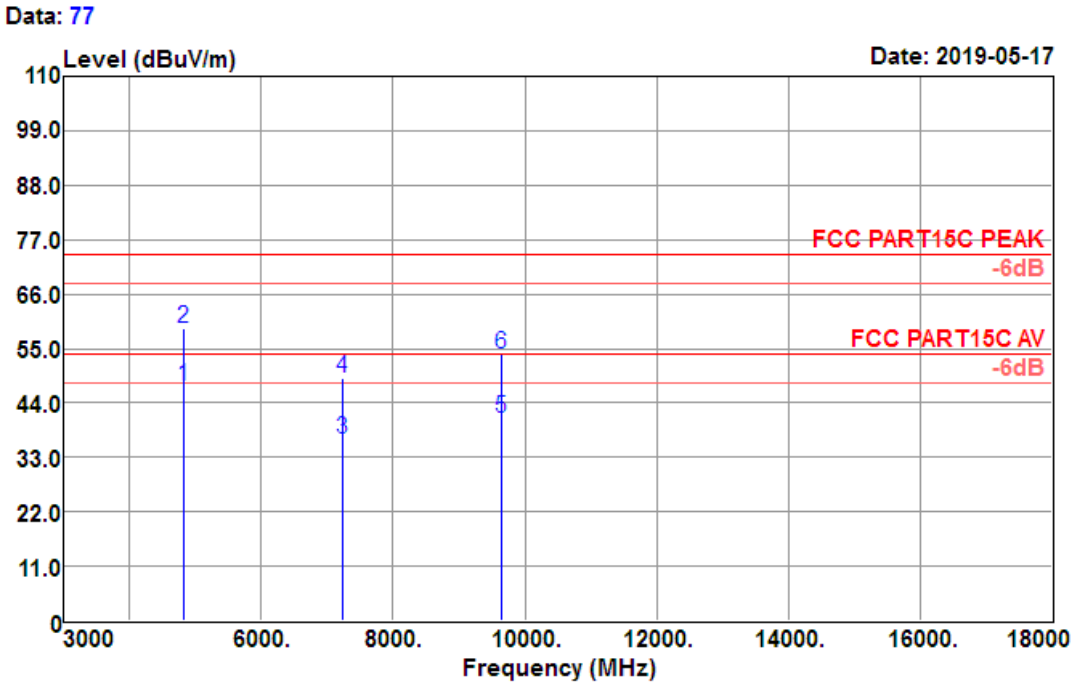


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

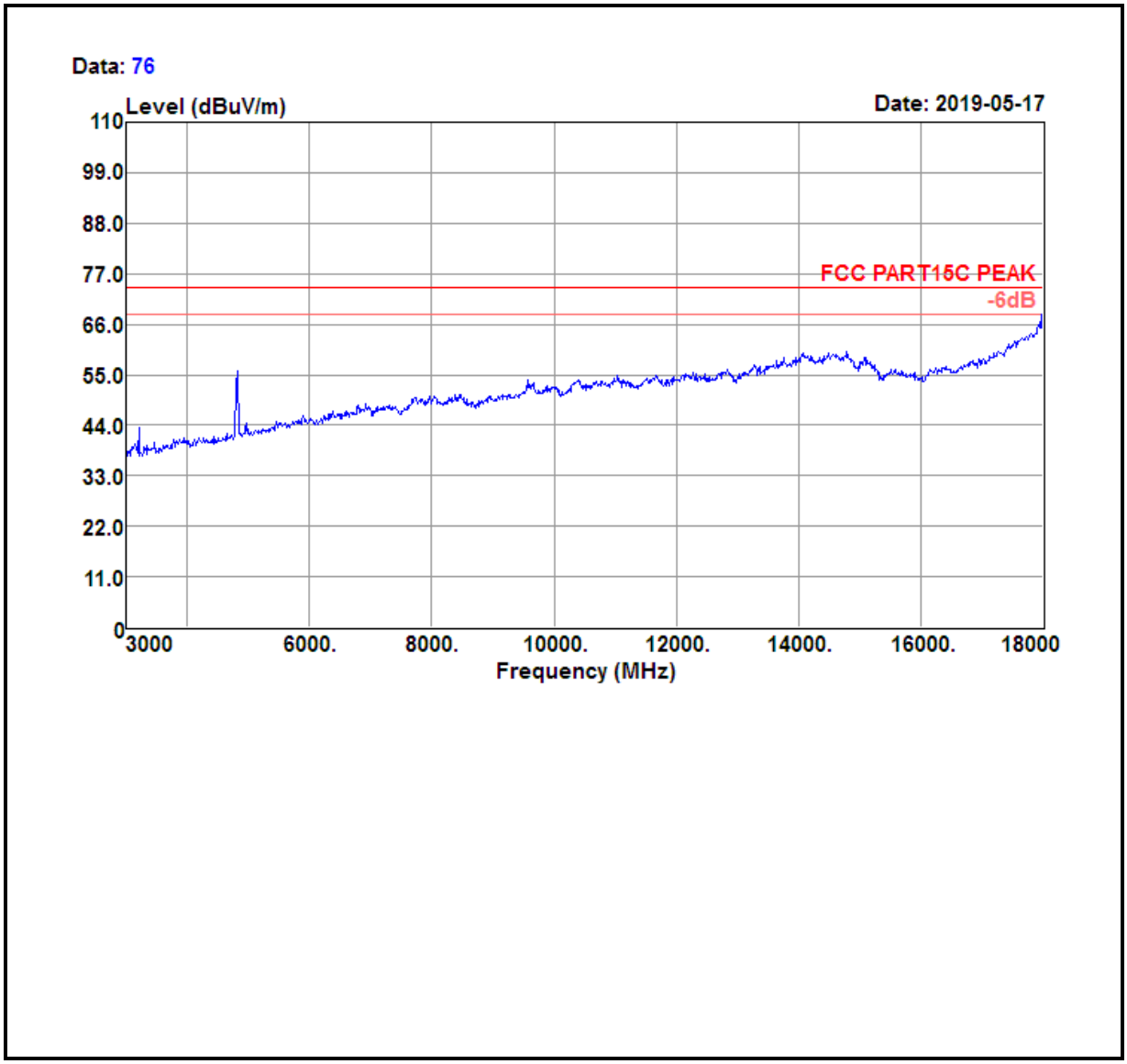
Test Mode :	802.11n HT20 CH01(2412MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Vertical



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	
2410.000	104.86	27.17	3.65	36.13	99.55	74.00	25.55	Peak

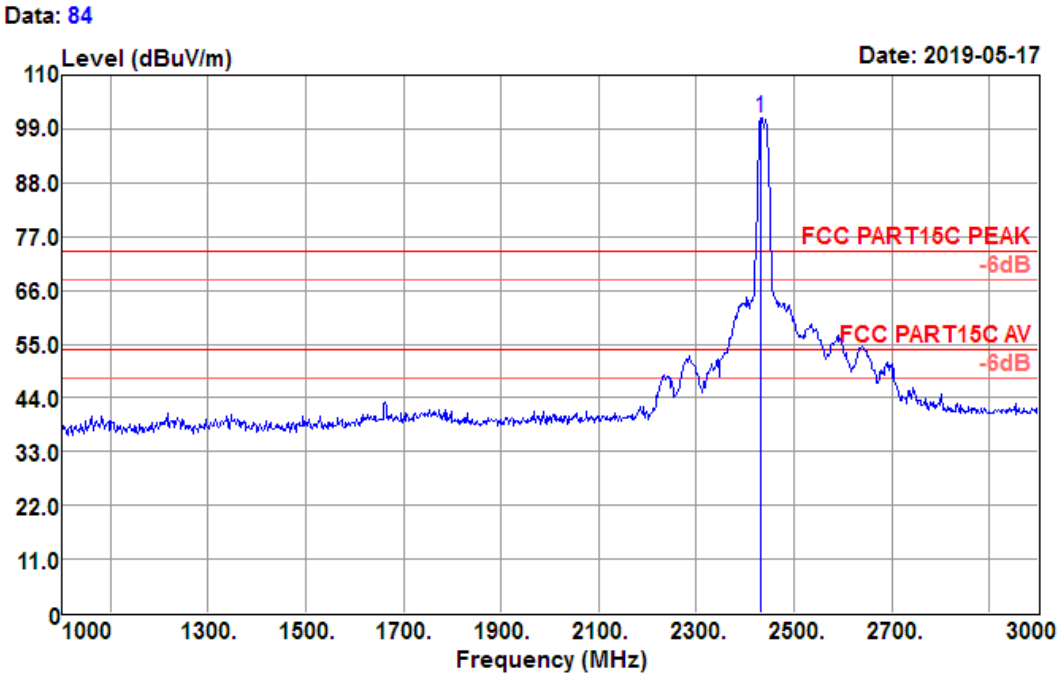


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4824.000	46.84	31.28	5.44	36.26	47.30	54.00	-6.70	Average
4824.000	58.69	31.28	5.44	36.26	59.15	74.00	-14.85	Peak
7236.000	28.01	35.94	7.02	34.27	36.70	54.00	-17.30	Average
7236.000	40.44	35.94	7.02	34.27	49.13	74.00	-24.87	Peak
9648.000	29.41	37.87	7.82	34.15	40.95	54.00	-13.05	Average
9648.000	42.26	37.87	7.82	34.15	53.80	74.00	-20.20	Peak

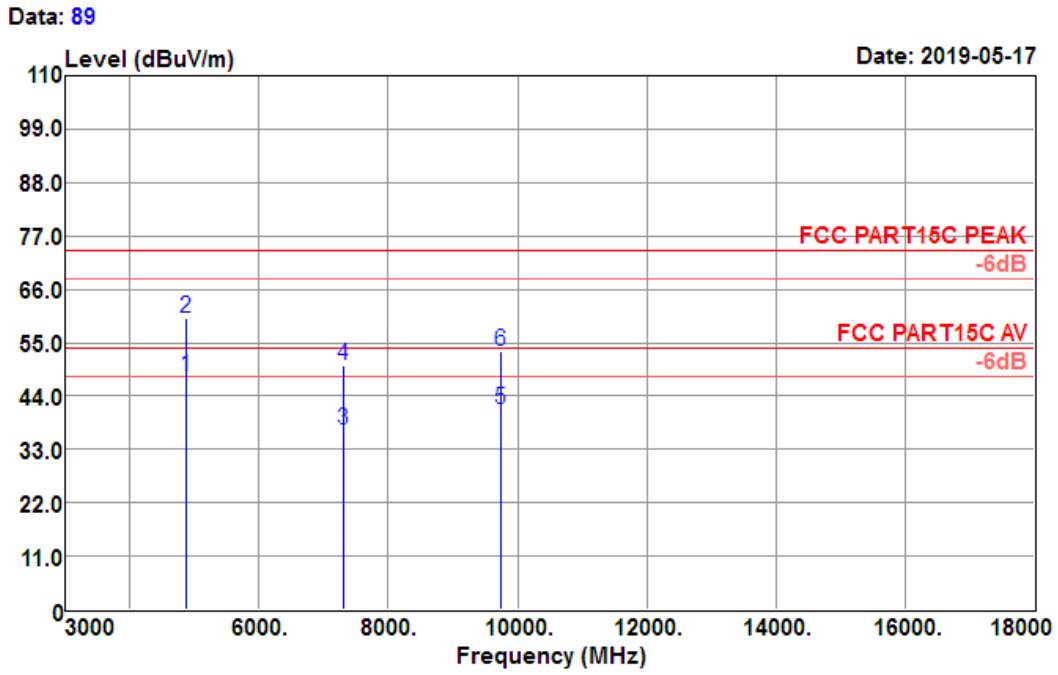


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

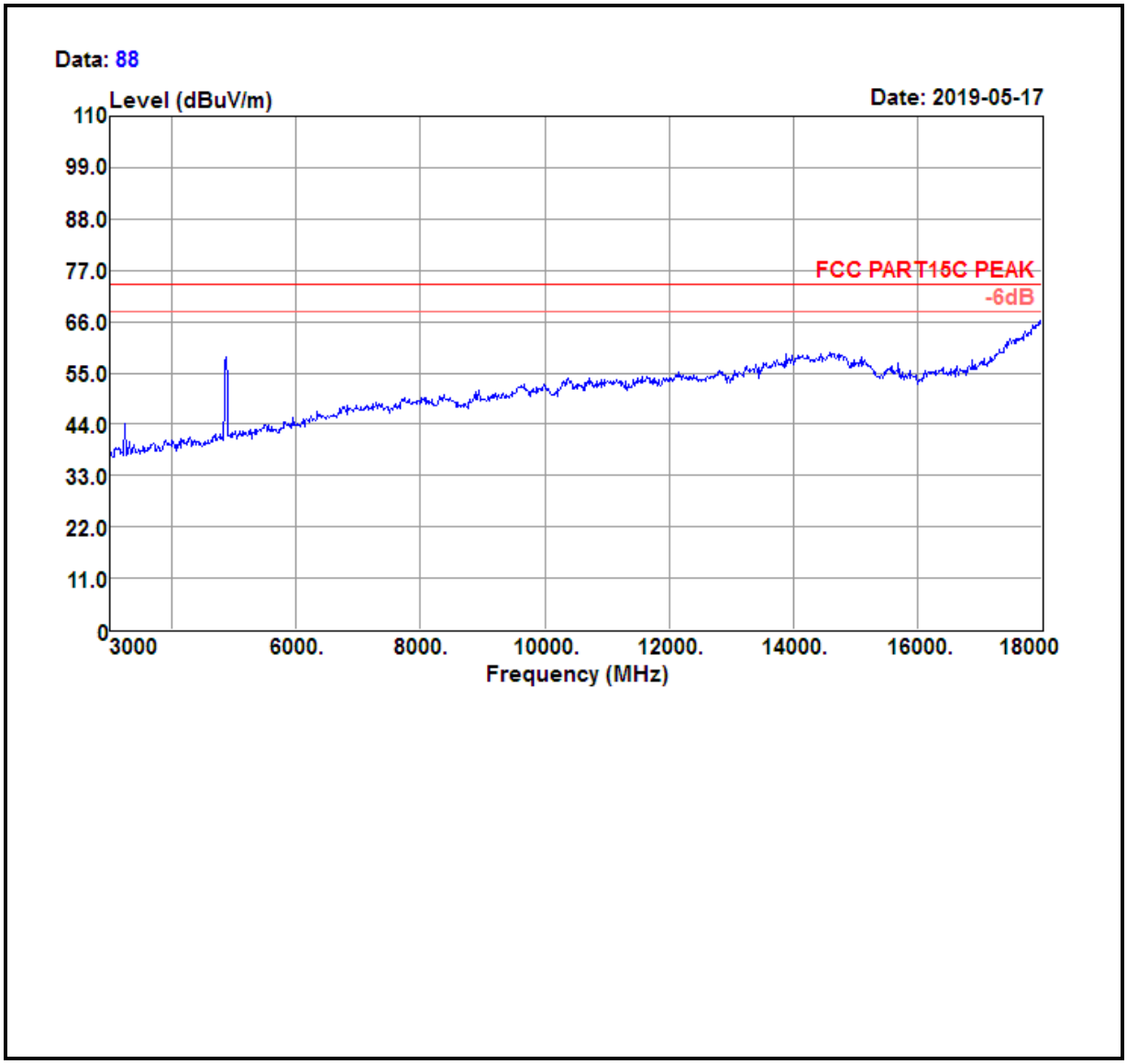
Test Mode :	802.11n HT20 CH06 (2437MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Horizontal



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	
2432.000	106.63	27.22	3.66	36.19	101.32	74.00	27.32	Peak

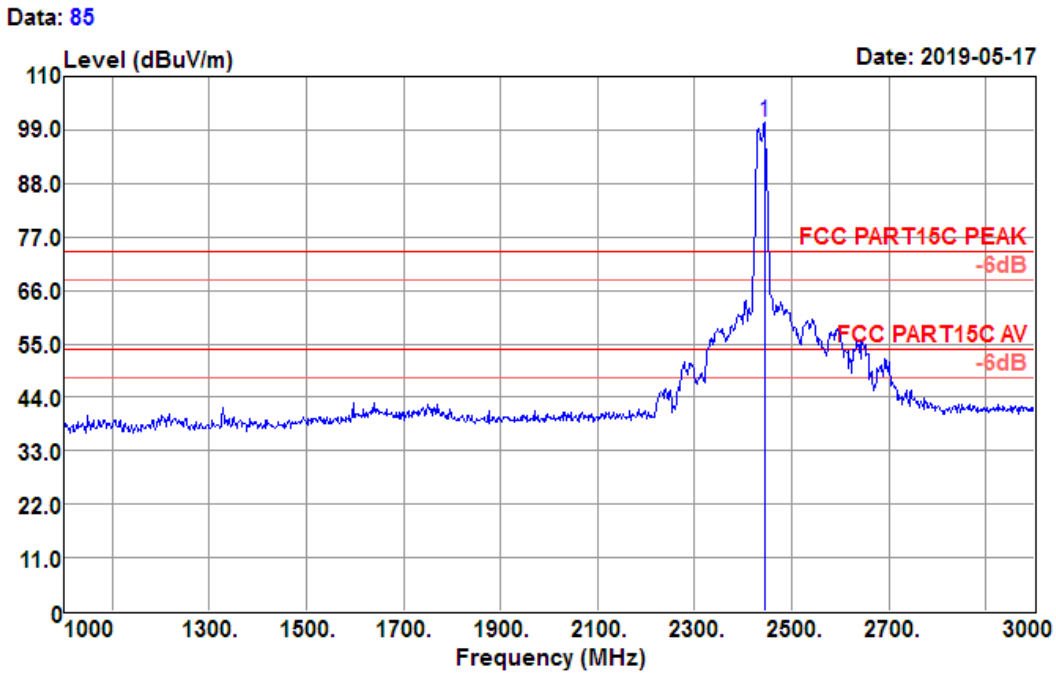


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4874.000	47.61	31.40	5.41	36.24	48.18	54.00	-5.82	Average
4874.000	59.43	31.40	5.41	36.24	60.00	74.00	-14.00	Peak
7311.000	28.12	36.12	7.24	34.35	37.13	54.00	-16.87	Average
7311.000	41.20	36.12	7.24	34.35	50.21	74.00	-23.79	Peak
9748.000	29.28	38.05	7.96	34.19	41.10	54.00	-12.90	Average
9748.000	41.48	38.05	7.96	34.19	53.30	74.00	-20.70	Peak



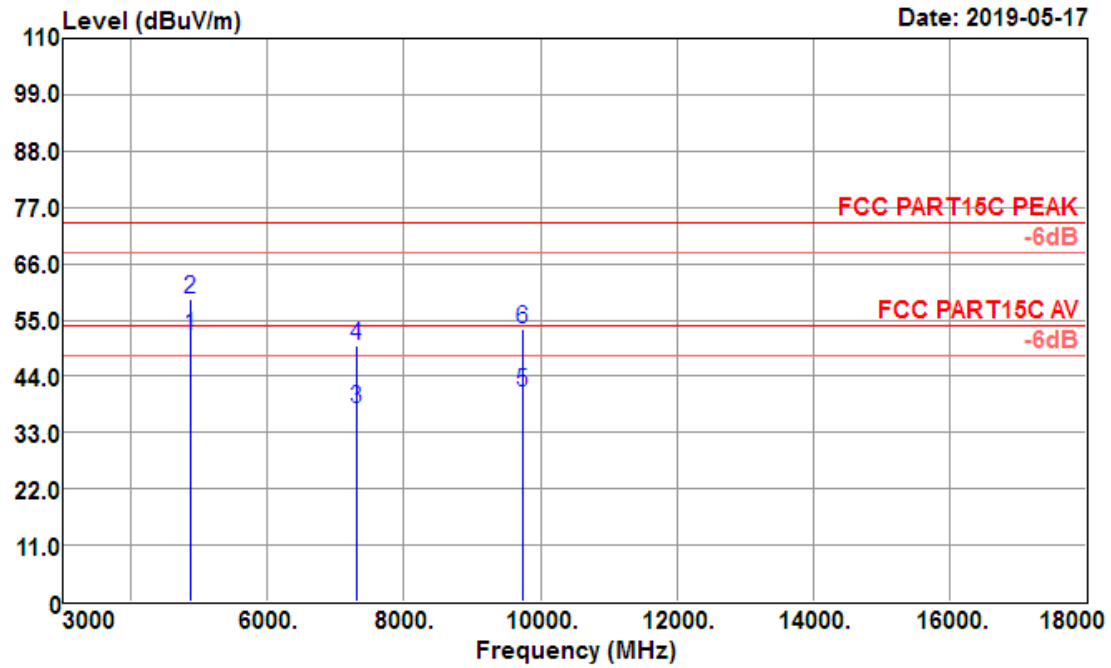
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT20 CH06 (2437MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Vertical

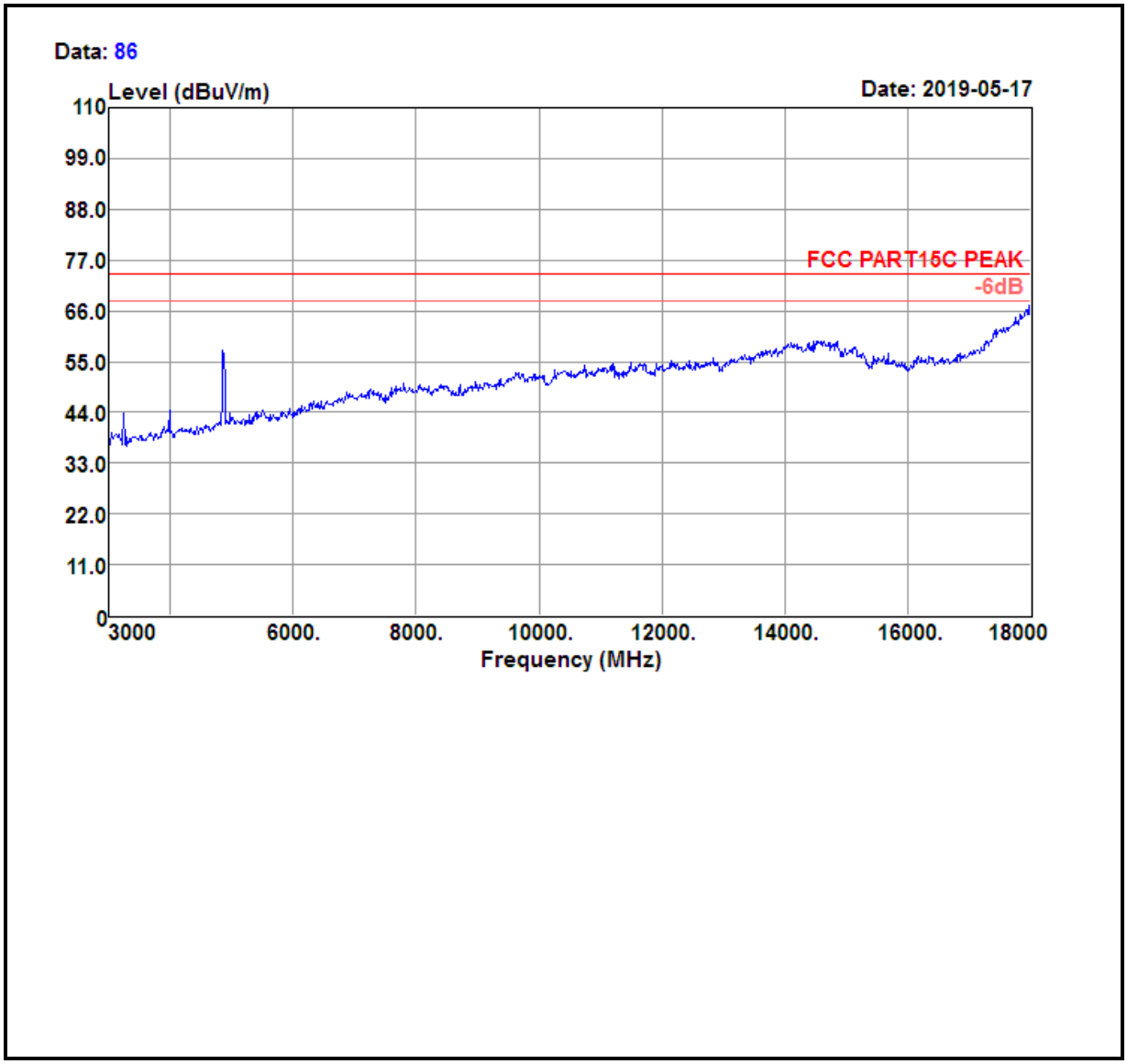


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
2444.000	105.85	27.25	3.67	36.22	100.55	74.00	26.55	Peak

Data: 87

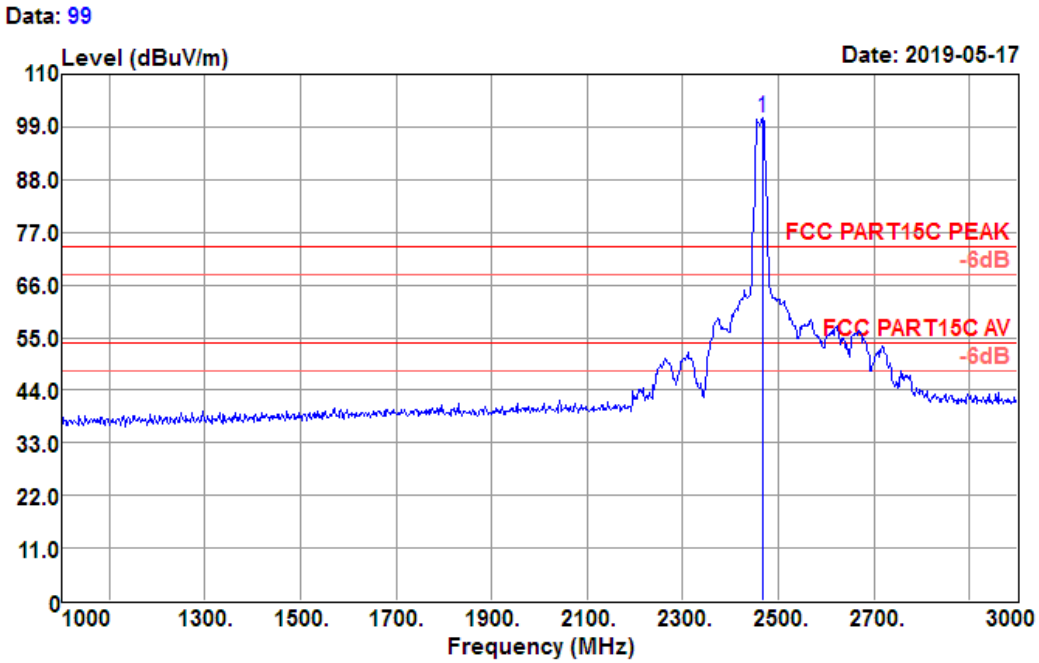


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	Level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	51.24	31.40	5.41	36.24	51.81	54.00	-2.19	Average
4874.000	58.57	31.40	5.41	36.24	59.14	74.00	-14.86	Peak
7311.000	28.48	36.12	7.24	34.35	37.49	54.00	-16.51	Average
7311.000	41.06	36.12	7.24	34.35	50.07	74.00	-23.93	Peak
9748.000	29.06	38.05	7.96	34.19	40.88	54.00	-13.12	Average
9748.000	41.50	38.05	7.96	34.19	53.32	74.00	-20.68	Peak

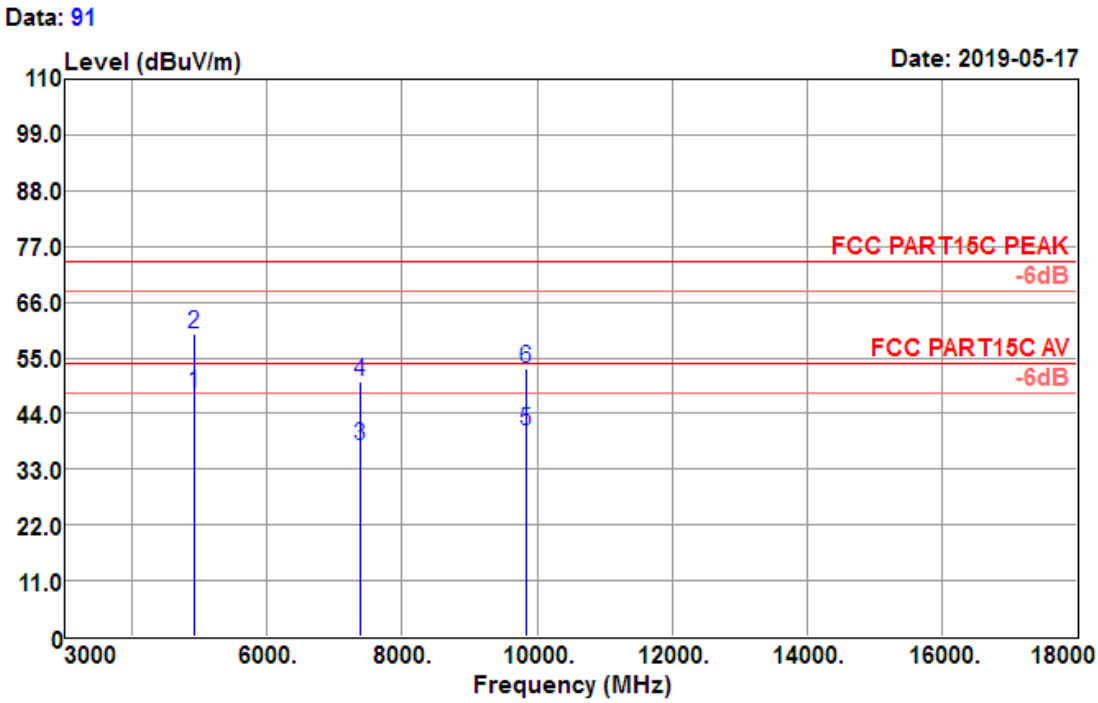


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

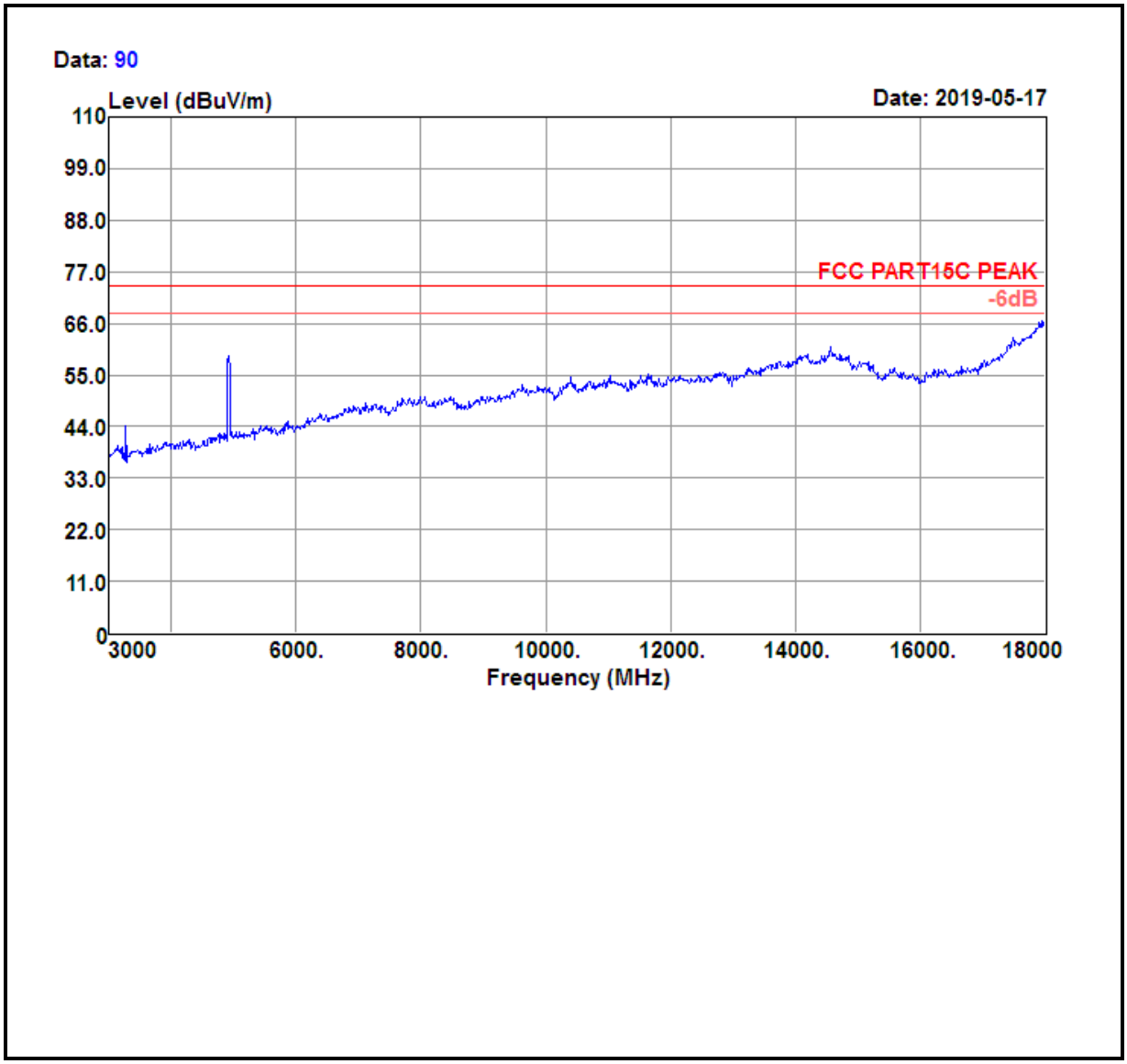
Test Mode :	802.11n HT20 CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Horizontal



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	
2466.000	106.08	27.31	3.67	36.28	100.78	74.00	26.78	Peak

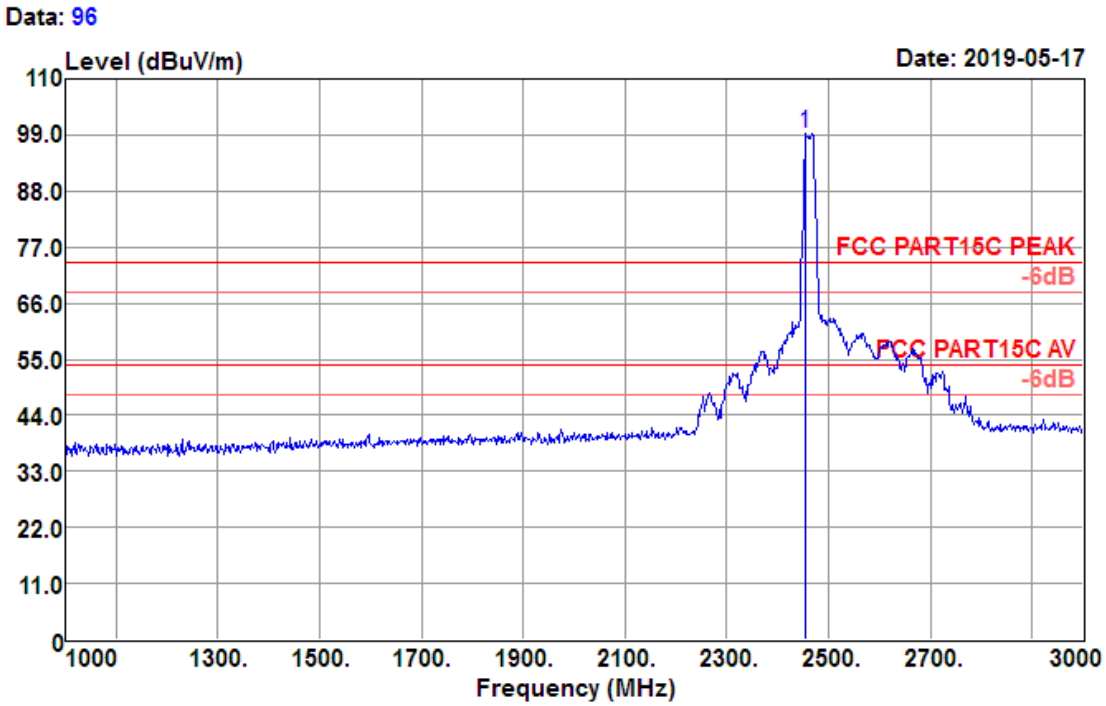


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4924.000	47.27	31.52	5.38	36.23	47.94	54.00	-6.06	Average
4924.000	58.91	31.52	5.38	36.23	59.58	74.00	-14.42	Peak
7386.000	28.25	36.29	7.46	34.42	37.58	54.00	-16.42	Average
7386.000	40.86	36.29	7.46	34.42	50.19	74.00	-23.81	Peak
9848.000	28.68	38.23	8.04	34.23	40.72	54.00	-13.28	Average
9848.000	40.99	38.23	8.04	34.23	53.03	74.00	-20.97	Peak

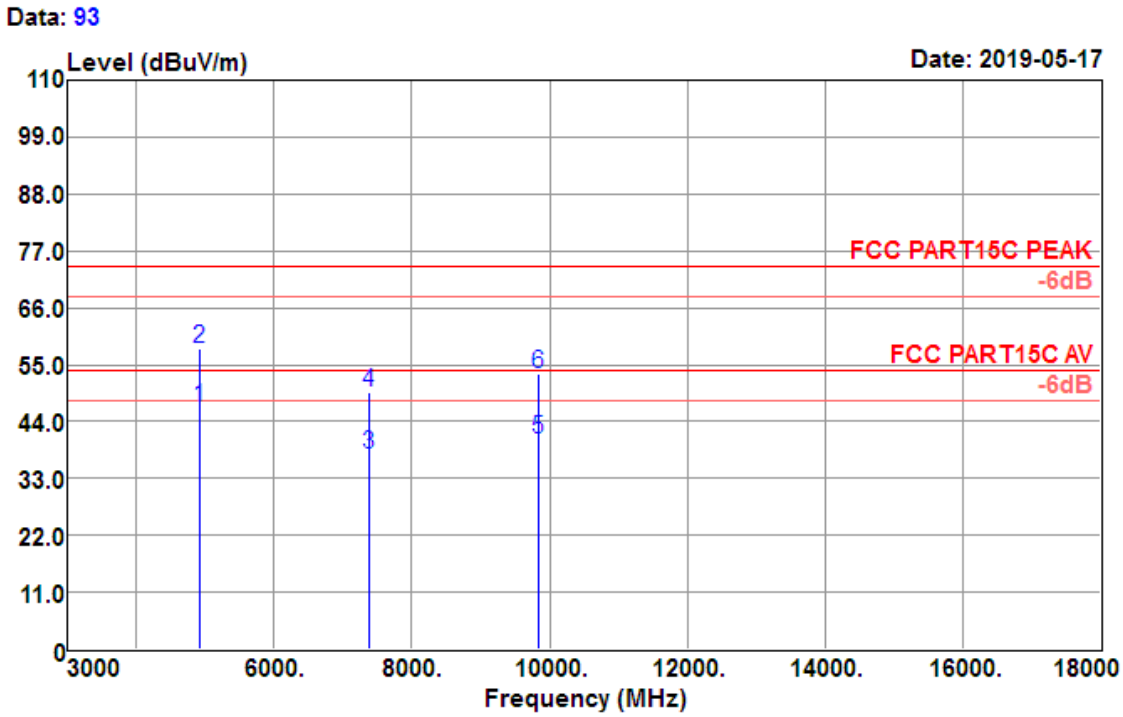


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

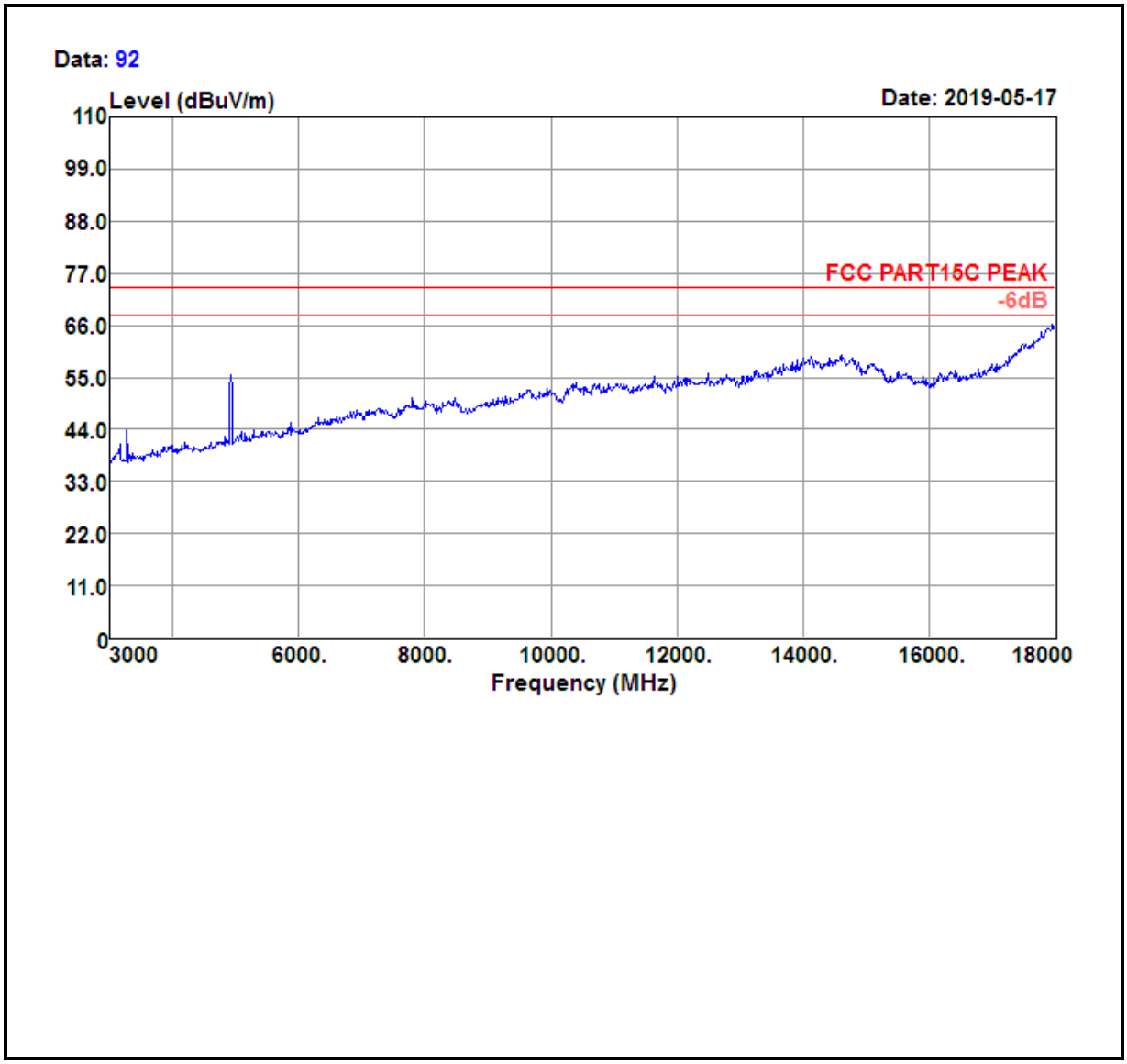
Test Mode :	802.11n HT20 CH011 (2462MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	Relative Humidity :	63~65%
Frequencey Range	1GHz~18GHz	Polarization :	Vertical



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	
2456.000	104.55	27.29	3.67	36.25	99.26	74.00	25.26	Peak



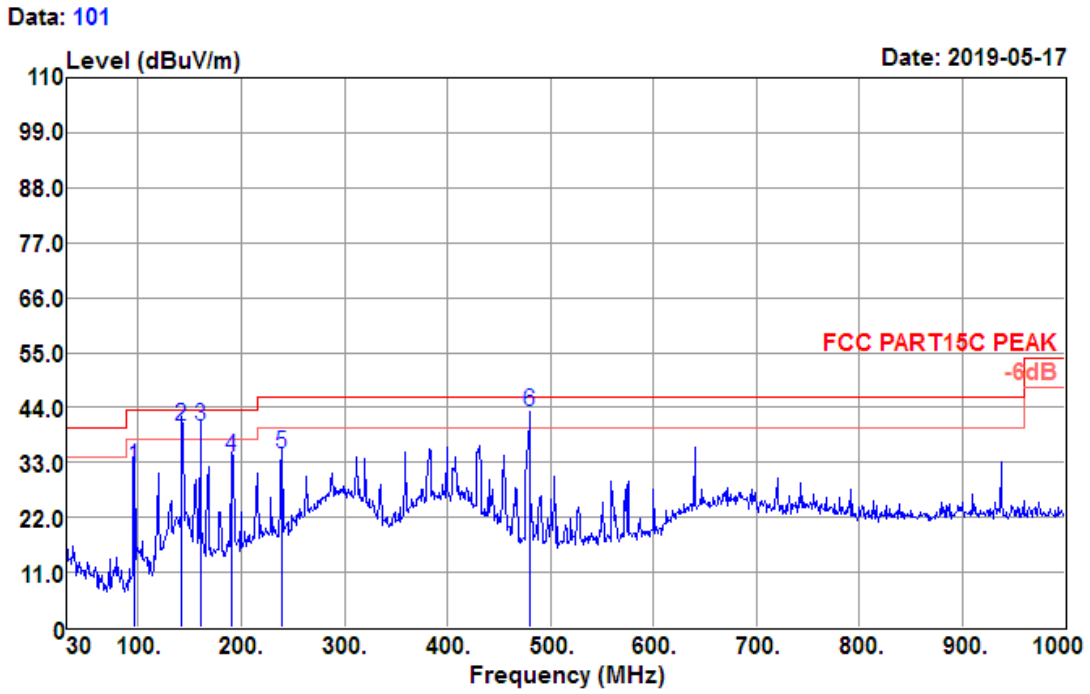
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
4924.000	46.16	31.52	5.38	36.23	46.83	54.00	-7.17	Average
4924.000	57.56	31.52	5.38	36.23	58.23	74.00	-15.77	Peak
7386.000	28.22	36.29	7.46	34.42	37.55	54.00	-16.45	Average
7386.000	40.24	36.29	7.46	34.42	49.57	74.00	-24.43	Peak
9848.000	28.38	38.23	8.04	34.23	40.42	54.00	-13.58	Average
9848.000	41.09	38.23	8.04	34.23	53.13	74.00	-20.87	Peak



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

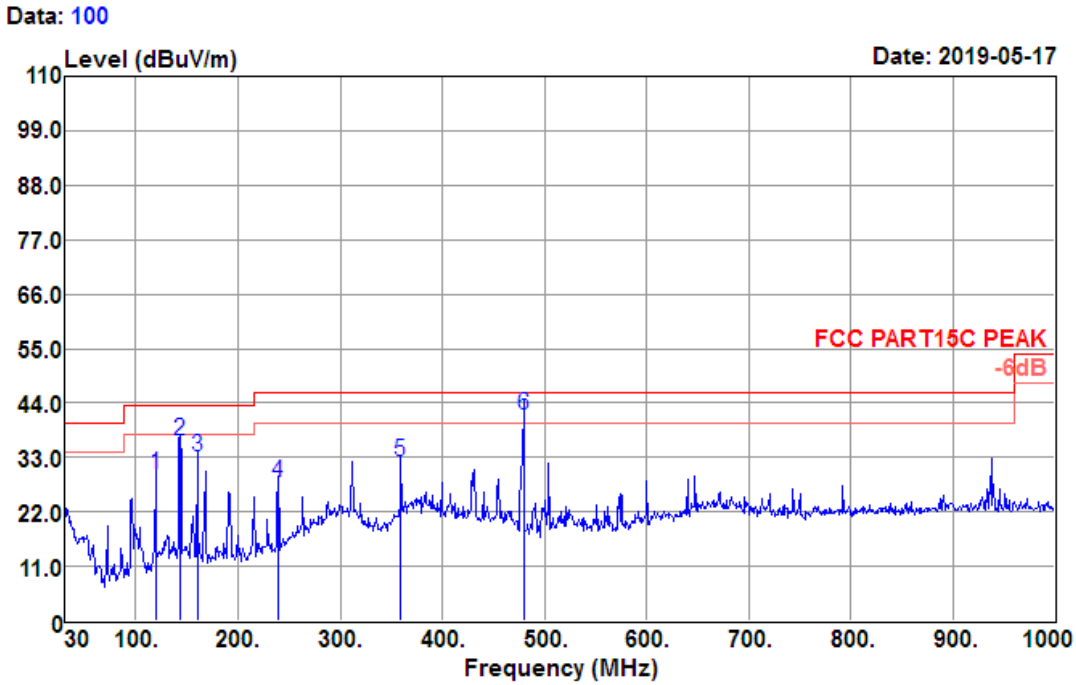
4.5.6 Test Result of Radiated Spurious Emission (30MHz ~ 1GHz)

Test Mode :	802.11g CH01 (2412MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	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
95.960	52.75	9.92	1.91	32.45	32.13	43.50	-11.37	QP
142.520	56.70	13.68	2.35	32.50	40.23	43.50	-3.27	QP
159.980	56.07	14.20	2.48	32.51	40.24	43.50	-3.26	QP
191.020	53.37	10.44	2.77	32.54	34.04	43.50	-9.46	QP
239.520	53.20	11.09	3.08	32.54	34.83	46.00	-11.17	QP
480.080	55.20	16.16	4.50	32.54	43.32	46.00	-2.68	QP

Test Mode :	802.11g CH01(2412MHz)	Temperature :	21~23℃
Test Engineer :	Julie Deng	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	
119.240	47.90	12.12	2.11	32.47	29.66	43.50	-13.84	QP
143.490	52.70	13.74	2.36	32.50	36.30	43.50	-7.20	QP
159.980	48.81	14.20	2.48	32.51	32.98	43.50	-10.52	QP
239.520	46.44	11.09	3.08	32.54	28.07	46.00	-17.93	QP
359.800	46.74	14.04	3.86	32.49	32.15	46.00	-13.85	QP
480.080	53.30	16.16	4.50	32.54	41.42	46.00	-4.58	QP

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

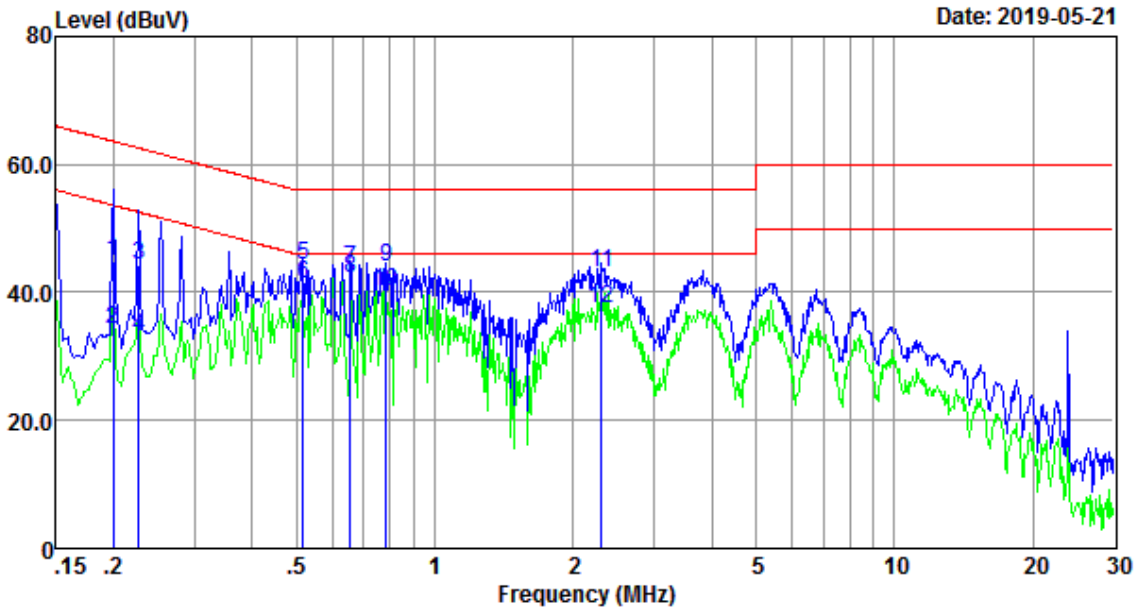
*Decreases with the logarithm of the frequency.

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.

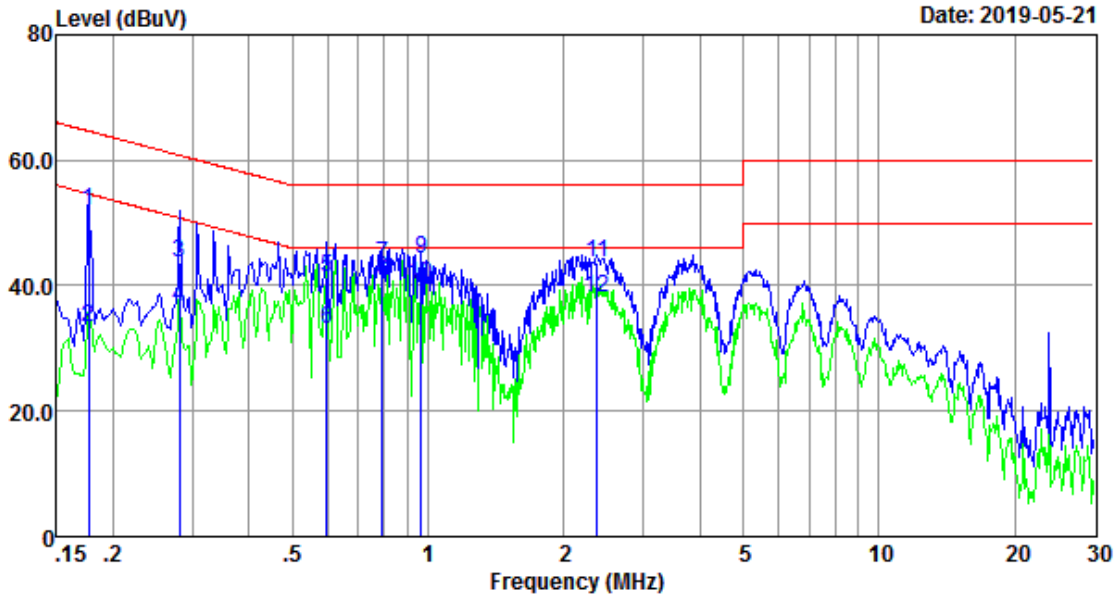
4.6.3 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Damon Zhang	Relative Humidity :	61~63%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Power Supply + WLAN Idle + Lamp		



Freq	Reading level	LISN/ISN factor	Cable loss	level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.200	35.26	9.65	0.04	44.95	63.62	-18.67	QP
0.200	24.56	9.65	0.04	34.25	63.62	-29.37	Average
0.227	34.67	9.65	0.04	44.36	62.57	-18.21	QP
0.227	23.37	9.65	0.04	33.06	62.57	-29.51	Average
0.516	34.40	9.72	0.04	44.16	56.00	-11.84	QP
0.516	31.60	9.72	0.04	41.36	56.00	-14.64	Average
0.654	33.90	9.75	0.04	43.69	56.00	-12.31	QP
0.654	32.30	9.75	0.04	42.09	56.00	-13.91	Average
0.783	34.10	9.78	0.04	43.92	56.00	-12.08	QP
0.783	30.30	9.78	0.04	40.12	56.00	-15.88	Average
2.309	33.10	9.81	0.06	42.97	56.00	-13.03	QP
2.309	27.60	9.81	0.06	37.47	56.00	-18.53	Average

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Damon Zhang	Relative Humidity :	61~63%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Power Supply + WLAN Idle + Lamp		



Freq	Reading level	LISN/ISN factor	Cable loss	level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.177	42.20	9.60	0.04	51.84	64.64	-12.80	QP
0.177	23.80	9.60	0.04	33.44	64.64	-31.20	Average
0.280	34.00	9.62	0.04	43.66	60.81	-17.15	QP
0.280	26.90	9.62	0.04	36.56	60.81	-24.25	Average
0.595	31.50	9.66	0.04	41.20	56.00	-14.80	QP
0.595	23.30	9.66	0.04	33.00	56.00	-23.00	Average
0.792	33.80	9.65	0.04	43.49	56.00	-12.51	QP
0.792	31.20	9.65	0.04	40.89	56.00	-15.11	Average
0.963	34.70	9.66	0.05	44.41	56.00	-11.59	QP
0.963	30.40	9.66	0.05	40.11	56.00	-15.89	Average
2.371	33.80	9.76	0.06	43.62	56.00	-12.38	QP
2.371	28.20	9.76	0.06	38.02	56.00	-17.98	Average

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 embedded-in 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	2019-01-23	2020-01-22	Conducted
Power Sensor	Keysight	U2021XA	MY56510025	2019-01-23	2020-01-22	Conducted
Power Sensor	Keysight	U2021XA	MY57030005	2019-01-23	2020-01-22	Conducted
Power Sensor	Keysight	U2021XA	MY56510018	2019-01-23	2020-01-22	Conducted
Power Sensor	Keysight	U2021XA	MY56480002	2019-01-23	2020-01-22	Conducted
Thermal Chamber	Sanmtest	SMC-408-CD	2435	2018-07-05	2019-07-04	Conducted
Base Station	R&S	CMW 270	101231	2019-01-23	2020-01-22	Conducted
Signal Generator (Interferer)	Keysight	N5182B	MY56200384	2019-04-19	2020-04-18	Conducted
Signal Generator (Blocker)	Keysight	N5171B	MY56200661	2019-01-23	2020-01-22	Conducted

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV 40	101433	2019-02-18	2020-02-17	Radiation
Amplifier	Sonoma	310	363917	2019-01-22	2020-01-21	Radiation
Amplifier	Schwarzbeck	BBV 9718	327	2019-01-22	2020-01-21	Radiation
Amplifier	Narda	TTA1840-35-HG	2034380	2018-07-18	2019-07-17	Radiation
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-051	2017/3/3	2020/3/2	Radiation
Broadband Antenna	Schwarzbeck	VULB 9168	9168-757	2017-03-03	2020-03-02	Radiation
Horn Antenna	Schwarzbeck	BBHA 9120 D	1677	2017-03-03	2020-03-02	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

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	2.67dB
Radiated emissions	30MHz ~ 1GMHz	5.05dB
	1GHz ~ 18GHz	5.06 dB
	18GHz ~ 40GHz	3.65dB

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

----------End of the report----------