FCC TEST REPORT

Product Name:	Smart Phone
Trade Mark:	BLU
Model No.:	X22 POS
Report Number:	2212233383RFC-3
Test Standards:	FCC 47 CFR Part 15 Subpart C
FCC ID:	YHLBLUX22
Test Result:	PASS
Date of Issue:	February 14, 2023

Prepared for:

BLU Products, Inc.
8600 NW 36th Street, Suite #200 Doral, FL 33166

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China
TEL: +86-755-2823 0888
FAX: +86-755-2823 0886

Prepared by: Kieron Luo — Project Engineer

Reviewed by: Henry Lu — Team Leader

Approved by: Kevin Liang — Assistant Manager

Date: February 14, 2023

Version

Version No.	Date	Description
V1.0	February 14, 2023	Original

CONTENTS

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	BLU Products, Inc.
Address of Applicant:	8600 NW 36th Street, Suite #200 Doral, FL 33166
Manufacturer:	BLU Products, Inc.
Address of Manufacturer:	8600 NW 36th Street, Suite #200 Doral, FL 33166

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Smart Phone		
Model No.:	X22 POS		
Trade Mark:	BLU		
DUT Stage:	Identical Prototype		
EUT Supports Function: (Provided by the customer)	GSM Bands:	GSM850/PCS 1900	
	UTRA Bands:	WCDMA Band II/ Band IV/ Band V	
	E-UTRA Bands:	LTE FDD Band 2/ Band 4/ Band 5/ Band 7/ Band 12/ Band 17/ Band 66	
	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth 5.0	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac
	RNSS Bands:	1559 MHz to 1610 MHz	GPS/ BDS/ Galileo/ GLONASS
	BSR:	VHF Band II	FM
	NFC:	13.553 MHz to 13.567 MHz	
Software Version:	BLU_X0010WW_V12.0.02.00_GENERIC_07-01-2023_1437(Provided by the customer)		
Hardware Version:	FS301-MB-V3.0 (Provided by the customer)		
Sample Received Date:	December 23, 2022		
Sample Tested Date:	December 23, 2022 to January 10, 2023		
Remark: The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.			

1.2.2 Description of Accessories

Adapter	
Model No.:	EU-JY-2000
Input:	100-240 V~50/60 Hz 0.5 A
Output:	5.0 V ⎓ 2000 mA

Battery	
Model No.:	C906550500P
Battery Type:	Lithium-ion Polymer Battery
Rated Voltage:	3.87 Vdc
Rated Capacity:	5000 mAh

Cable	
Description:	USB Cable
Cable Type:	Unshielded without ferrite
Length:	0.8 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2412 MHz to 2472 MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS 7
Number of Channels:	IEEE 802.11b:13 IEEE 802.11g:13 IEEE 802.11n-HT20:13
Channel Separation:	5 MHz
Antenna Type: (Provided by the customer)	PIFA Antenna
Antenna Gain: (Provided by the customer)	-0.53 dBi
Maximum Peak Power:	IEEE 802.11b: 19.23 dBm IEEE 802.11g: 21.91 dBm IEEE 802.11n-HT20: 22.19 dBm
Normal Test Voltage:	3.87 Vdc

1.4 OTHER INFORMATION

Operation Frequency Each of Channel	
IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20	**f = 2407 + 5k MHz, k = 1,…,13**
Note: **f** is the operating frequency (MHz); **k** is the operating channel.	

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
--	--	--	--	--

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.1 Meter	Applicant

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9kHz-150kHz	±3.2 dB
2	Conducted emission 150kHz-30MHz	±2.7 dB
3	Radiated emission 9kHz-30MHz	± 4.7 dB
4	Radiated emission 30MHz-1GHz	± 4.9 dB
5	Radiated emission 1GHz-18GHz	± 4.8 dB
6	Radiated emission 18GHz-26GHz	± 5.1 dB
7	Radiated emission 26GHz-40GHz	± 5.1 dB
8	Conducted spurious emissions	± 2.7 dB
9	RF Power, Conducted	± 0.68 dB
10	Occupied Bandwidth	± 1.86 %
11	Radio Frequency	2.4 GHz: ± 6.5 x 10^{-8}
12	Transmission Time	± 0.19 %

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart C Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203/15.247 (b)	N/A	PASS
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013 Clause 6.2	PASS
Conducted Peak Output Power	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013 Clause 11.9.1.3	PASS
6dB Bandwidth	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013 Clause 11.8.1	PASS
Power Spectral Density	FCC 47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013 Clause 11.10.2	PASS
Conducted Out of Band Emission	FCC 47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013 Clause 11.11	PASS
Radiated Spurious Emissions	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013 Clause 11.11 & Clause 11.12	PASS
Band Edge Measurements (Radiated)	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013 Clause 11.13	PASS
Disclaimer and Explanations: The declared of product specification and data (e.g., antenna gain, RF specification, etc) for EUT presented in the report are provided by the customer, and the customer takes all the responsibilities for the accuracy of product specification.			

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	Euroshiedpn-CT001270-1317	22-Jan-2021	21-Jan-2024
☒	Receiver	R&S	ESIB26	100114	3-Nov-2022	2-Nov-2023
☐	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	15-Apr-2022	14-Apr-2023
☒	Loop Antenna	ETS-LINDGREN	6502	00202525	11-Nov-2021	10-Nov-2023
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	11-Nov-2021	10-Nov-2023
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	11-Nov-2021	10-Nov-2023
☒	Preamplifier	HP	8447F	2805A02960	1-Nov-2022	31-Oct-2023
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	17-Apr-2022	16-Apr-2024
☒	Pre-amplifier	ETS-LINDGREN	00118385	00201874	1-Nov-2022	31-Oct-2023
☐	Horn Antenna	ETS-LINDGREN	3116C	00200180	17-Apr-2022	16-Apr-2024
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	21-Nov-2022	20-Nov-2023
☒	Pre-amplifier	ETS-LINDGREN	00118384	00202652	21-Nov-2022	20-Nov-2023
☒	Band Reject Filter (2400MHz~2500MHz)	Micro-Tronics	BRM50702	G248	2-Nov-2022	1-Nov-2023
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	Receiver	R&S	ESR7	101181	1-Nov-2022	31-Oct-2023
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	1-Nov-2022	31-Oct-2023
☒	LISN	R&S	ESH2-Z5	860014/024	1-Nov-2022	31-Oct-2023
☐	LISN	ETS-Lindgren	3816/2SH	00201088	1-Nov-2022	31-Oct-2023
☒	Test Software	Audix	e3	Software Version: 9 20151119i		

RF Conducted Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	15-Apr-2022	14-Apr-2023
☐	EXA Spectrum Analyzer	KEYSIGHT	N9020A	MY51286807	1-Nov-2022	31-Oct-2023
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	3-Nov-2022	2-Nov-2023

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage	Relative Humidity (%)
NT/NV	+15 to +35	3.87 Vdc	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
AC Power Line Conducted Emission	21.2	39	100.1	S20221227966-ZJA03/4	Lucas Ouyang
Conducted Peak Output Power	22.5	41	99.5	S20221227966-ZJA01/4	Bowie Zhang
6dB Bandwidth					
Power Spectral Density					
Conducted Out of Band Emission					
Radiated Spurious Emissions	23.8	46.9	99.5	S20221227966-ZJA03/4	Fire Huo
Band Edge Measurements (Radiated)					

4.2 TEST CHANNELS

Mode	Tx/Rx Frequency	Test RF Channel Lists				
		Lowest(L)	Middle(M)	Highest(H11)	Highest(H12)	Highest(H13)
IEEE 802.11b	2412 MHz to 2472 MHz	Channel 1	Channel 7	Channel 11	Channel 12	Channel 13
		2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
IEEE 802.11g	2412 MHz to 2472 MHz	Channel 1	Channel 7	Channel 11	Channel 12	Channel 13
		2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
IEEE 802.11n-HT20	2412 MHz to 2472 MHz	Channel 1	Channel 7	Channel 11	Channel 12	Channel 13
		2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz

4.3 EUT TEST STATUS

Mode	Tx/Rx Function	Description
IEEE 802.11b IEEE 802.11g IEEE 802.11n-HT20	1Tx/1Rx	1. Keep the EUT in continuously transmitting or receiving with modulation test single.

Power Setting (Provided by the customer)					
Mode	**Channel 1**	**Channel 6**	**Channel 11**	**Channel 12**	**Channel 13**
IEEE 802.11b	16	16	16	16	16
IEEE 802.11g	13	13	13	13	13
IEEE 802.11n-HT20	12	12	12	12	12

Test Software (Provided by the customer)
Engineering mode: *#*# 83781#*#*

4.4 PRE-SCAN

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. Following data rate was (were) selected for the final test as listed below

Mode	Worst-case data rates
IEEE 802.11b	1 Mbps
IEEE 802.11g	6 Mbps
IEEE 802.11n-HT20	MCS0

4.5 TEST SETUP

4.5.1 For Radiated Emissions test setup

Figure 1. Below 30MHz

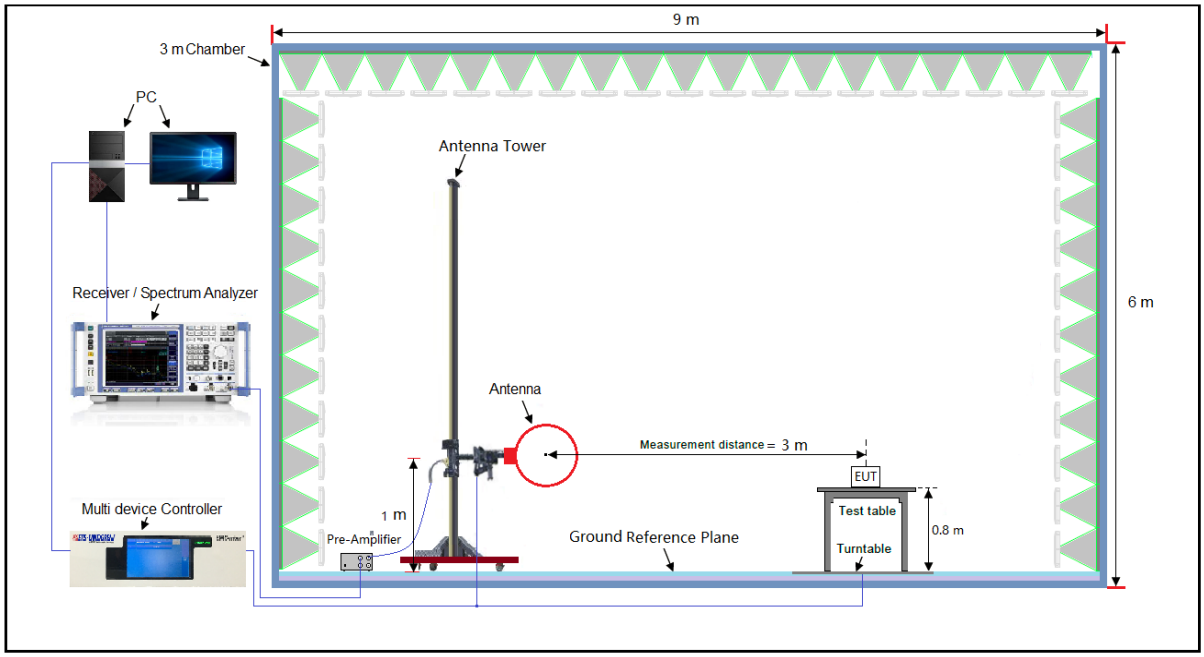


Figure 2. 30MHz to 1GHz

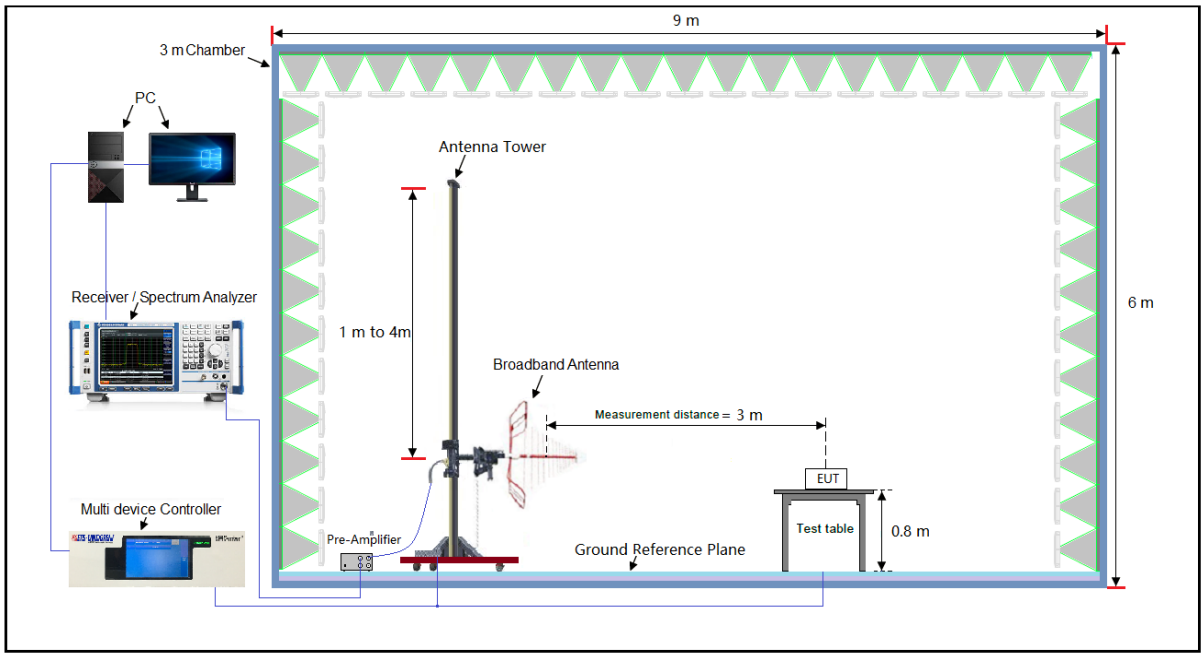
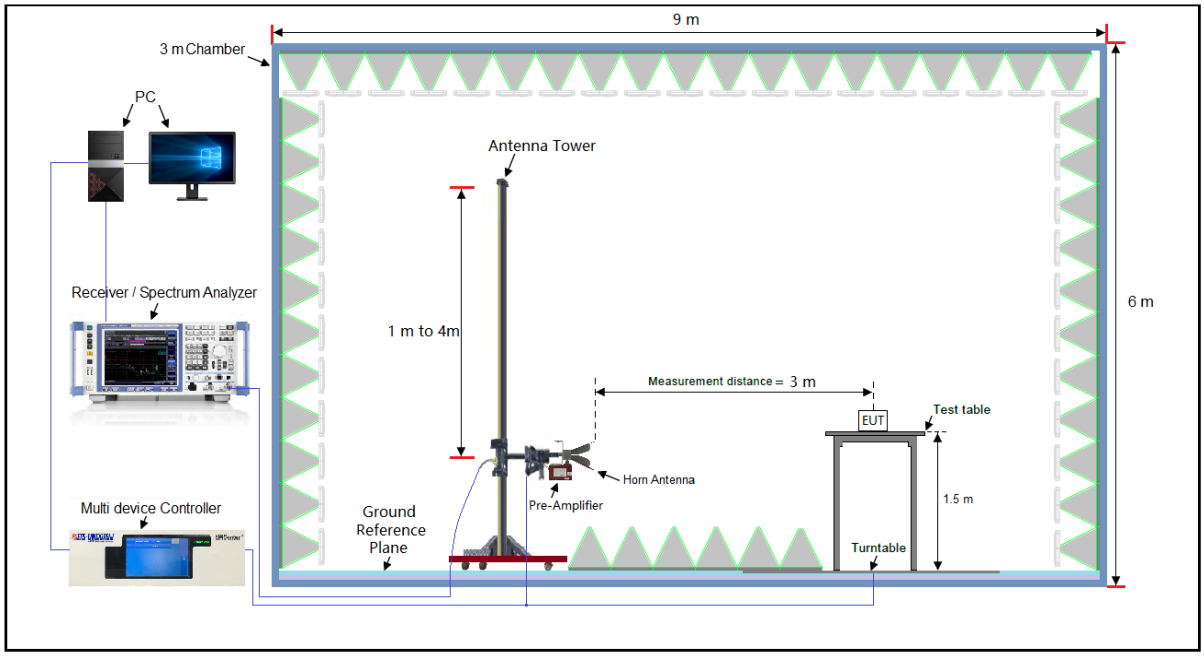
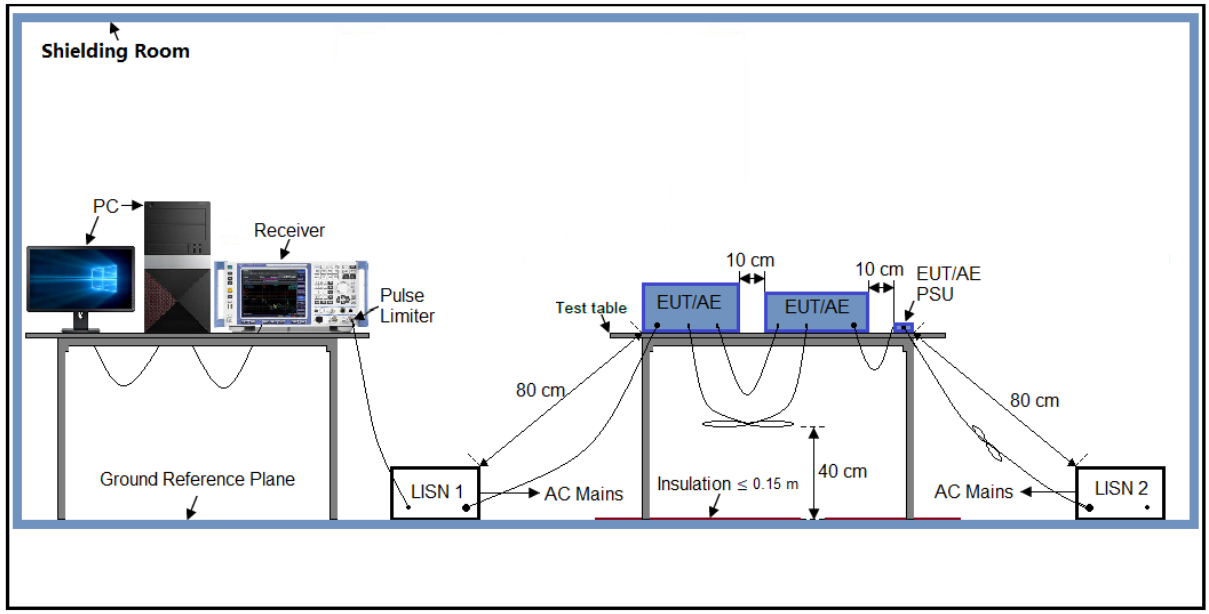


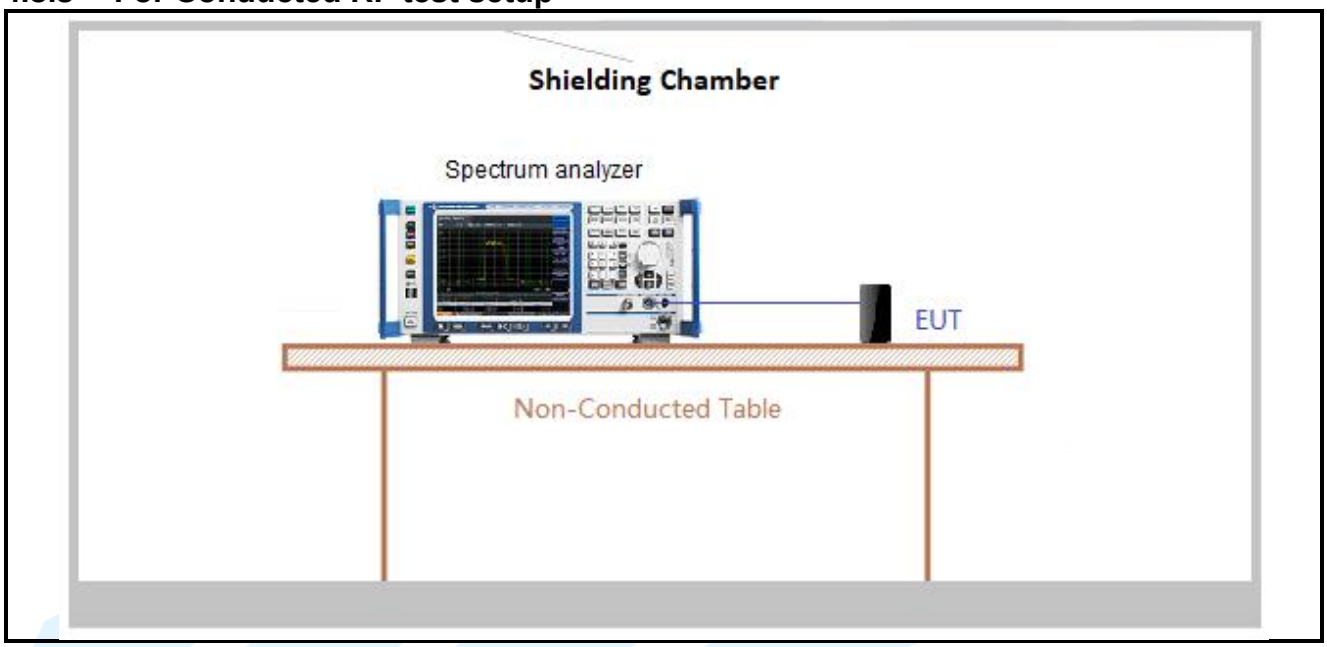
Figure 3. Above 1GHz



4.5.2 For Conducted Emissions test setup



4.5.3 For Conducted RF test setup



4.6 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.87V battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in orientation.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.7 DUTY CYCLE

Test Procedure: ANSI C63.10-2013 Clause 11.6.

Test Results

Mode	Data Rates	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/T Minimum VBW (kHz)
IEEE 802.11b	1 Mbps	8.160	8.340	0.98	97.84	0.09	0.12
IEEE 802.11g	6 Mbps	1.340	1.520	0.88	88.16	0.55	0.75
IEEE 802.11n-HT20	MCS 0	1.130	1.310	0.86	86.26	0.64	0.88

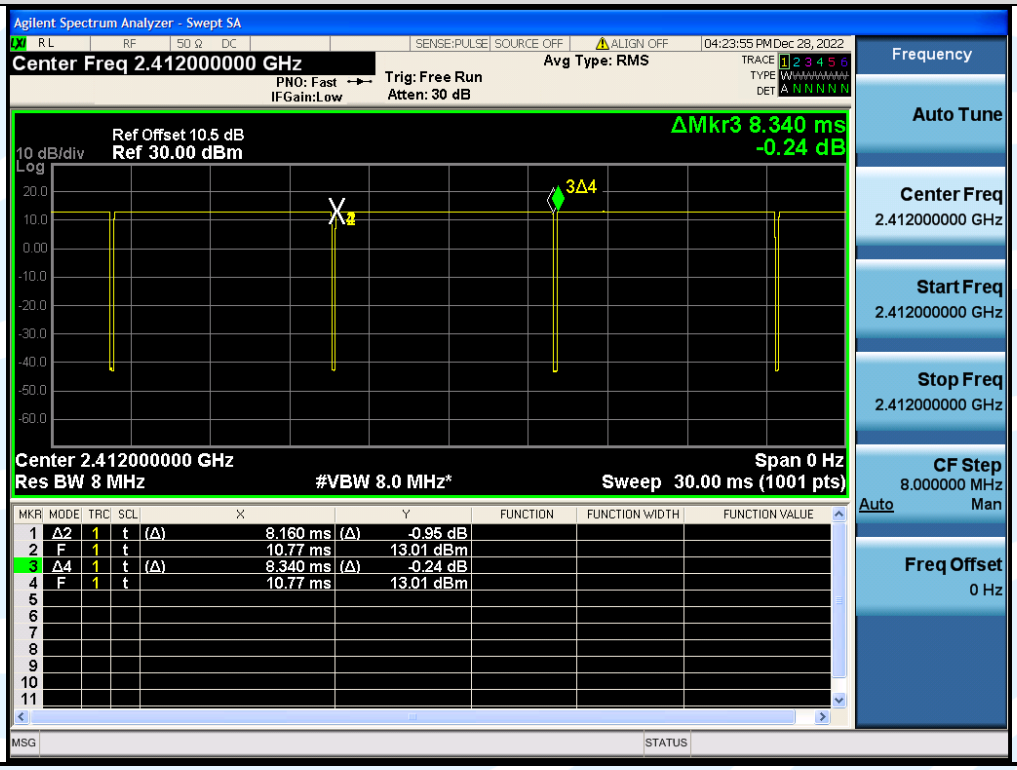
Remark:

1) Duty cycle= On Time/ Period;

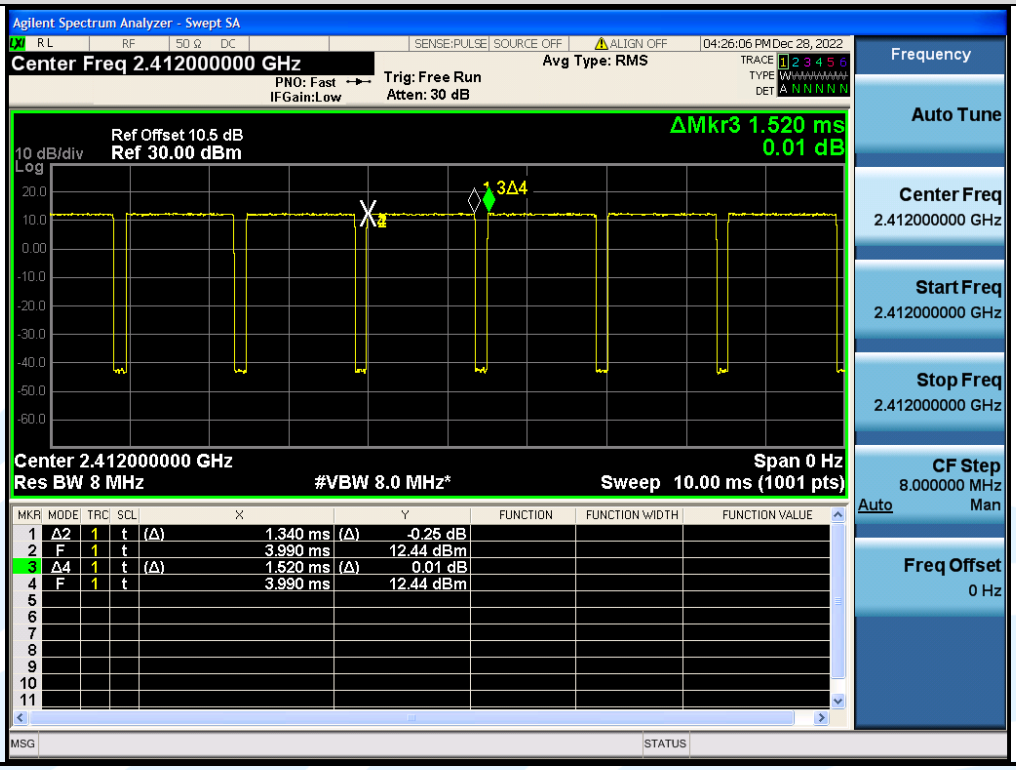
2) Duty Cycle factor = 10 * log(1/ Duty cycle);

The test plots as follows

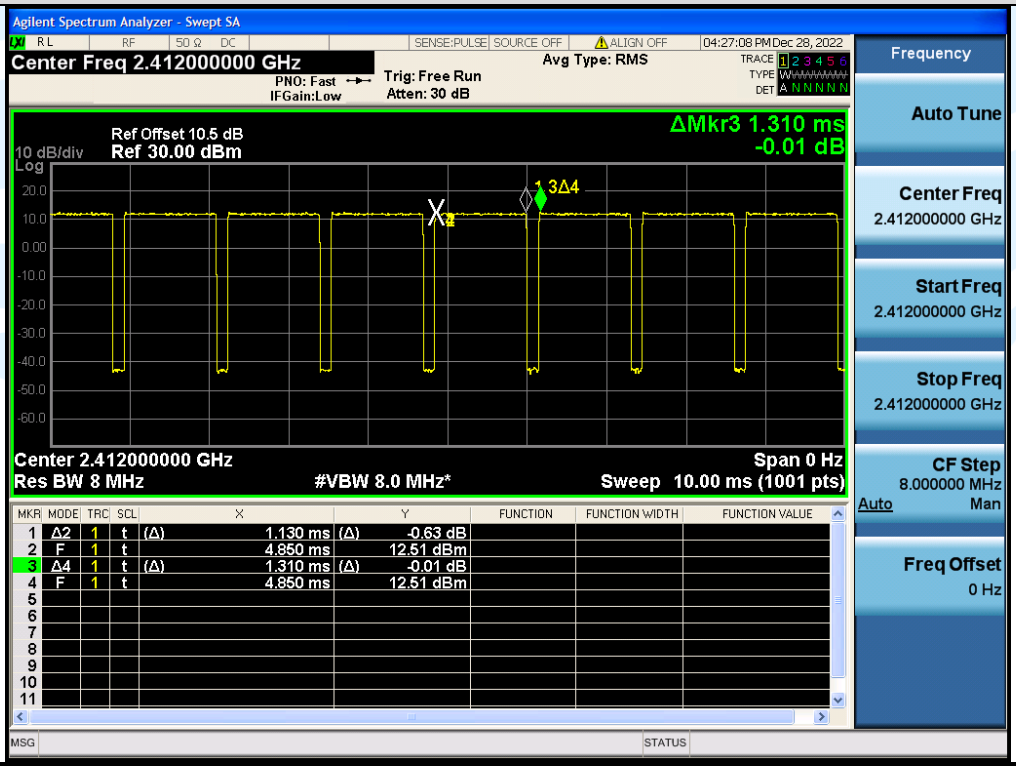
IEEE 802.11b



IEEE 802.11g



IEEE 802.11n-HT20



5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices
4	KDB 558074 D01 15.247 Meas Guidance v05r02	Guidance for compliance measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum system, and Hybrid system devices operating under Section 15.247 of the FCC rules

5.2 ANTENNA REQUIREMENT

Standard Requirement
15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. **15.247(b) (4) requirement:** The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
EUT Antenna:
Antenna in the interior of the equipment and no consideration of replacement. The gain of the antenna is -0.53 dBi.

5.3 CONDUCTED PEAK OUTPUT POWER

Test Requirement: FCC 47 CFR Part 15 Subpart C Section15.247 (b)(3)

Test Method: ANSI C63.10-2013 Clause 11.9.1.3

Limit: For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

Test Procedure:
1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.
2. Measure out each test modes' peak or average output power, record the power level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Results:

Mode	Channel/ Frequency (MHz)	Maximum Conducted Peak Power		Maximum Conducted Average Power (dBm)		Limit (dBm)	Result
		(dBm)	(W)	Measured Value	Corrected Value		
IEEE 802.11b	1(2412)	17.10	0.05129	13.35	13.44	30	Pass
	6(2437)	**19.23**	0.08375	***15.56***	***15.65***	30	Pass
	11(2462)	15.95	0.03936	12.43	12.52	30	Pass
	12(2467)	16.69	0.04667	12.86	12.95	30	Pass
	13(2472)	17.83	0.06067	13.96	14.05	30	Pass
IEEE 802.11g	1(2412)	20.29	0.10691	11.78	12.33	30	Pass
	6(2437)	**21.91**	0.15524	**13.67**	***14.22***	30	Pass
	11(2462)	19.19	0.08299	10.89	11.44	30	Pass
	12(2467)	19.98	0.09954	11.29	11.83	30	Pass
	13(2472)	20.73	0.11830	12.44	12.99	30	Pass
IEEE 802.11n-HT20	1(2412)	20.88	0.12246	10.44	11.08	30	Pass
	6(2437)	***22.19***	0.16558	**12.76**	***13.40***	30	Pass
	11(2462)	18.26	0.06699	9.95	10.59	30	Pass
	12(2467)	18.52	0.07112	10.38	11.02	30	Pass
	13(2472)	20.60	0.11482	11.58	12.22	30	Pass

Note: The antenna gain of -0.53 dBi less than 6dBi maximum permission antenna gain value based on 1 watt (30dBm) peak output power limit.

5.46 DB BANDWIDTH

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2)
Test Method:	ANSI C63.10-2013 Clause 11.8.1
Limit:	For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz
Test Procedure:	Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. Use the following spectrum analyzer settings: a) Set RBW = 100 kHz. b) Set the video bandwidth (VBW) ≥ 3 x RBW. c) Detector = Peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.
Test Setup:	Refer to section 4.5.3 for details.
Instruments Used:	Refer to section 3 for details
Test Mode:	Link mode
Test Results:	**Please refer to Appendix A**

5.5 POWER SPECTRAL DENSITY

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.247 (e)

Test Method: ANSI C63.10-2013 Clause 11.10.2

Limit: For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

Test Procedure: Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: **Please refer to Appendix A**

5.6 CONDUCTED OUT OF BAND EMISSION

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.247(d)

Test Method: ANSI C63.10-2013 Clause 11.11

Limit: In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

Test Procedure: Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

Step 1:Measurement Procedure REF

a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to ≥ 1.5 times the DTS bandwidth.
c) Set the RBW = 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.
j) Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Step 2:Measurement Procedure OOBE

a) Set RBW = 100 kHz.
b) Set VBW ≥ 300 kHz.
c) Detector = peak.
d) Sweep = auto couple.
e) Trace Mode = max hold.
f) Allow trace to fully stabilize.
g) Use the peak marker function to determine the maximum amplitude level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: **Please refer to Appendix A**

5.7 RADIATED SPURIOUS EMISSIONS

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209

Test Method: ANSI C63.10-2013 Clause 11.11 & Clause 11.12

Receiver Setup:

Frequency	RBW
0.009 MHz-0.150 MHz	200/300 kHz
0.150 MHz -30 MHz	9/10 kHz
30 MHz-1 GHz	100/120 kHz
Above 1 GHz	1 MHz

Limits:

Spurious Emissions

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	--	--	300
0.490 MHz-1.705 MHz	24000/F(kHz)	--	--	30
1.705 MHz-30 MHz	30	--	--	30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:

1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
5) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

2. Above 1GHz test procedure as below:

1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter (Above 18GHz the distance is 1 meter and table is 1.5 meter).

2) Test the EUT in the lowest channel, middle channel, the Highest channel
3) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Y positioning which it is worse case.
4) Repeat above procedures until all frequencies measured was complete.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

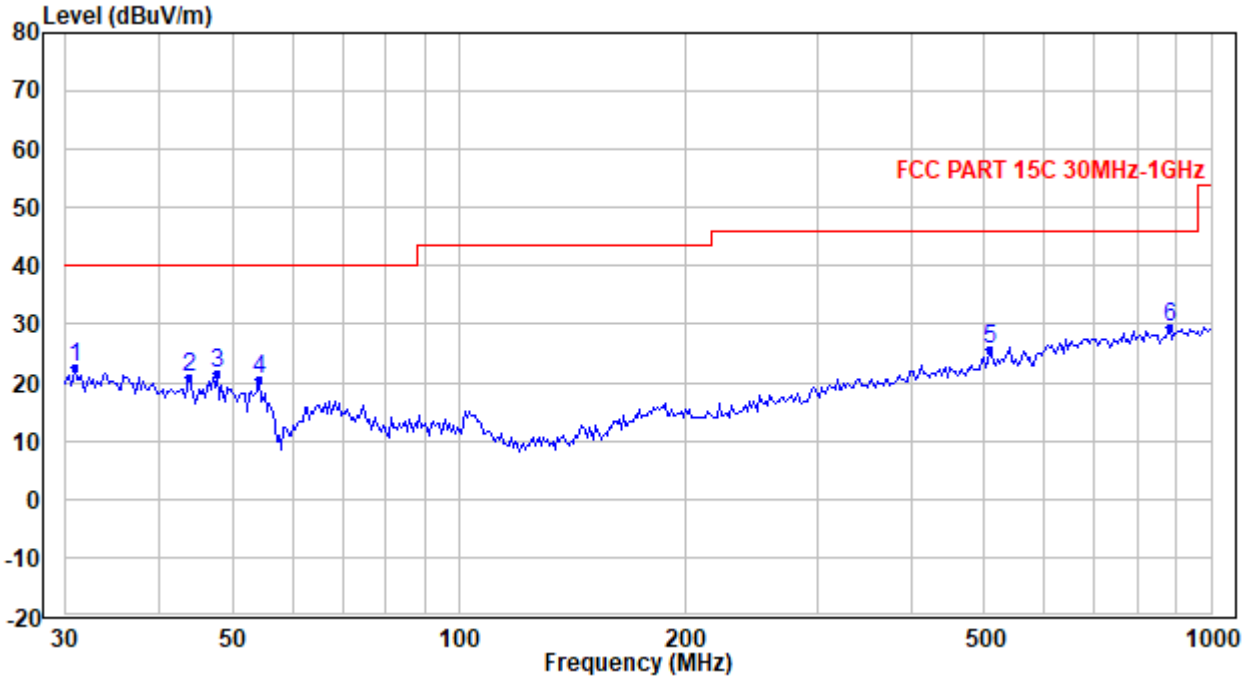
The measurement data as follows:

Radiated Emission Test Data (9 kHz ~ 30 MHz):
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Radiated Emission Test Data (30 MHz ~ 1 GHz):

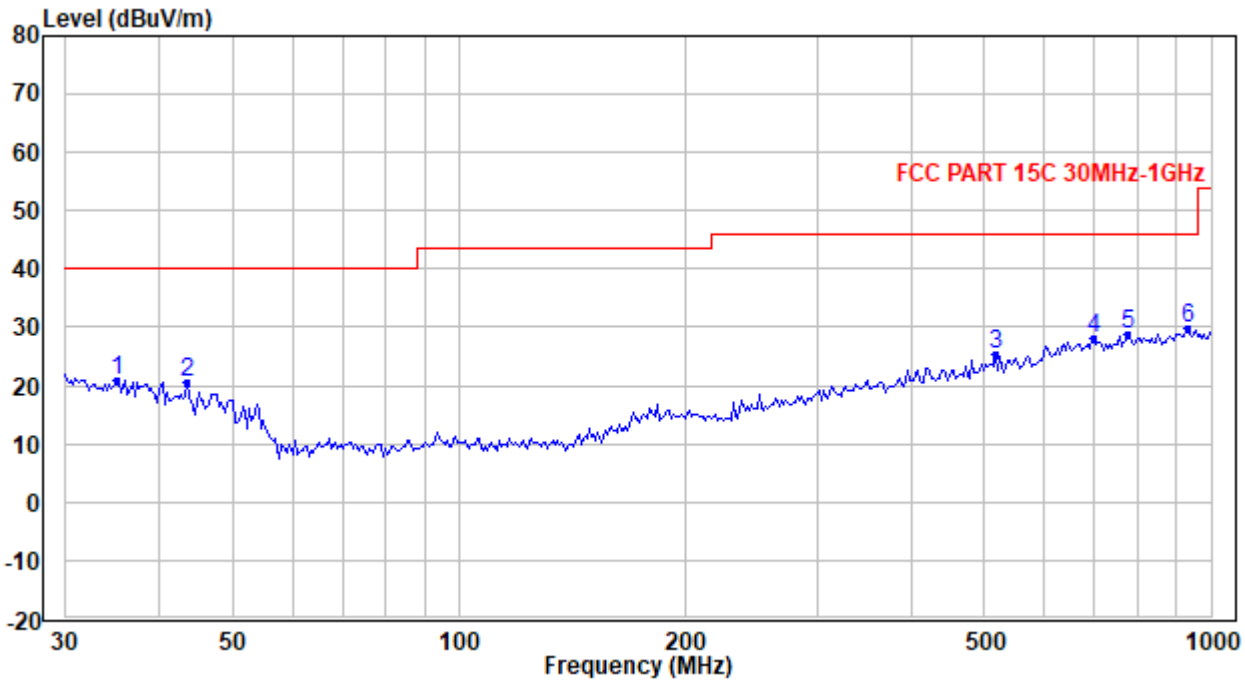
Worst-Case Configuration

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.855	27.49	-4.97	22.52	40.00	-17.48	QP
2	43.845	31.52	-10.49	21.03	40.00	-18.97	QP
3	47.703	34.90	-13.26	21.64	40.00	-18.36	QP
4	54.135	36.70	-16.27	20.43	40.00	-19.57	QP
5	509.356	27.66	-1.96	25.70	46.00	-20.30	QP
6	881.184	25.43	4.06	29.49	46.00	-16.51	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.016	26.37	-5.49	20.88	40.00	-19.12	QP
2	43.538	30.76	-10.09	20.67	40.00	-19.33	QP
3	516.565	26.98	-1.61	25.37	46.00	-20.63	QP
4	698.804	25.65	2.43	28.08	46.00	-17.92	QP
5	776.485	25.73	3.12	28.85	46.00	-17.15	QP
6	932.141	24.52	5.26	29.78	46.00	-16.22	QP

Radiated Emission Test Data (Above 1GHz): IEEE 802.11b_ Channel 1:								
No.	**Frequency (MHz)**	**Reading (dBμV)**	**Correction factor (dB/m)**	**Result (dBμV/m)**	**Limit (dBμV/m)**	**Margin (dB)**	**Detector**	**Antenna Polaxis**
1	4824.00	42.10	-2.40	39.70	74.00	-34.30	Peak	Horizontal
2	4824.00	29.82	-2.40	27.42	54.00	-26.58	Average	Horizontal
3	7236.00	41.87	1.63	43.50	74.00	-30.50	Peak	Horizontal
4	7236.00	30.25	1.63	31.88	54.00	-22.12	Average	Horizontal
5	4824.00	41.20	-2.40	38.80	74.00	-35.20	Peak	Vertical
6	4824.00	29.40	-2.40	27.00	54.00	-27.00	Average	Vertical
7	7236.00	42.20	1.63	43.83	74.00	-30.17	Peak	Vertical
8	7236.00	30.31	1.63	31.94	54.00	-22.06	Average	Vertical
IEEE 802.11b_ Channel 6:								
1	4874.00	41.87	-2.34	39.53	74.00	-34.47	Peak	Horizontal
2	4874.00	29.27	-2.34	26.90	54.00	-27.10	Average	Horizontal
3	7311.00	41.71	1.68	43.39	74.00	-30.61	Peak	Horizontal
4	7311.00	27.53	1.68	29.21	54.00	-24.79	Average	Horizontal
5	4874.00	40.82	-2.34	38.48	74.00	-35.52	Peak	Vertical
6	4874.00	29.78	-2.34	27.44	54.00	-26.56	Average	Vertical
7	7311.00	42.54	1.68	44.22	74.00	-29.78	Peak	Vertical
8	7311.00	28.01	1.68	29.69	54.00	-24.31	Average	Vertical
IEEE 802.11b_ Channel 11:								
1	4924.00	41.68	-2.29	39.39	74.00	-34.61	Peak	Horizontal
2	4924.00	28.68	-2.29	26.39	54.00	-27.61	Average	Horizontal
3	7386.00	41.86	1.73	43.59	74.00	-30.41	Peak	Horizontal
4	7386.00	28.16	1.73	29.89	54.00	-24.11	Average	Horizontal
5	4924.00	40.73	-2.29	38.44	74.00	-35.56	Peak	Vertical
6	4924.00	28.07	-2.29	25.78	54.00	-28.22	Average	Vertical
7	7386.00	40.56	1.73	42.29	74.00	-31.71	Peak	Vertical
8	7386.00	29.23	1.73	30.96	54.00	-23.04	Average	Vertical
IEEE 802.11b_ Channel 12:								
1	4934.00	41.69	-2.30	39.39	74.00	-34.61	Peak	Horizontal
2	4934.00	28.39	-2.30	26.09	54.00	-27.91	Average	Horizontal
3	7401.00	40.57	1.74	42.31	74.00	-31.69	Peak	Horizontal
4	7401.00	28.27	1.74	30.01	54.00	-23.99	Average	Horizontal
5	4934.00	41.28	-2.30	38.98	74.00	-35.02	Peak	Vertical
6	4934.00	29.46	-2.30	27.16	54.00	-26.84	Average	Vertical
7	7401.00	42.41	1.74	44.15	74.00	-29.85	Peak	Vertical
8	7401.00	29.55	1.74	31.29	54.00	-22.71	Average	Vertical

IEEE 802.11b_ Channel 13:								
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4944.00	41.69	-2.28	39.41	74.00	-34.59	Peak	Horizontal
2	4944.00	29.78	-2.28	27.50	54.00	-26.50	Average	Horizontal
3	7416.00	39.02	1.75	40.77	74.00	-33.23	Peak	Horizontal
4	7416.00	27.34	1.75	29.09	54.00	-24.91	Average	Horizontal
5	4944.00	40.56	-2.28	38.28	74.00	-35.72	Peak	Vertical
6	4944.00	29.65	-2.28	27.37	54.00	-26.63	Average	Vertical
7	7416.00	38.72	1.75	40.47	74.00	-33.53	Peak	Vertical
8	7416.00	28.51	1.75	30.26	54.00	-23.74	Average	Vertical
IEEE 802.11g_ Channel 1:								
1	4824.00	41.45	-2.40	39.05	74.00	-34.95	Peak	Horizontal
2	4824.00	29.51	-2.40	27.11	54.00	-26.89	Average	Horizontal
3	7236.00	38.03	1.63	39.66	74.00	-34.34	Peak	Horizontal
4	7236.00	27.34	1.63	28.97	54.00	-25.03	Average	Horizontal
5	4824.00	40.65	-2.40	38.25	74.00	-35.75	Peak	Vertical
6	4824.00	28.17	-2.40	25.77	54.00	-28.23	Average	Vertical
7	7236.00	38.55	1.63	40.18	74.00	-33.82	Peak	Vertical
8	7236.00	27.10	1.63	28.73	54.00	-25.27	Average	Vertical
IEEE 802.11g_ Channel 6:								
1	4874.00	40.44	-2.34	38.10	74.00	-35.90	Peak	Horizontal
2	4874.00	29.55	-2.34	27.21	54.00	-26.79	Average	Horizontal
3	7311.00	37.79	1.68	39.47	74.00	-34.53	Peak	Horizontal
4	7311.00	25.70	1.68	27.38	54.00	-26.62	Average	Horizontal
5	4874.00	40.82	-2.34	38.48	74.00	-35.52	Peak	Vertical
6	4874.00	29.16	-2.34	26.82	54.00	-27.18	Average	Vertical
7	7311.00	38.05	1.68	39.73	74.00	-34.27	Peak	Vertical
8	7311.00	26.45	1.68	28.13	54.00	-25.87	Average	Vertical
IEEE 802.11g_ Channel 11:								
1	4924.00	40.67	-2.29	38.38	74.00	-35.62	Peak	Horizontal
2	4924.00	28.51	-2.29	26.22	54.00	-27.78	Average	Horizontal
3	7386.00	37.49	1.73	39.22	74.00	-34.78	Peak	Horizontal
4	7386.00	27.16	1.73	28.89	54.00	-25.11	Average	Horizontal
5	4924.00	41.05	-2.29	38.76	74.00	-35.24	Peak	Vertical
6	4924.00	28.16	-2.29	25.87	54.00	-28.13	Average	Vertical
7	7386.00	37.77	1.73	39.50	74.00	-34.50	Peak	Vertical
8	7386.00	26.89	1.73	28.62	54.00	-25.38	Average	Vertical

IEEE 802.11g_ Channel 12:								
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4934.00	40.42	-2.30	38.12	74.00	-35.88	Peak	Horizontal
2	4934.00	29.80	-2.30	27.50	54.00	-26.50	Average	Horizontal
3	7401.00	39.86	1.74	41.60	74.00	-32.40	Peak	Horizontal
4	7401.00	27.70	1.74	29.44	54.00	-24.56	Average	Horizontal
5	4934.00	41.42	-2.30	39.12	74.00	-34.88	Peak	Vertical
6	4934.00	27.46	-2.30	27.16	54.00	-26.84	Average	Vertical
7	7401.00	39.99	1.74	41.73	74.00	-32.27	Peak	Vertical
8	7401.00	27.33	1.74	29.07	54.00	-24.93	Average	Vertical
IEEE 802.11g_ Channel 13:								
1	4944.00	40.22	-2.28	37.94	74.00	-36.06	Peak	Horizontal
2	4944.00	28.72	-2.28	26.44	54.00	-27.56	Average	Horizontal
3	7416.00	39.61	1.75	41.36	74.00	-32.64	Peak	Horizontal
4	7416.00	28.34	1.75	30.09	54.00	-23.91	Average	Horizontal
5	4944.00	38.43	-2.28	36.15	74.00	-37.85	Peak	Vertical
6	4944.00	28.44	-2.28	26.16	54.00	-27.84	Average	Vertical
7	7416.00	40.75	1.75	42.50	74.00	-31.50	Peak	Vertical
8	7416.00	28.65	1.75	30.40	54.00	-23.60	Average	Vertical
IEEE 802.11n-HT20_ Channel 1:								
1	4824.00	39.87	-2.40	37.47	74.00	-36.53	Peak	Horizontal
2	4824.00	29.29	-2.40	26.89	54.00	-27.11	Average	Horizontal
3	7236.00	38.36	1.63	39.99	74.00	-34.01	Peak	Horizontal
4	7236.00	26.82	1.63	28.45	54.00	-25.55	Average	Horizontal
5	4824.00	41.69	-2.40	39.29	74.00	-34.71	Peak	Vertical
6	4824.00	29.17	-2.40	26.77	54.00	-27.23	Average	Vertical
7	7236.00	37.37	1.63	39.00	74.00	-35.00	Peak	Vertical
8	7236.00	25.97	1.63	27.60	54.00	-26.40	Average	Vertical
IEEE 802.11n-HT20_ Channel 6:								
1	4874.00	39.19	-2.34	36.85	74.00	-37.15	Peak	Horizontal
2	4874.00	29.40	-2.34	27.06	54.00	-26.94	Average	Horizontal
3	7311.00	39.67	1.68	41.35	74.00	-32.65	Peak	Horizontal
4	7311.00	28.71	1.68	30.39	54.00	-23.61	Average	Horizontal
5	4874.00	41.50	-2.34	39.16	74.00	-34.84	Peak	Vertical
6	4874.00	29.70	-2.34	27.36	54.00	-26.64	Average	Vertical
7	7311.00	38.03	1.68	39.71	74.00	-34.29	Peak	Vertical
8	7311.00	26.33	1.68	28.01	54.00	-25.99	Average	Vertical

IEEE 802.11n-HT20_ Channel 11:								
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4924.00	40.22	-2.29	37.93	74.00	-36.07	Peak	Horizontal
2	4924.00	29.25	-2.29	26.96	54.00	-27.04	Average	Horizontal
3	7386.00	40.42	1.73	42.15	74.00	-31.85	Peak	Horizontal
4	7386.00	28.08	1.73	29.81	54.00	-24.19	Average	Horizontal
5	4924.00	42.40	-2.29	40.11	74.00	-33.89	Peak	Vertical
6	4924.00	29.68	-2.29	27.39	54.00	-26.61	Average	Vertical
7	7386.00	40.83	1.73	42.56	74.00	-31.44	Peak	Vertical
8	7386.00	28.50	1.73	30.23	54.00	-23.77	Average	Vertical
IEEE 802.11n-HT20_ Channel 12:								
1	4934.00	41.14	-2.30	38.84	74.00	-35.16	Peak	Horizontal
2	4934.00	29.74	-2.30	27.44	54.00	-26.56	Average	Horizontal
3	7401.00	40.57	1.74	42.31	74.00	-31.69	Peak	Horizontal
4	7401.00	29.05	1.74	30.79	54.00	-23.21	Average	Horizontal
5	4934.00	41.33	-2.30	39.03	74.00	-34.97	Peak	Vertical
6	4934.00	29.80	-2.30	27.50	54.00	-26.50	Average	Vertical
7	7401.00	40.21	1.74	41.95	74.00	-32.05	Peak	Vertical
8	7401.00	28.59	1.74	30.33	54.00	-23.67	Average	Vertical
IEEE 802.11n-HT20_ Channel 13:								
1	4944.00	41.25	-2.28	38.97	74.00	-35.03	Peak	Horizontal
2	4944.00	29.65	-2.28	27.37	54.00	-26.63	Average	Horizontal
3	7416.00	39.95	1.75	41.70	74.00	-32.30	Peak	Horizontal
4	7416.00	28.98	1.75	30.73	54.00	-23.27	Average	Horizontal
5	4944.00	40.77	-2.28	38.49	74.00	-35.51	Peak	Vertical
6	4944.00	30.72	-2.28	28.44	54.00	-25.56	Average	Vertical
7	7416.00	41.89	1.75	43.64	74.00	-30.36	Peak	Vertical
8	7416.00	28.91	1.75	30.66	54.00	-23.34	Average	Vertical

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit.

5.8 BAND EDGE MEASUREMENTS (RADIATED)

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209

Test Method: ANSI C63.10-2013 Clause 11.13

Limits:

Radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

Frequency	Limit (dBμV/m @3m)	Remark
30 MHz-88 MHz	40.0	Quasi-peak Value
88 MHz-216 MHz	43.5	Quasi-peak Value
216 MHz-960 MHz	46.0	Quasi-peak Value
960 MHz-1 GHz	54.0	Quasi-peak Value
Above 1 GHz	54.0	Average Value
	74.0	Peak Value

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

Radiated band edge measurements at 2390 MHz and 2483.5 MHz were made with the unit transmitting in the low end of the channel range and the high end closest to the restricted bands respectively. The emissions were made on the 966 Semi-Chamber. Use (resolution bandwidth (RBW) = 1 MHz, video bandwidth (VBW) = 3 MHz for peak levels and RBW = 1 MHz and VBW = 10 Hz or 1/T for average levels).

1. Use radiated spurious emission test procedure described in clause 5.10. The transmitter output (antenna port) was connected to the test receiver.
2. Set the PK and AV limit line.
3. Record the fundamental emission and emissions out of the band-edge.
4. Determine band-edge compliance as required.

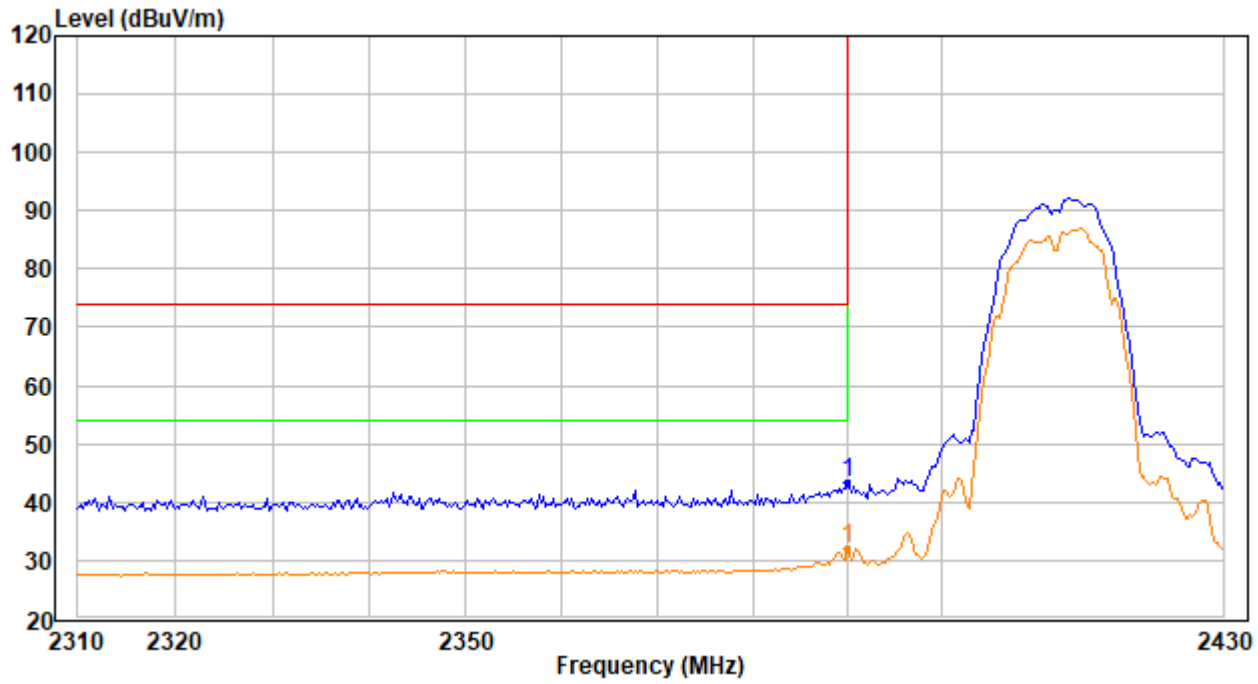
Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

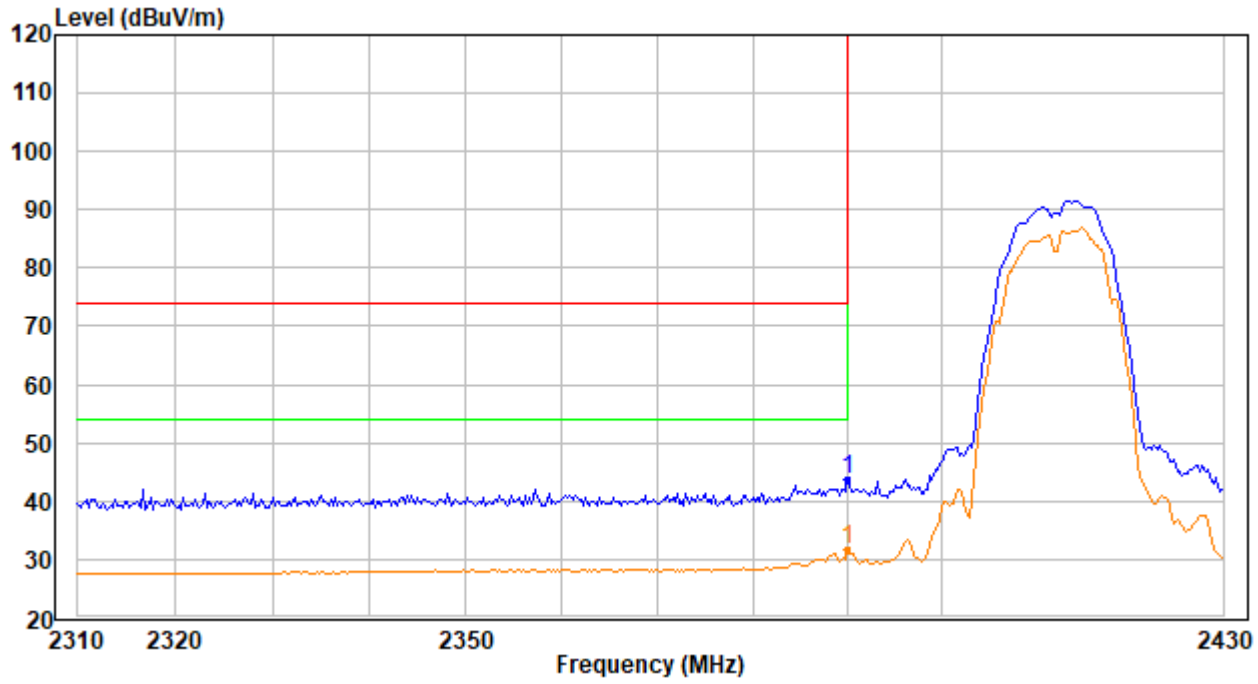
IEEE 802.11b

Test Channel:	Channel 1	Ant. Polar. :	Vertical



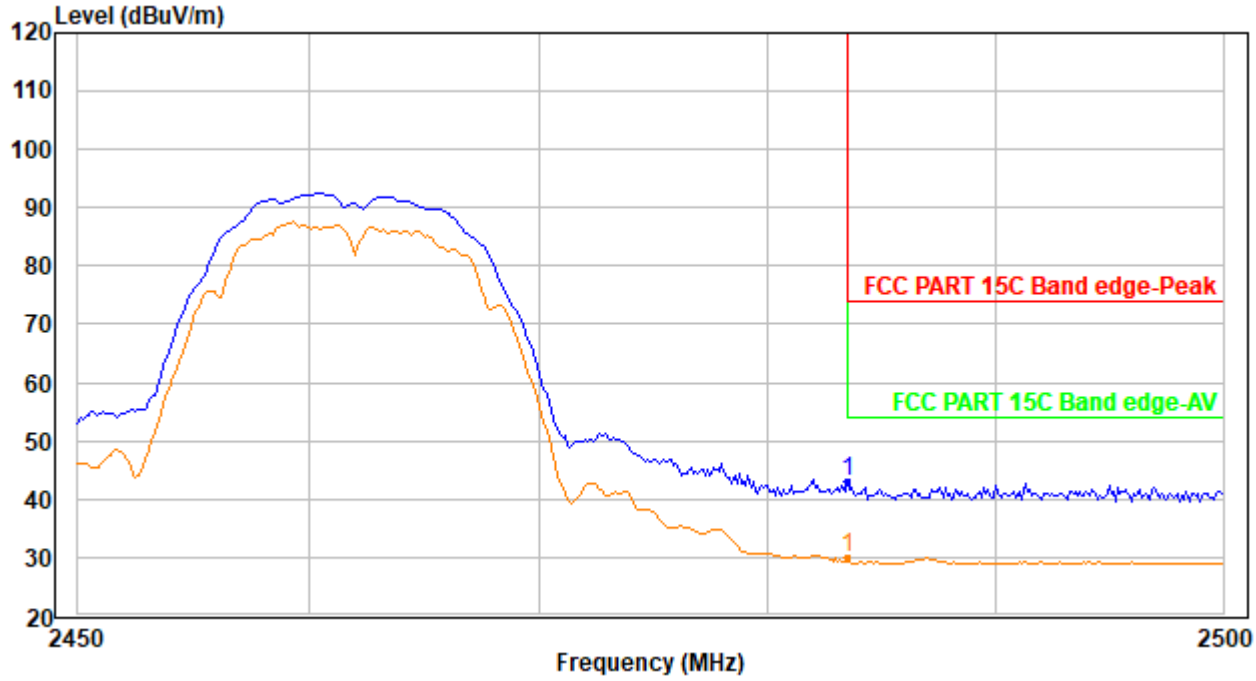
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	43.25	74.00	32.13	54.00	Pass

Test Channel:	Channel 1	Ant. Polar. :	Vertical



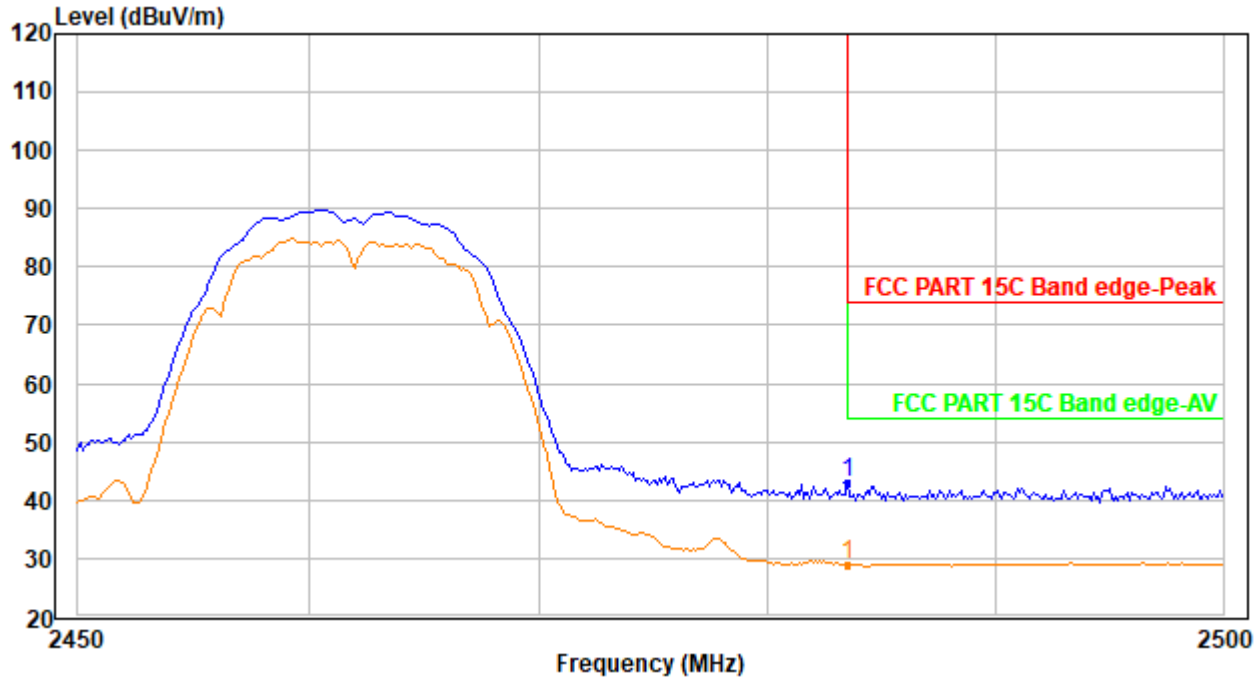
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	43.56	74.00	31.67	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Vertical



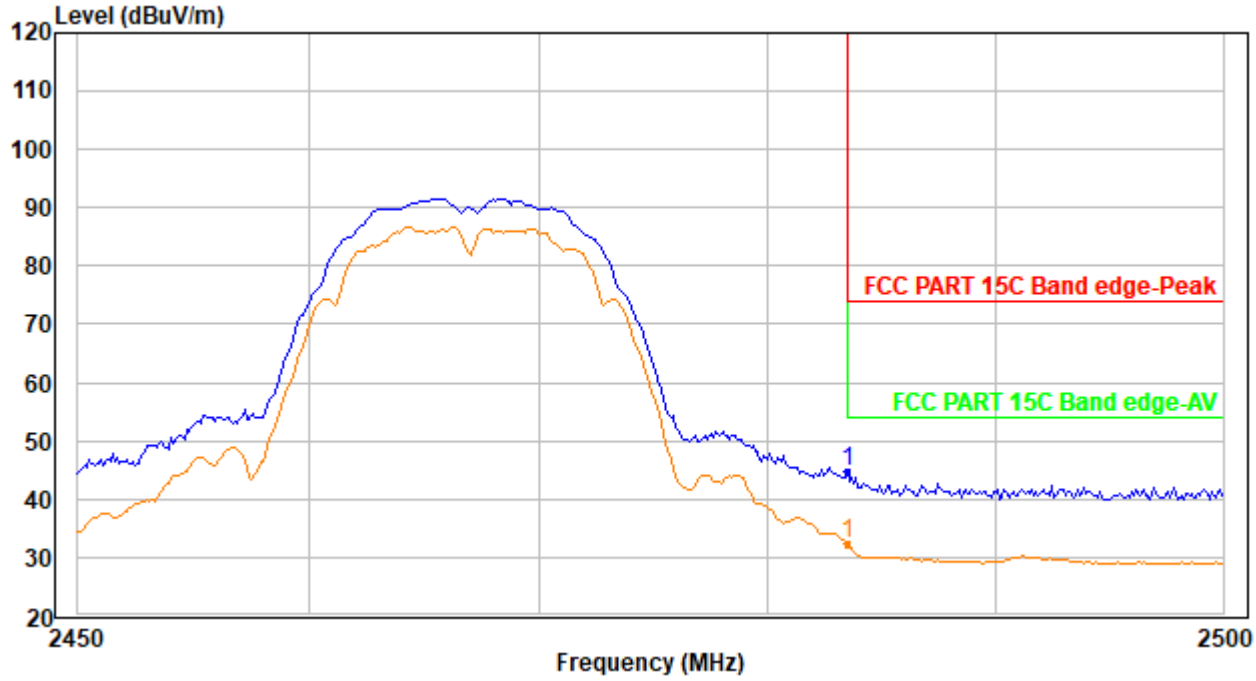
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	43.08	74.00	29.04	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Vertical



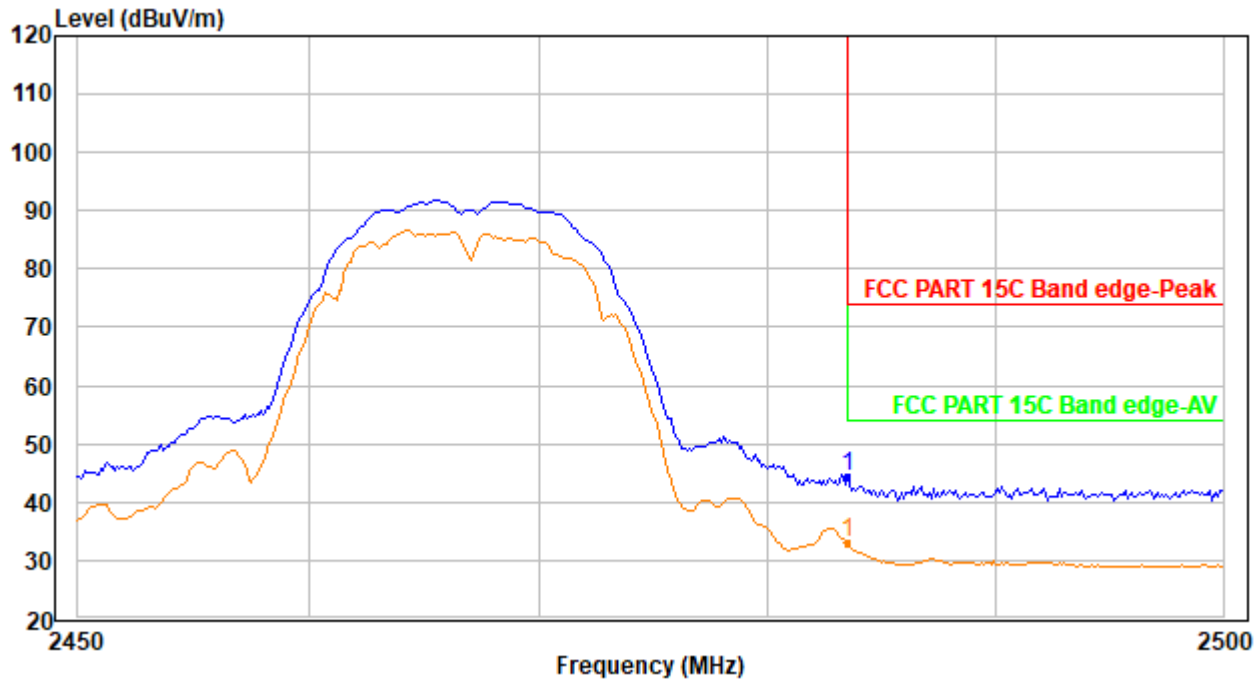
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	42.90	74.00	29.99	54.00	Pass

Test Channel:	Channel 12	Ant. Polar. :	Horizontal



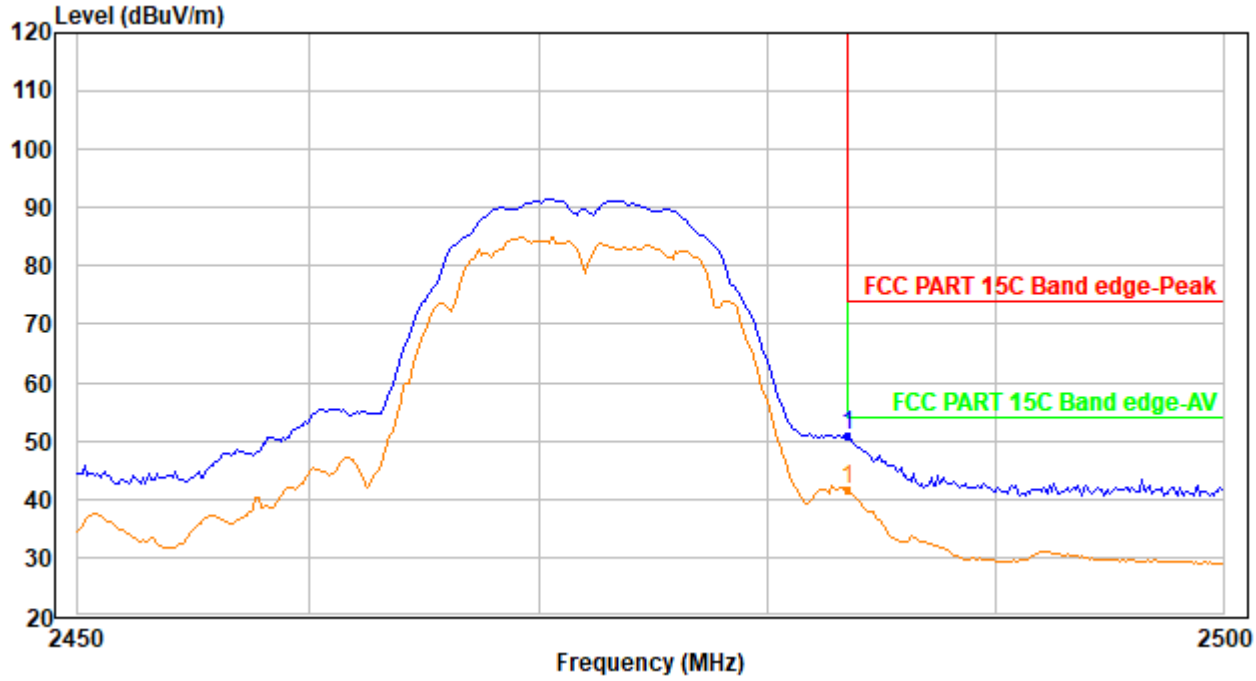
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	44.83	74.00	32.44	54.00	Pass

Test Channel:	Channel 12	Ant. Polar. :	Vertical



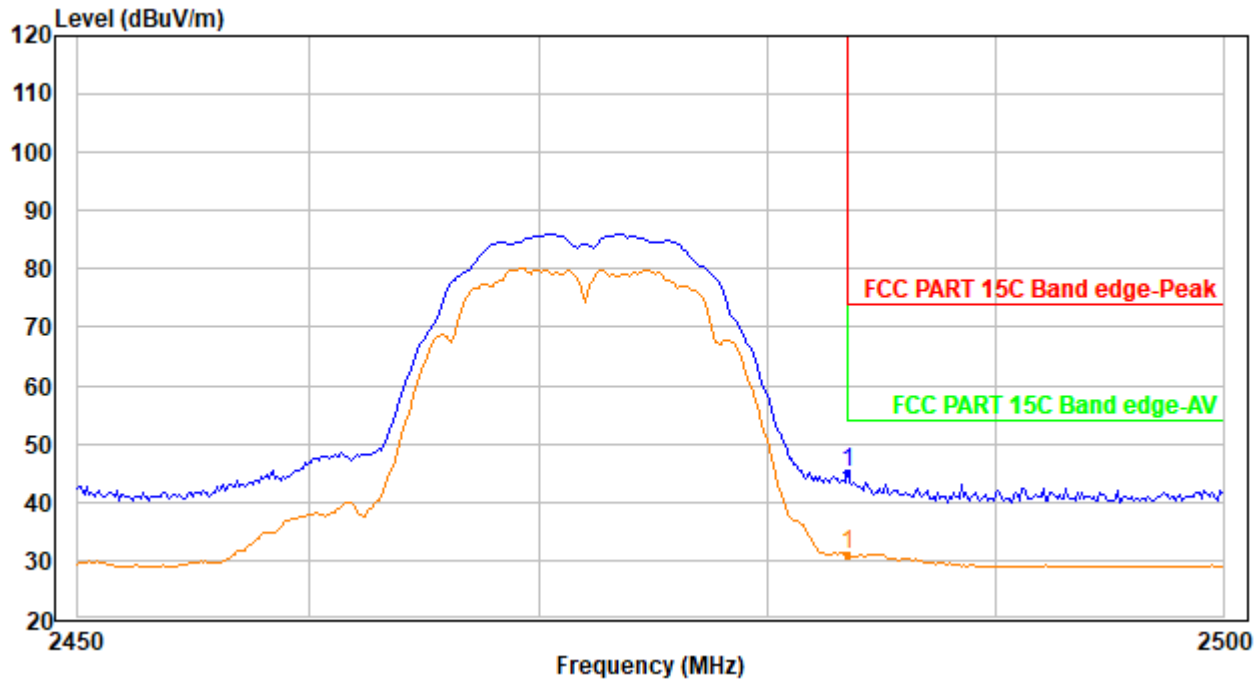
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	44.35	74.00	32.95	54.00	Pass

Test Channel:	Channel 13	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	50.81	74.00	41.62	54.00	Pass

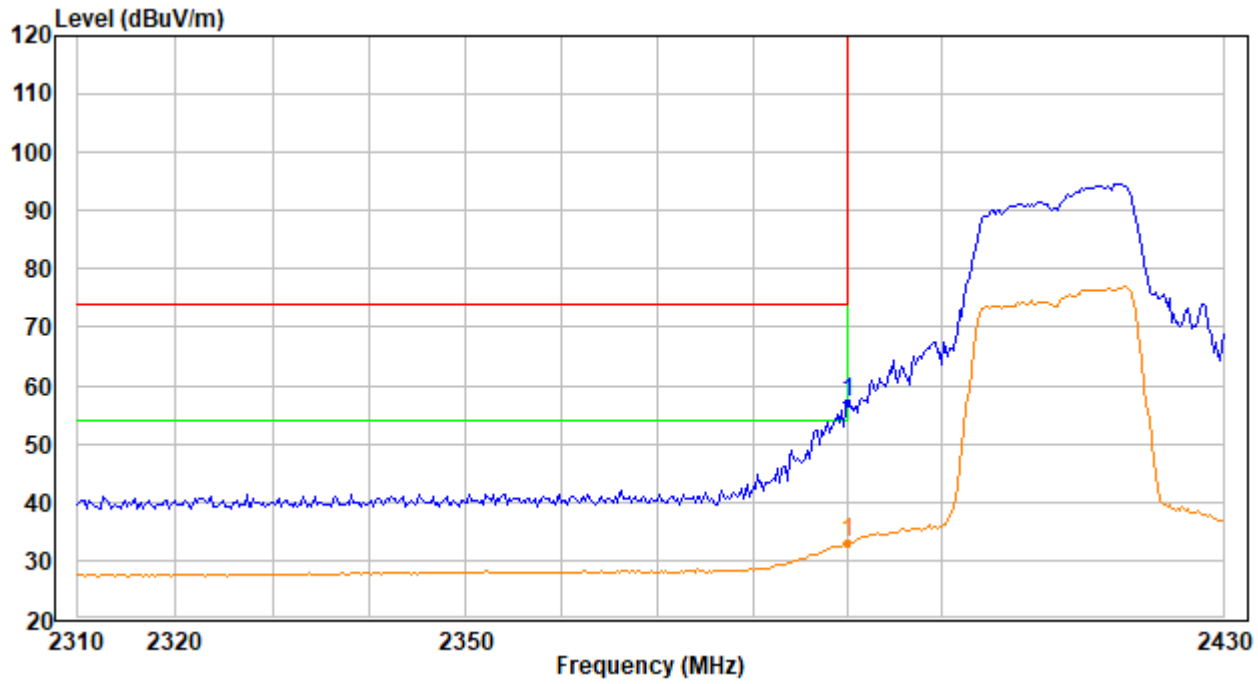
Test Channel:	Channel 13	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	44.96	74.00	31.15	54.00	Pass

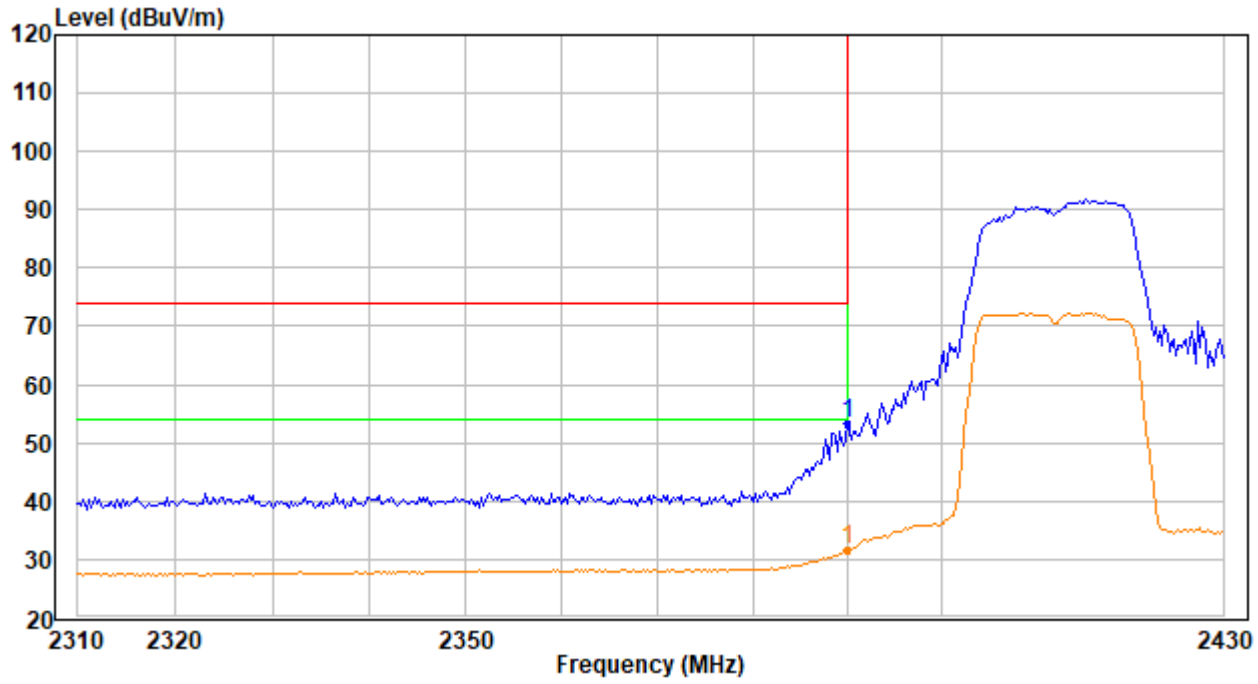
IEEE 802.11g

Test Channel:	Channel 1	Ant. Polar. :	Horizontal



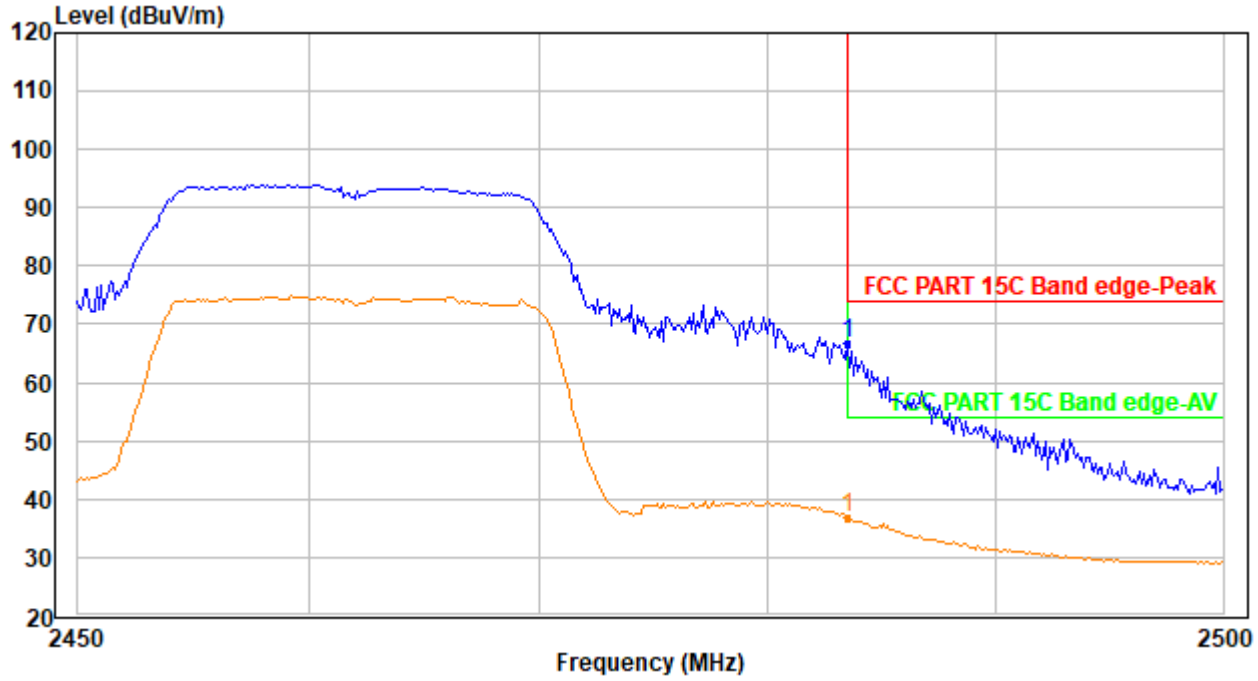
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	57.02	74.00	32.90	54.00	Pass

Test Channel:	Channel 1	Ant. Polar. :	Vertical



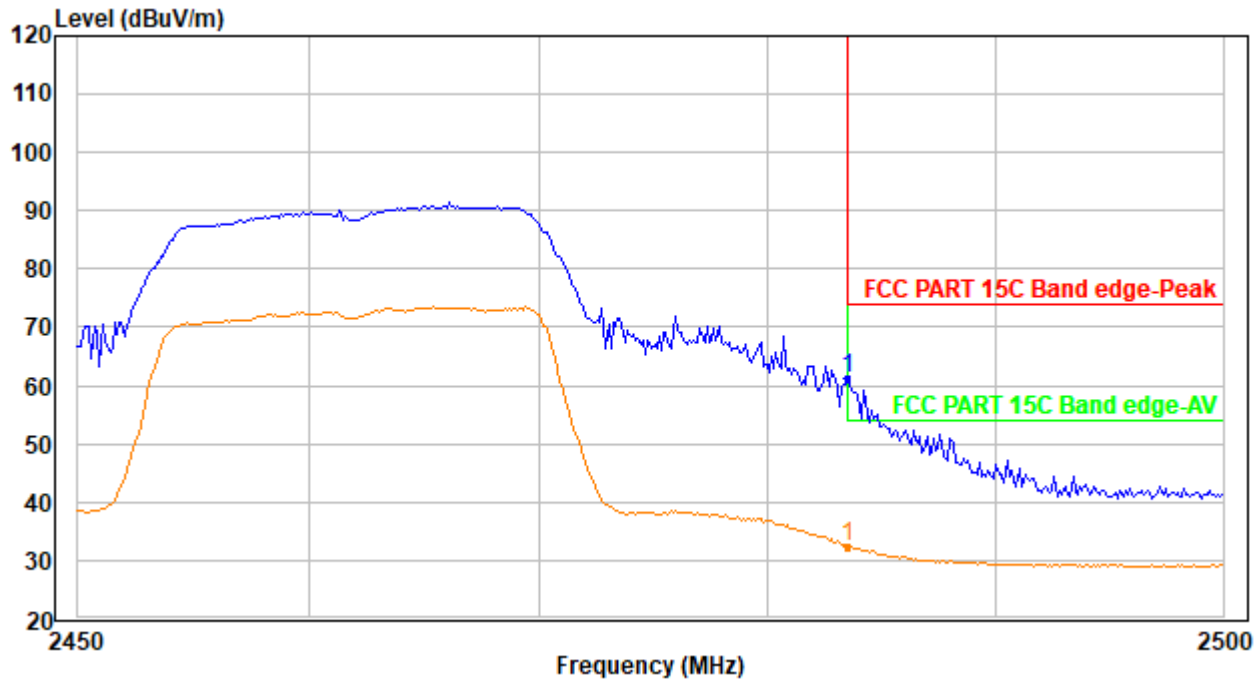
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	53.42	74.00	31.61	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Horizontal



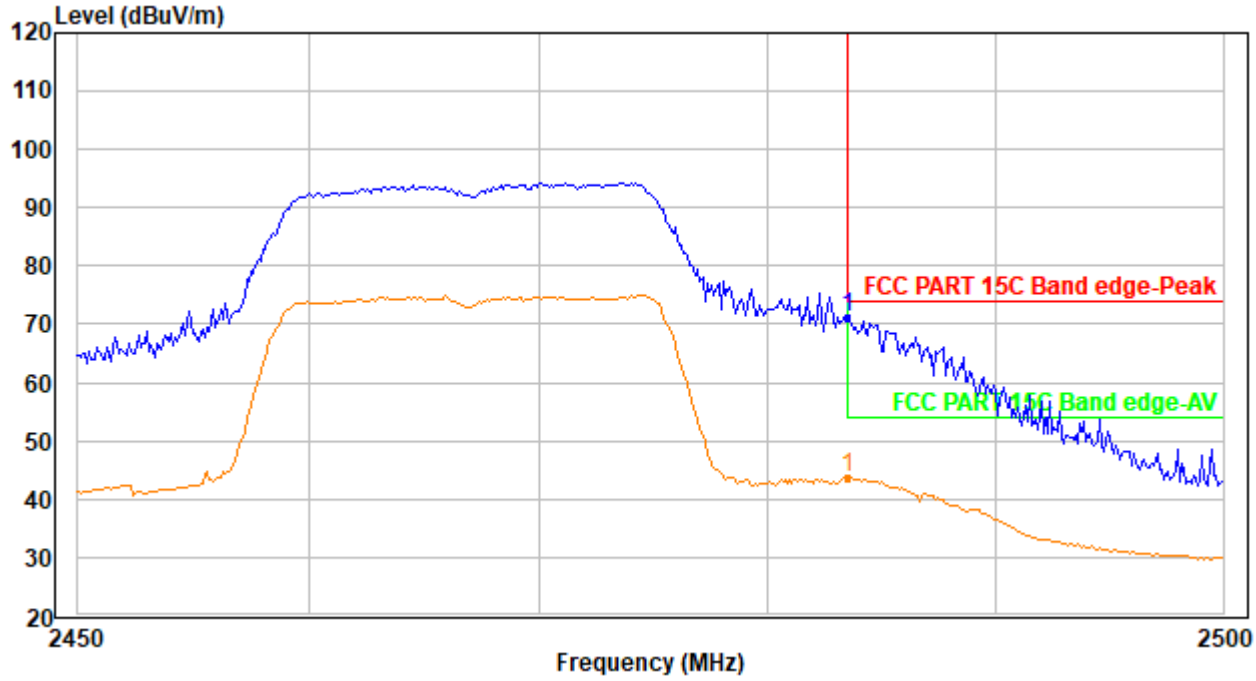
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	66.58	74.00	36.76	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Vertical



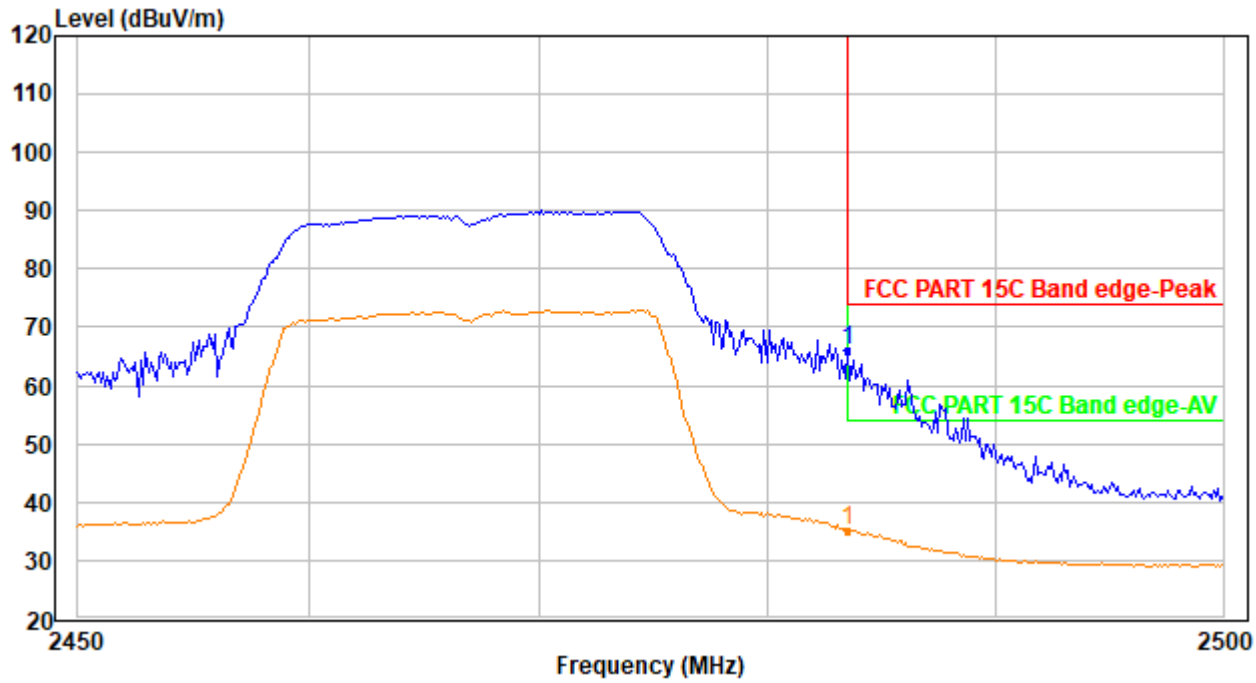
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	61.28	74.00	32.35	54.00	Pass

Test Channel:	Channel 12	Ant. Polar. :	Horizontal



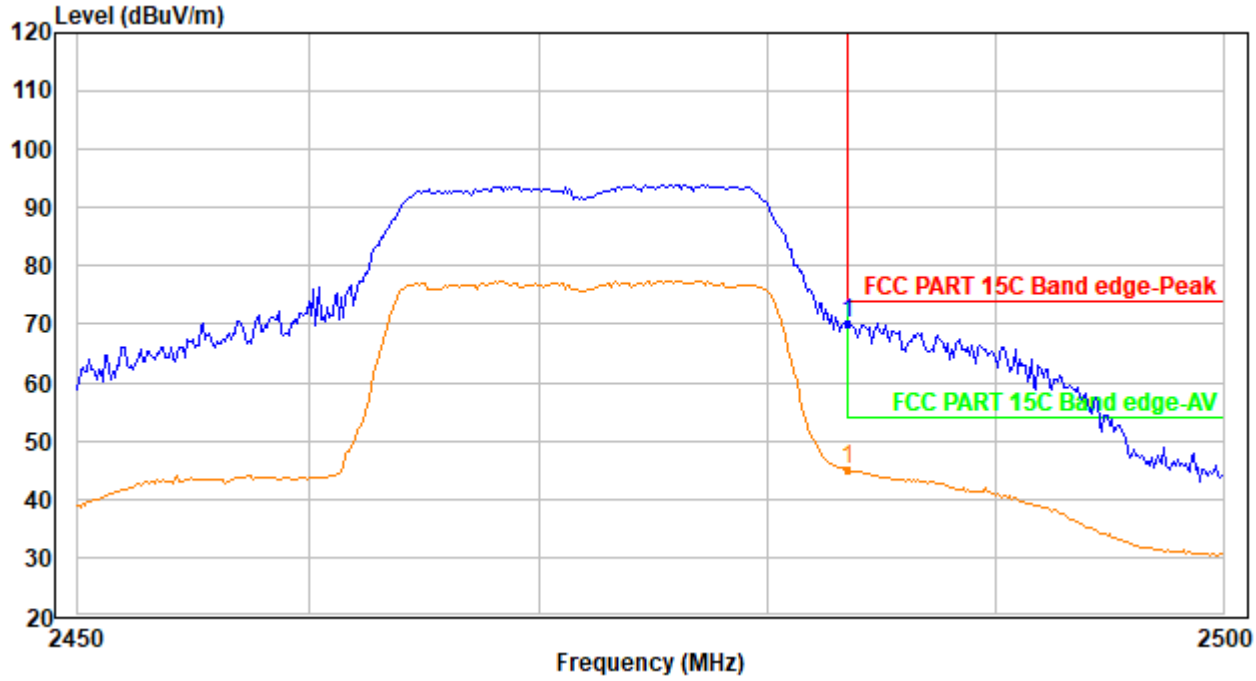
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	71.10	74.00	43.54	54.00	Pass

Test Channel:	Channel 12	Ant. Polar. :	Vertical



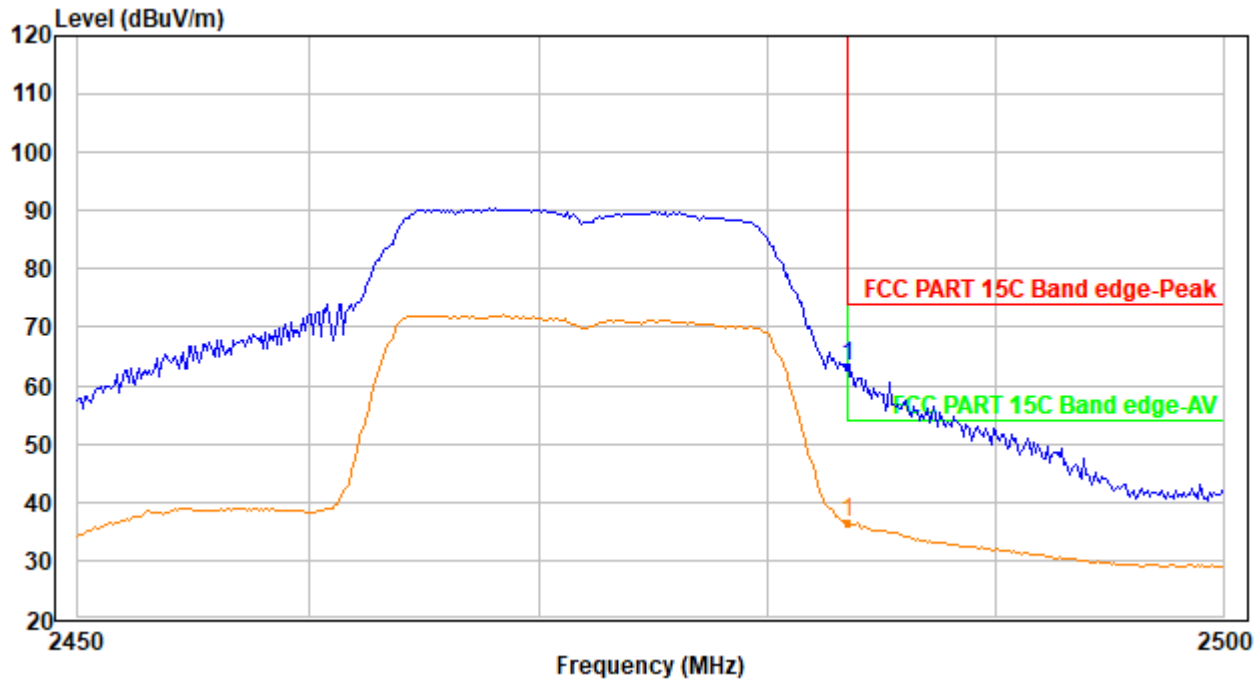
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	65.91	74.00	35.06	54.00	Pass

Test Channel:	Channel 13	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	70.32	74.00	45.21	54.00	Pass

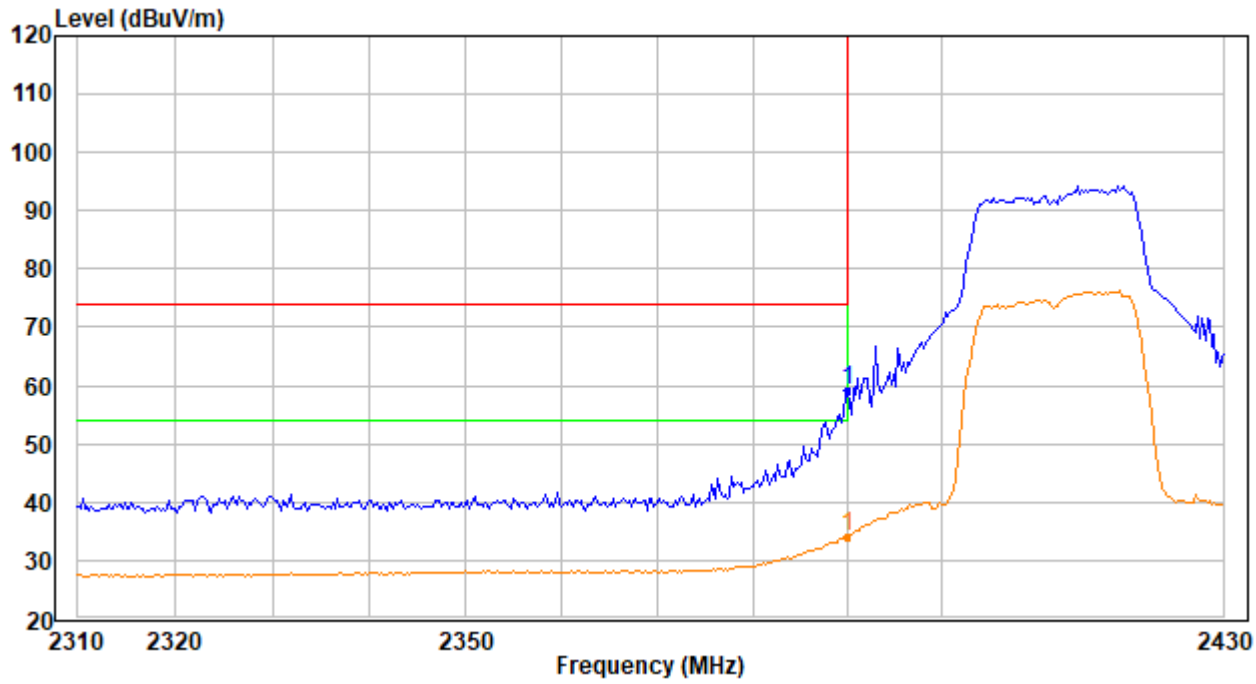
Test Channel:	Channel 13	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	63.33	74.00	36.42	54.00	Pass

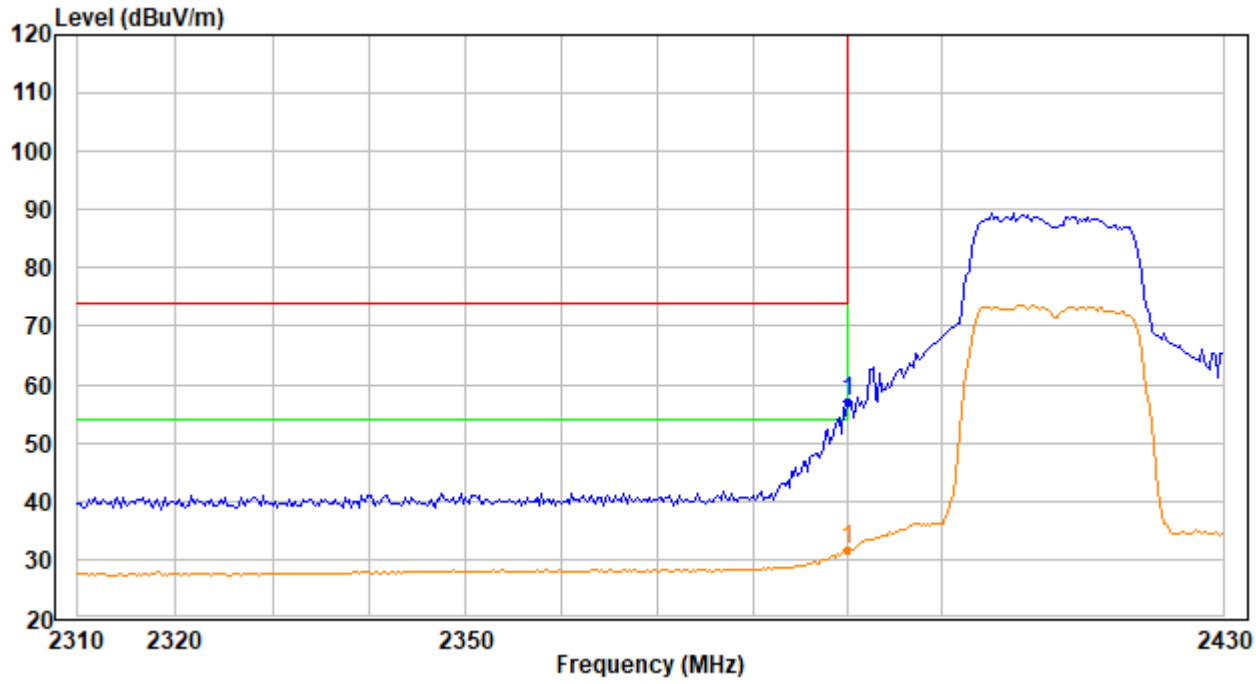
IEEE 802.11n-HT20

Test Channel:	Channel 1	Ant. Polar. :	Horizontal



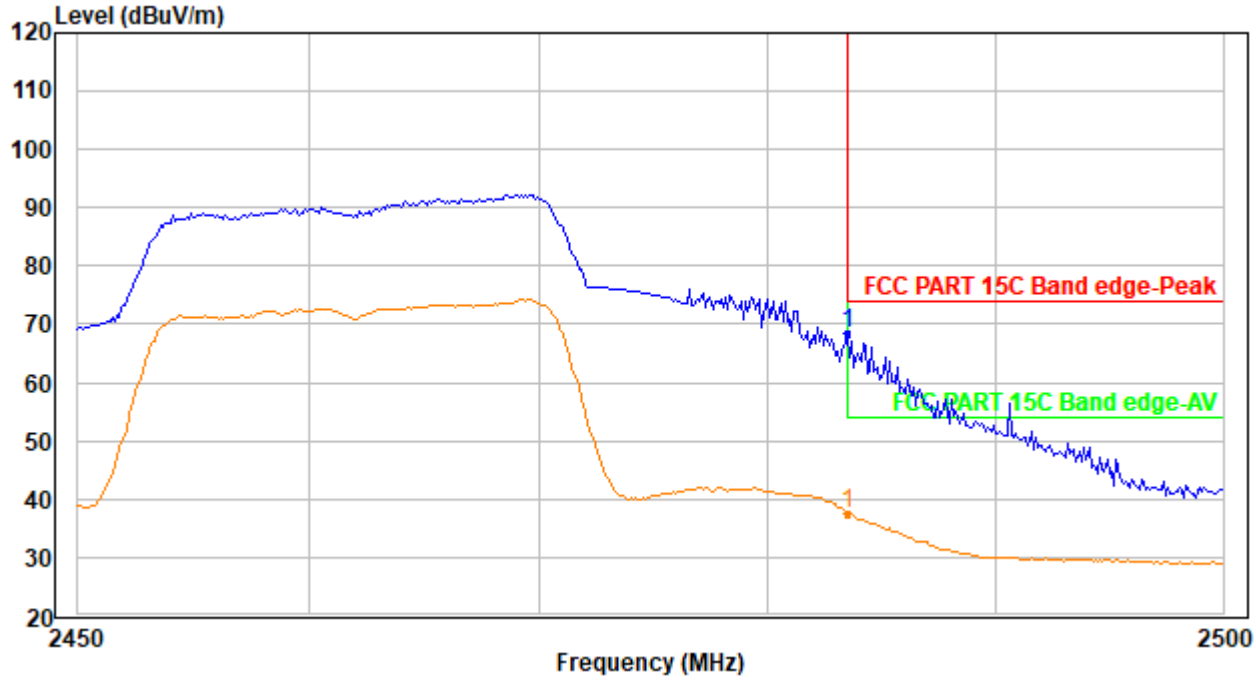
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	59.26	74.00	34.21	54.00	Pass

Test Channel:	Channel 1	Ant. Polar. :	Vertical



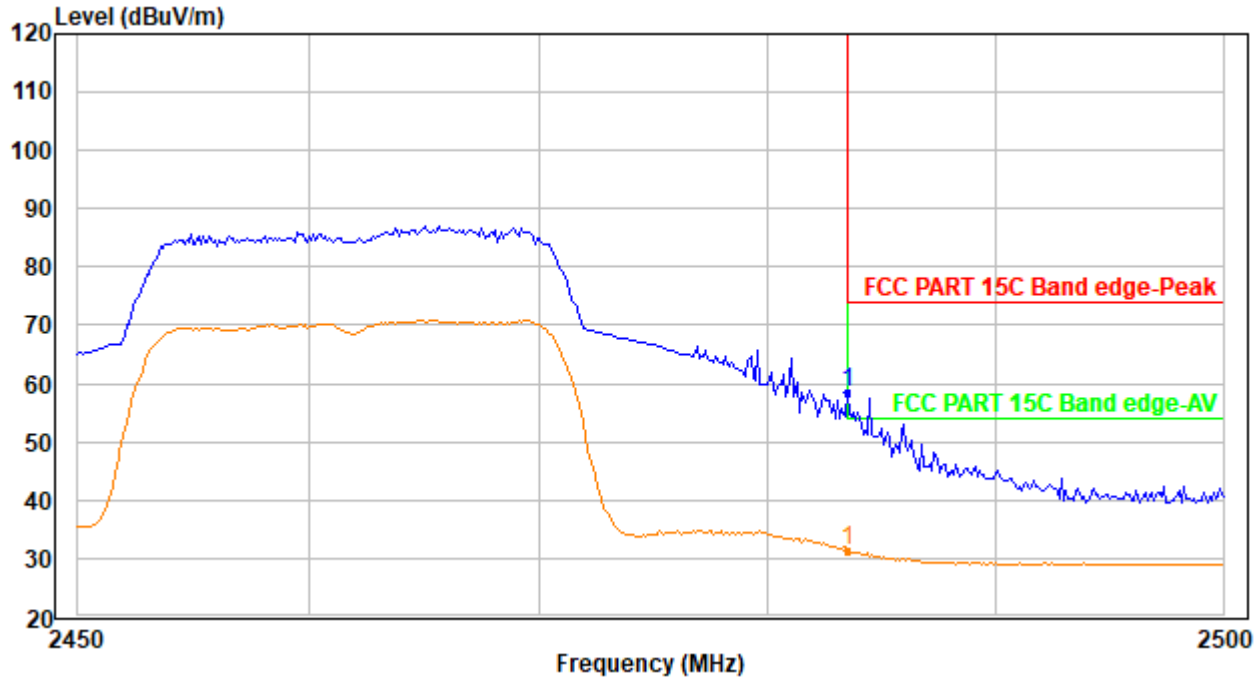
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2390.0000	56.95	74.00	31.65	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Horizontal



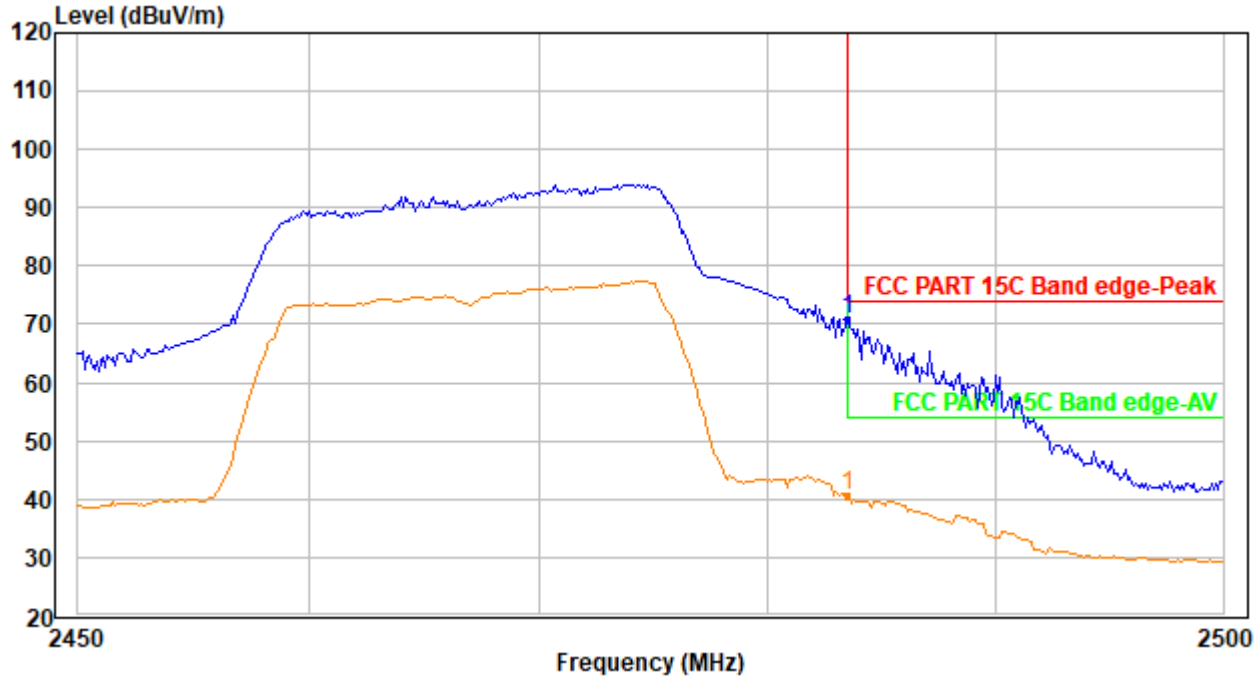
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	68.40	74.00	37.68	54.00	Pass

Test Channel:	Channel 11	Ant. Polar. :	Vertical



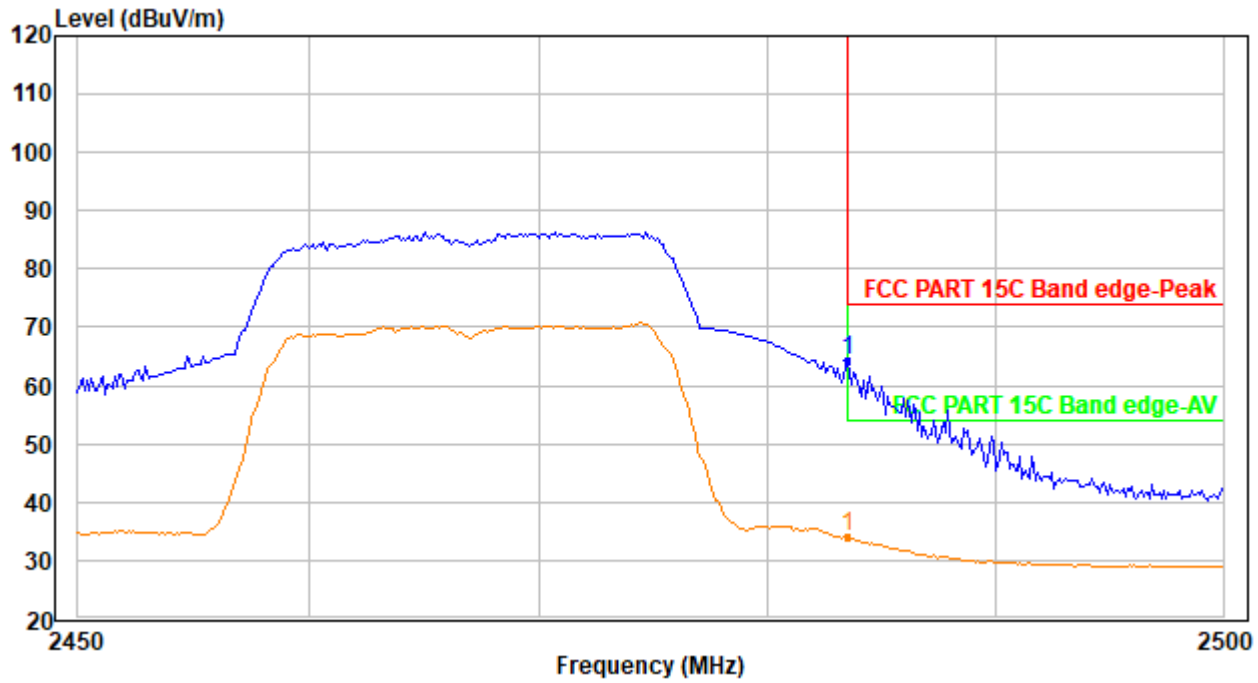
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	58.62	74.00	31.24	54.00	Pass

Test Channel:	Channel 12	Ant. Polar. :	Horizontal



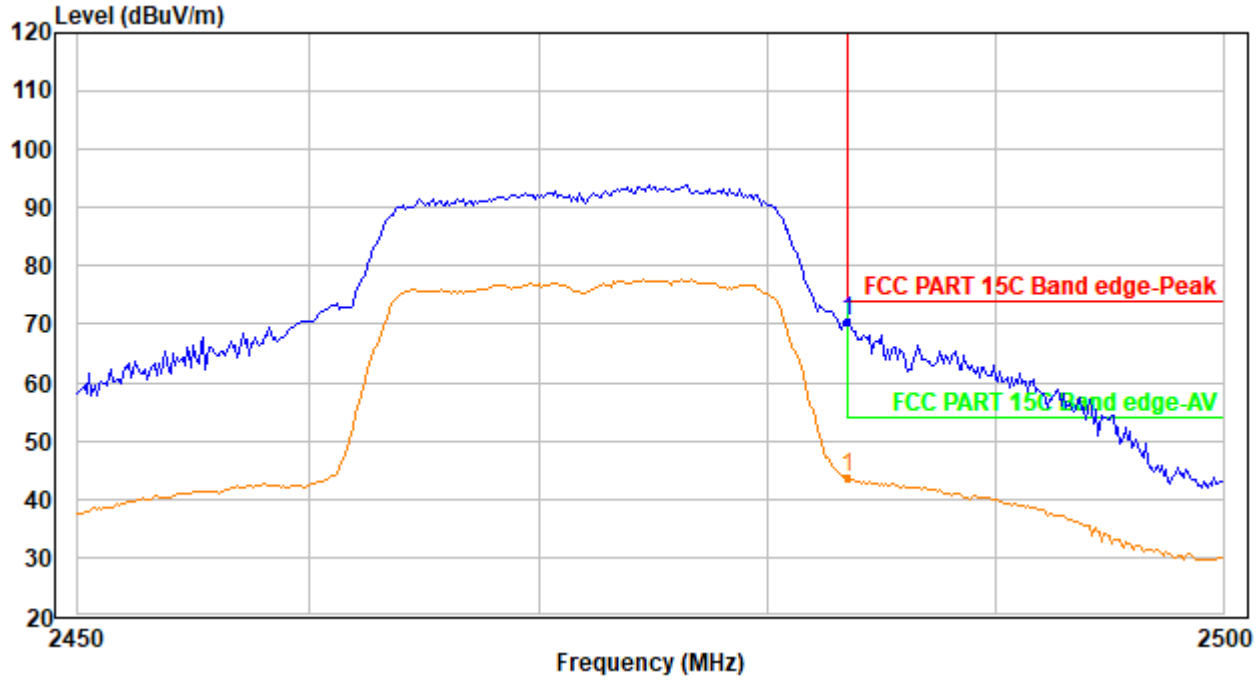
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	70.82	74.00	40.58	54.00	Pass

Test Channel:	Channel 12	Ant. Polar. :	Vertical



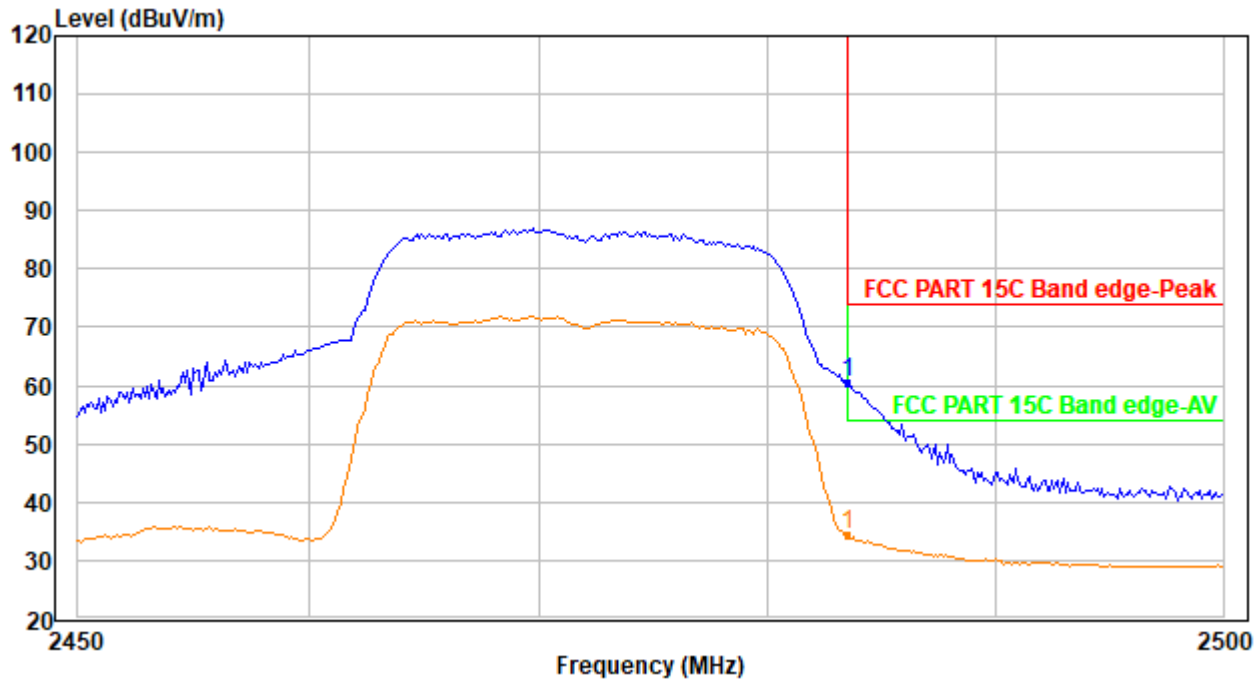
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	64.38	74.00	33.94	54.00	Pass

Test Channel:	Channel 13	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	70.41	74.00	43.80	54.00	Pass

Test Channel:	Channel 13	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
2483.5000	60.42	74.00	34.49	54.00	Pass

5.9 CONDUCTED EMISSION

Test Requirement: 47 CFR Part 15C Section 15.207

Test Method: ANSI C63.10-2013 Section 6.2

Limits:

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.4.2 for details.

Test Procedures:

Test frequency range :150KHz-30MHz

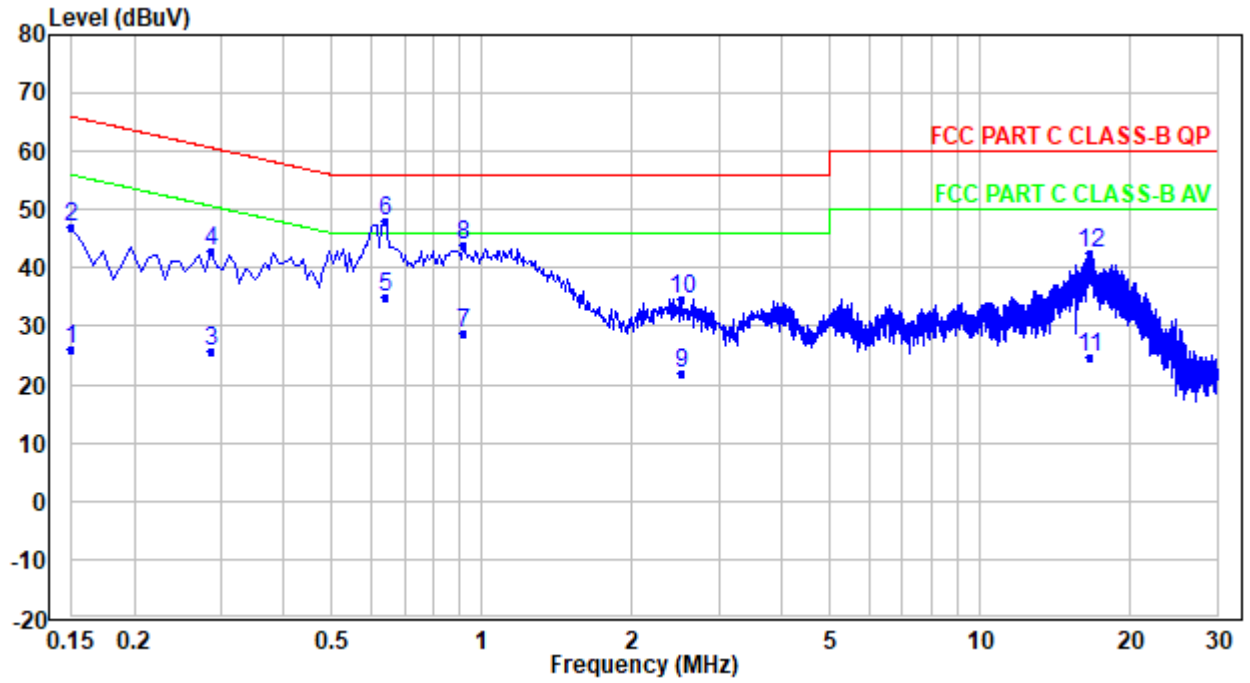
1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

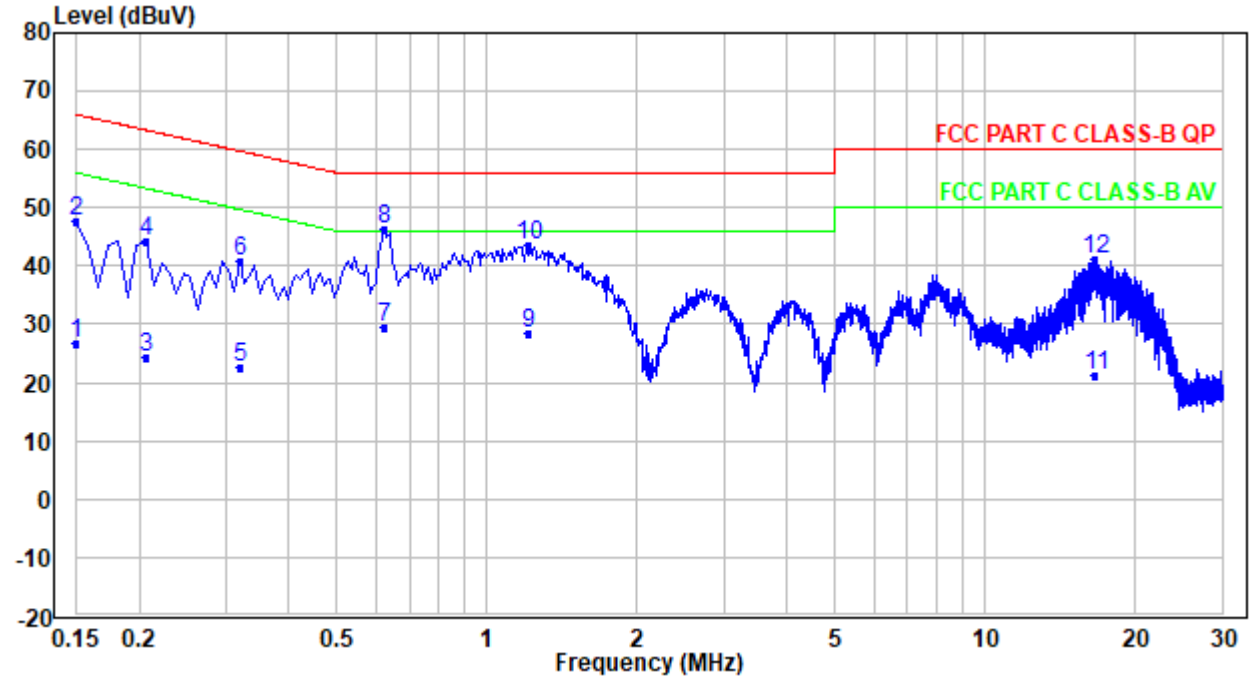
The worst measurement data as follows:
Quasi Peak and Average:
Mode: WIFI Link

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.150	15.91	10.03	25.94	56.00	-30.06	Average
2	0.150	36.91	10.03	46.94	66.00	-19.06	QP
3	0.286	15.74	10.03	25.77	50.64	-24.87	Average
4	0.286	32.74	10.03	42.77	60.64	-17.87	QP
5	0.638	24.88	10.05	34.93	46.00	-11.07	Average
6	0.638	37.88	10.05	47.93	56.00	-8.07	QP
7	0.918	18.71	10.06	28.77	46.00	-17.23	Average
8	0.918	33.71	10.06	43.77	56.00	-12.23	QP
9	2.510	11.62	10.16	21.78	46.00	-24.22	Average
10	2.510	24.62	10.16	34.78	56.00	-21.22	QP
11	16.659	13.55	10.98	24.53	50.00	-25.47	Average
12	16.659	31.55	10.98	42.53	60.00	-17.47	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.150	16.82	10.02	26.84	56.00	-29.16	Average
2	0.150	37.82	10.02	47.84	66.00	-18.16	QP
3	0.206	14.19	10.00	24.19	53.37	-29.18	Average
4	0.206	34.19	10.00	44.19	63.37	-19.18	QP
5	0.318	12.75	10.01	22.76	49.76	-27.00	Average
6	0.318	30.75	10.01	40.76	59.76	-19.00	QP
7	0.622	19.38	10.04	29.42	46.00	-16.58	Average
8	0.622	36.38	10.04	46.42	56.00	-9.58	QP
9	1.214	18.45	10.07	28.52	46.00	-17.48	Average
10	1.214	33.45	10.07	43.52	56.00	-12.48	QP
11	16.683	10.36	10.95	21.31	50.00	-28.69	Average
12	16.683	30.36	10.95	41.31	60.00	-18.69	QP

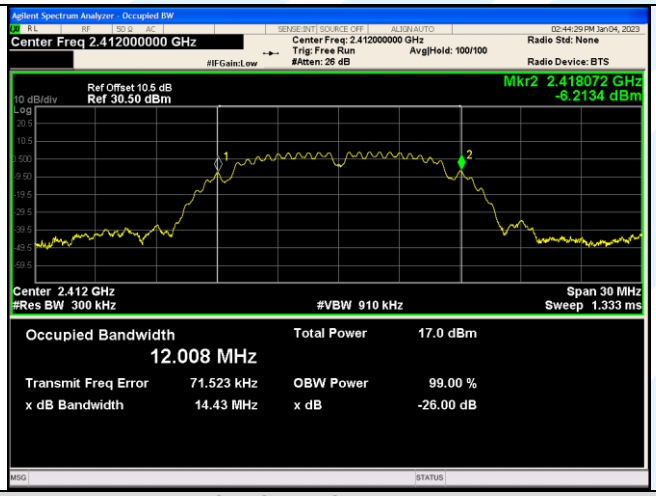
Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.
5. All possible modes of operation were investigated, and testing at two nominal voltages of 240V/50Hz and 120V/60Hz, only the worst case emissions reported.

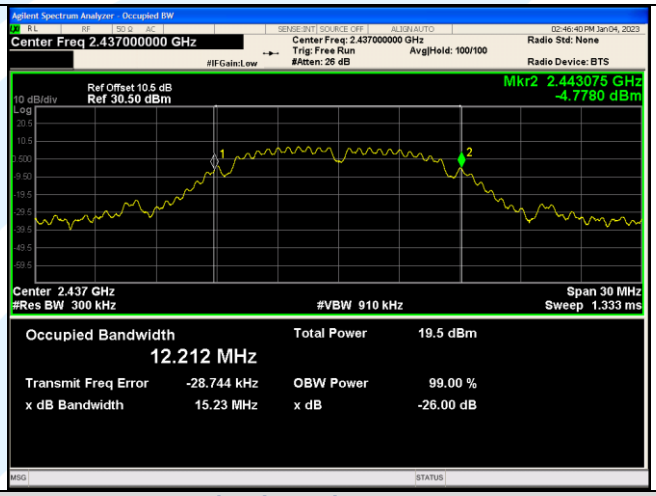
APPENDIX A RF TEST DATA

A.1 99% BANDWIDTH

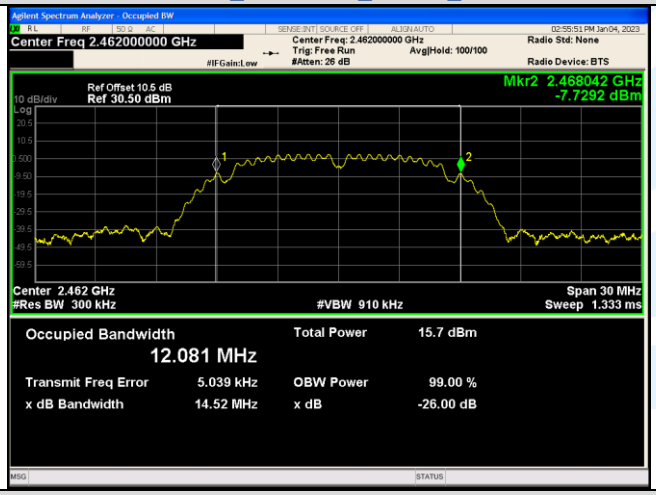
Mode	Channel	Ant.	99% BW (MHz)
IEEE 802.11b	1	0	12.008
	6		12.212
	11		12.081
	12		12.084
	13		11.888
IEEE 802.11g	1		16.546
	6		16.755
	11		16.676
	12		16.573
	13		16.397
IEEE 802.11n_20	1		17.575
	6		17.703
	11		17.713
	12		17.574
	13		17.296



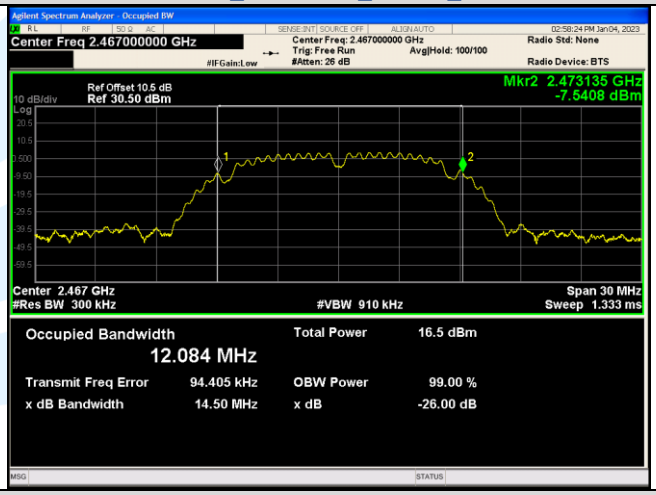
IEEE 802.11b_Channel 1_20MHz_Antenna 0



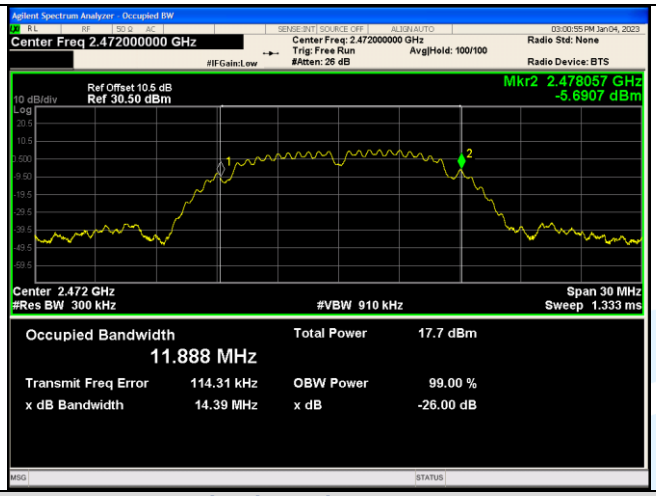
IEEE 802.11b_Channel 6_20MHz_Antenna 0



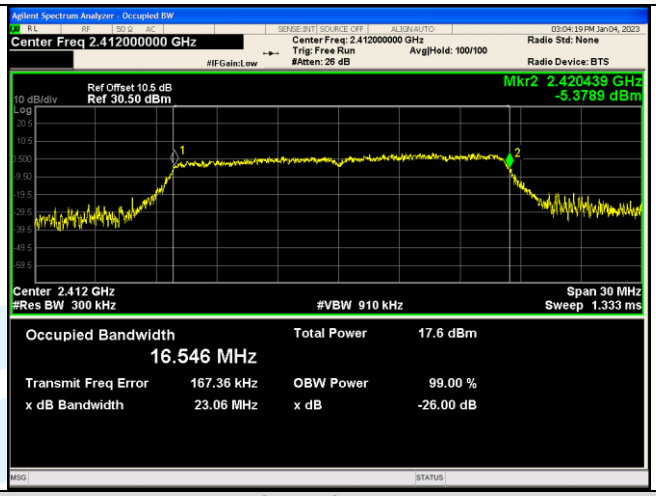
IEEE 802.11b_Channel 11_20MHz_Antenna 0



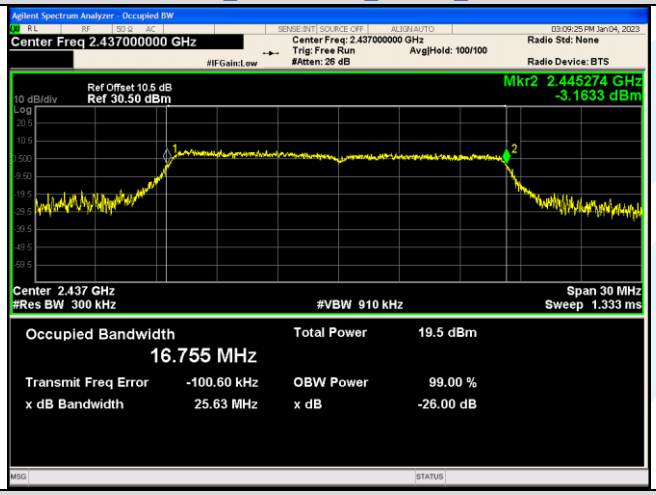
IEEE 802.11b_Channel 12_20MHz_Antenna 0



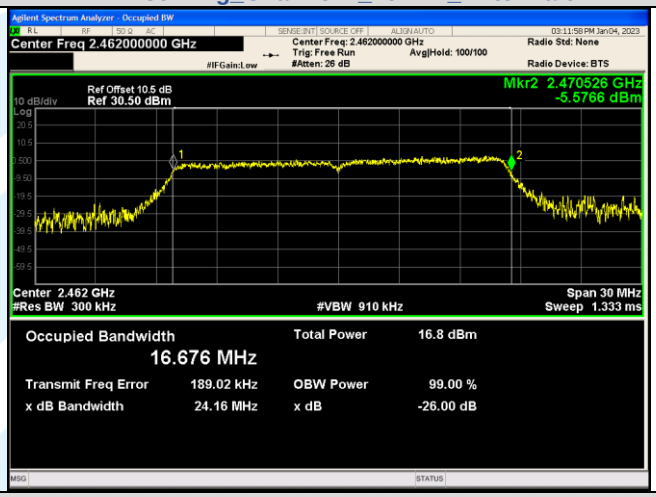
IEEE 802.11b_Channel 13_20MHz_Antenna 0



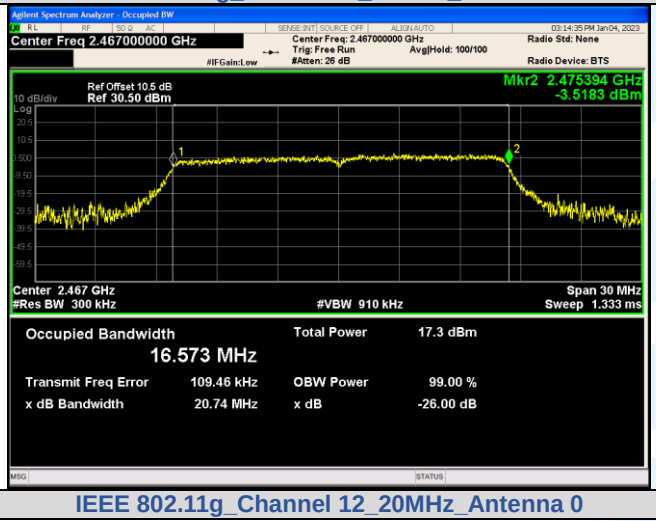
IEEE 802.11g_Channel 1_20MHz_Antenna 0



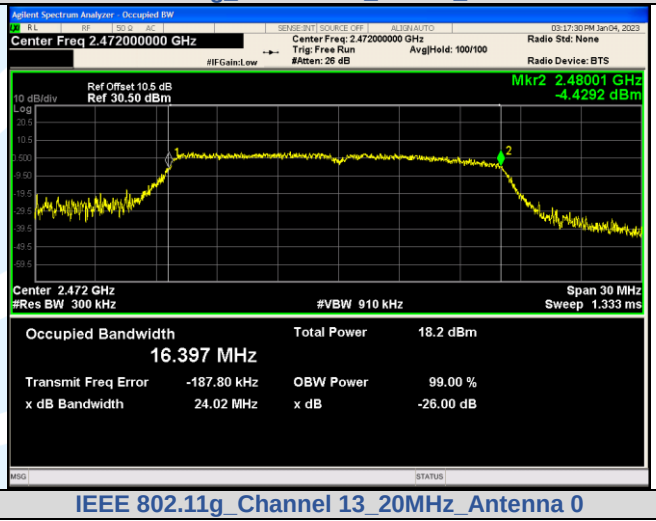
IEEE 802.11g_Channel 6_20MHz_Antenna 0



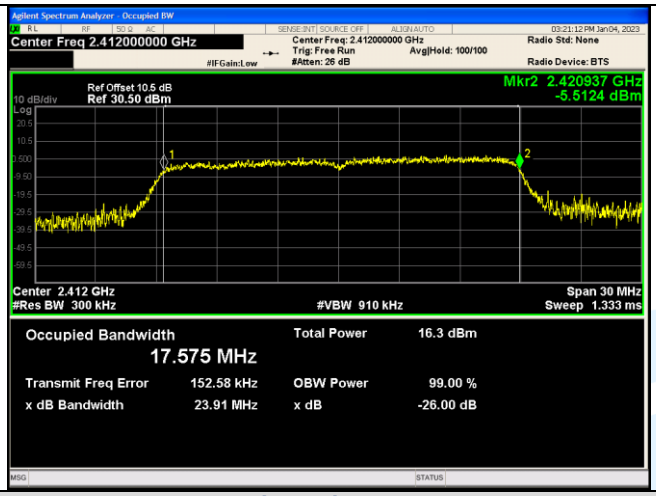
IEEE 802.11g_Channel 11_20MHz_Antenna 0



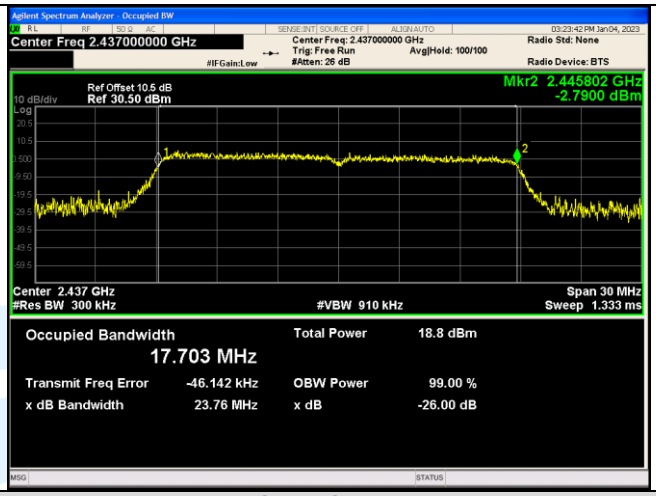
IEEE 802.11g_Channel 12_20MHz_Antenna 0



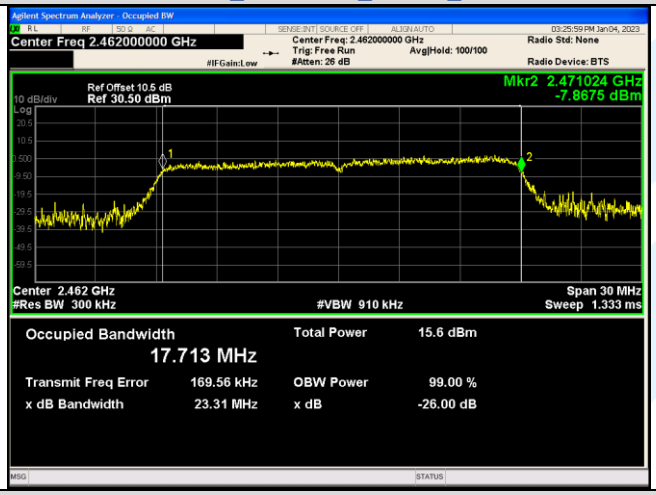
IEEE 802.11g_Channel 13_20MHz_Antenna 0



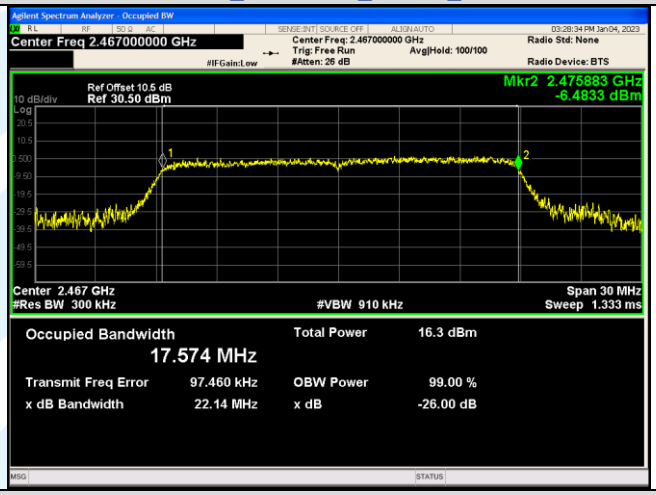
IEEE 802.11n_Channel 1_20MHz_Antenna 0



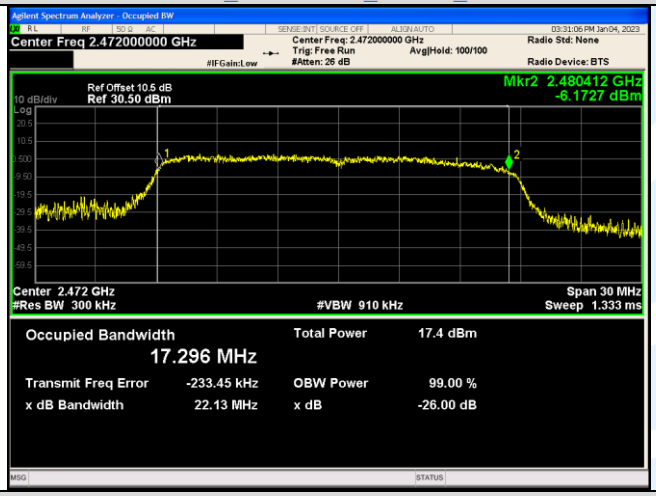
IEEE 802.11n_Channel 6_20MHz_Antenna 0



IEEE 802.11n_Channel 11_20MHz_Antenna 0



IEEE 802.11n_Channel 12_20MHz_Antenna 0

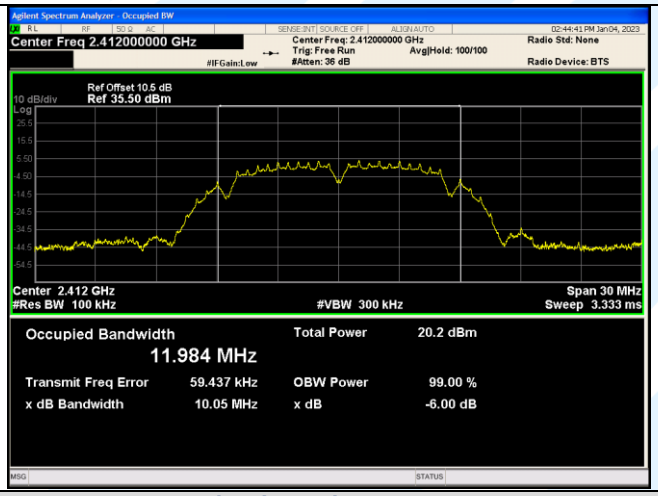


IEEE 802.11n_Channel 13_20MHz_Antenna 0

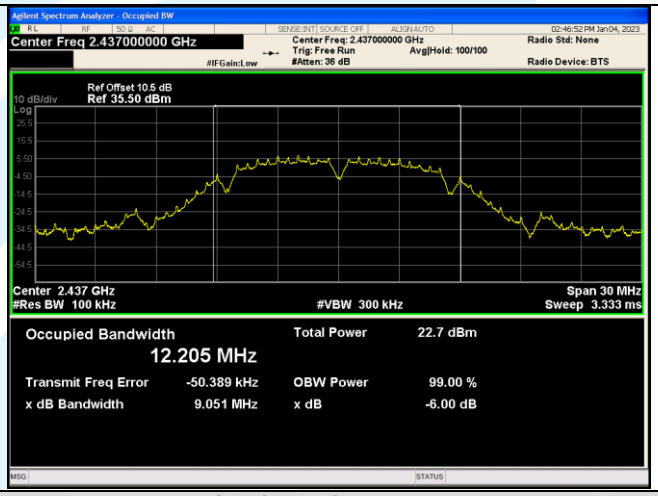
Void

A.2 6DB BANDWIDTH

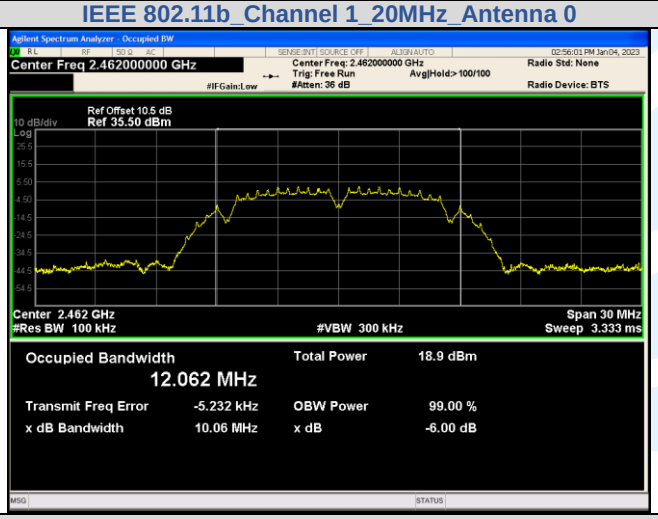
Mode	Channel	Ant.	Center Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
IEEE 802.11b	1	0	2412	10.05	0.5	PASS
	6		2437	9.051		PASS
	11		2462	10.06		PASS
	12		2467	9.567		PASS
	13		2472	9.078		PASS
IEEE 802.11g	1		2412	15.75		PASS
	6		2437	16.11		PASS
	11		2462	15.66		PASS
	12		2467	15.71		PASS
	13		2472	15.72		PASS
IEEE 802.11n_20	1		2412	16.17		PASS
	6		2437	16.56		PASS
	11		2462	16.36		PASS
	12		2467	16.22		PASS
	13		2472	16.27		PASS



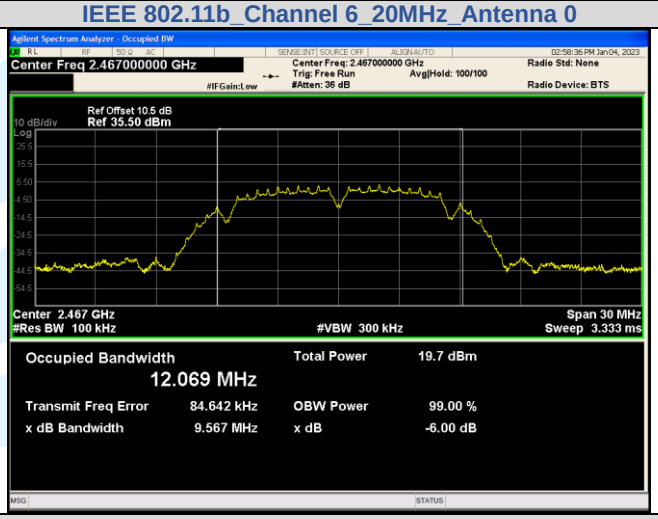
IEEE 802.11b_Channel 1_20MHz_Antenna 0



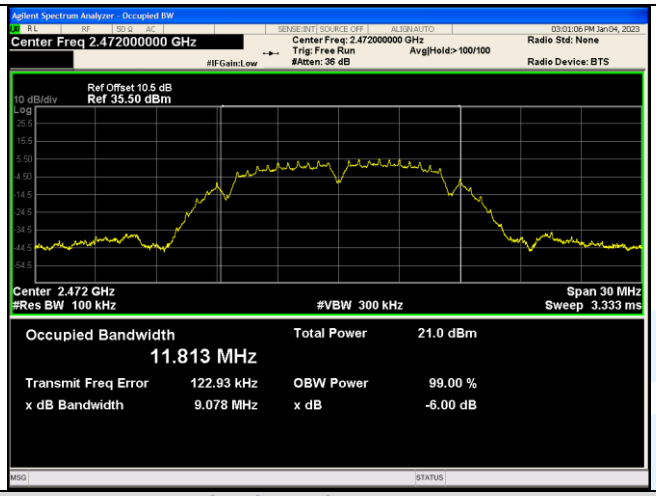
IEEE 802.11b_Channel 6_20MHz_Antenna 0



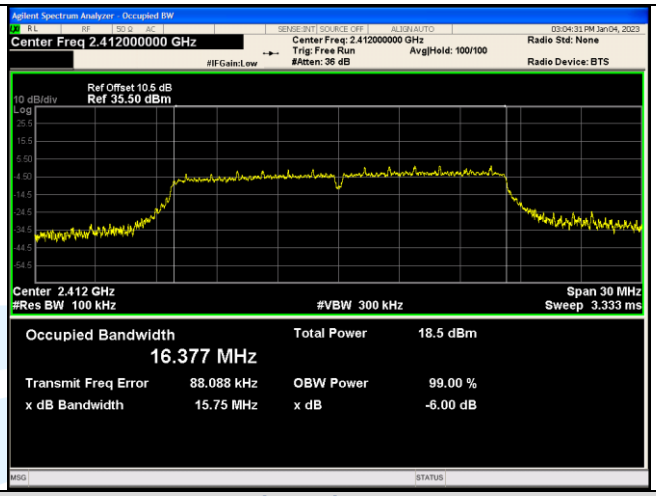
IEEE 802.11b_Channel 11_20MHz_Antenna 0



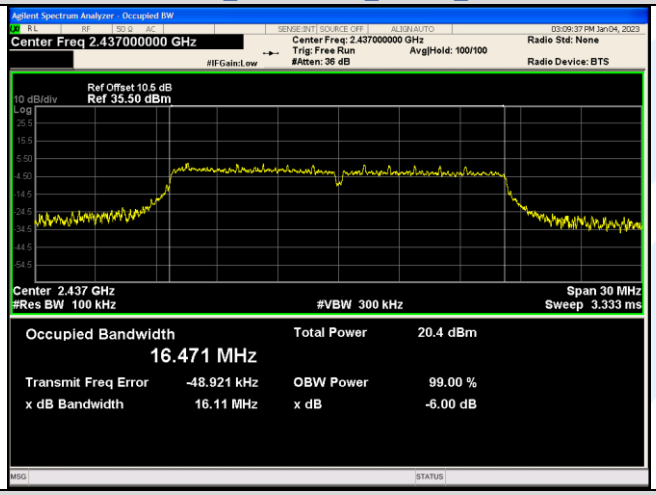
IEEE 802.11b_Channel 12_20MHz_Antenna 0



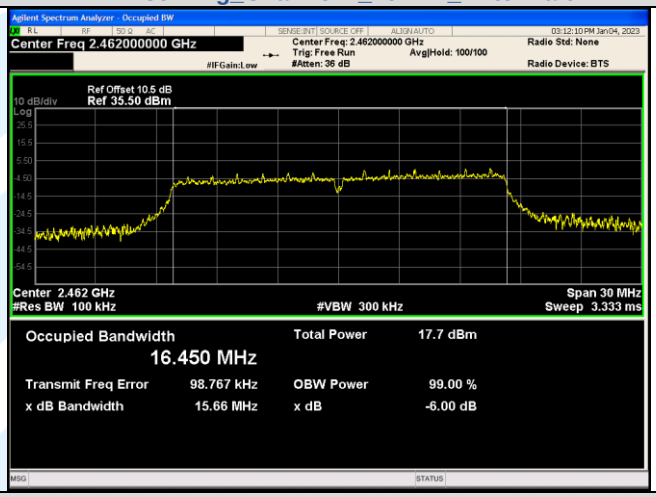
IEEE 802.11b_Channel 13_20MHz_Antenna 0



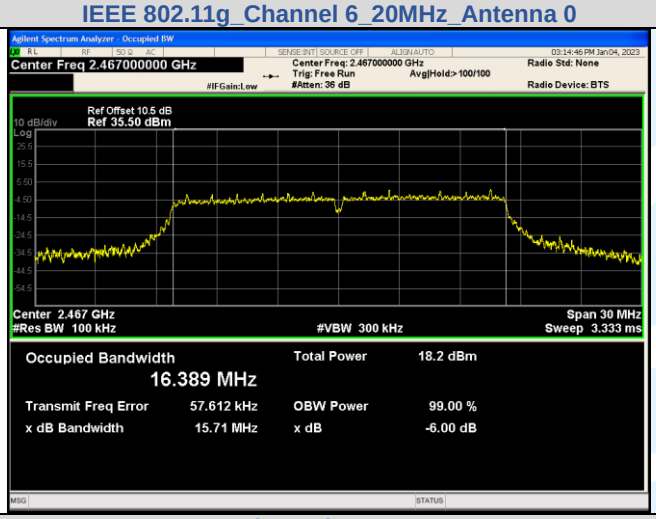
IEEE 802.11g_Channel 1_20MHz_Antenna 0



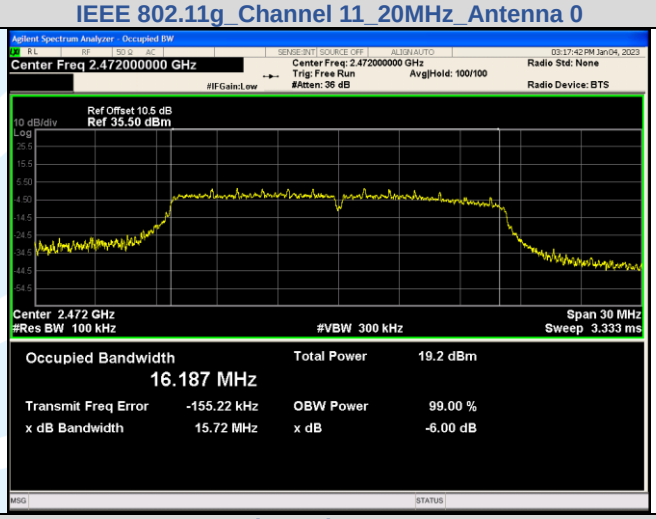
IEEE 802.11g_Channel 6_20MHz_Antenna 0



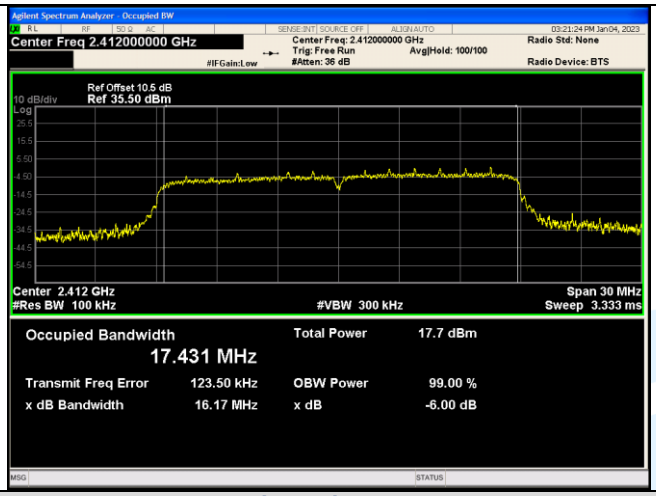
IEEE 802.11g_Channel 11_20MHz_Antenna 0



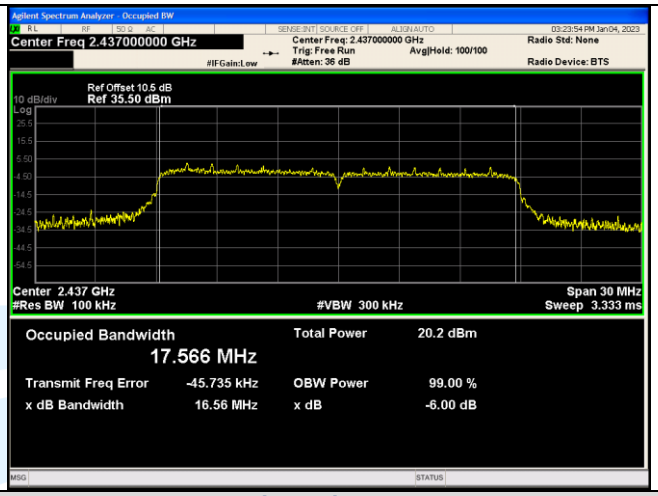
IEEE 802.11g_Channel 12_20MHz_Antenna 0



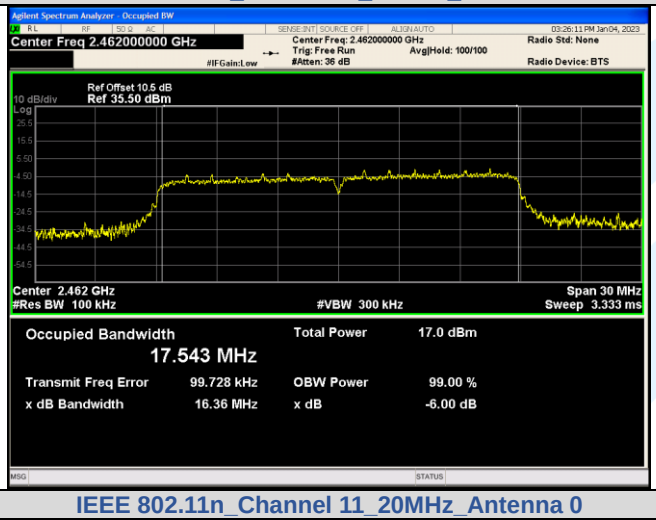
IEEE 802.11g_Channel 13_20MHz_Antenna 0



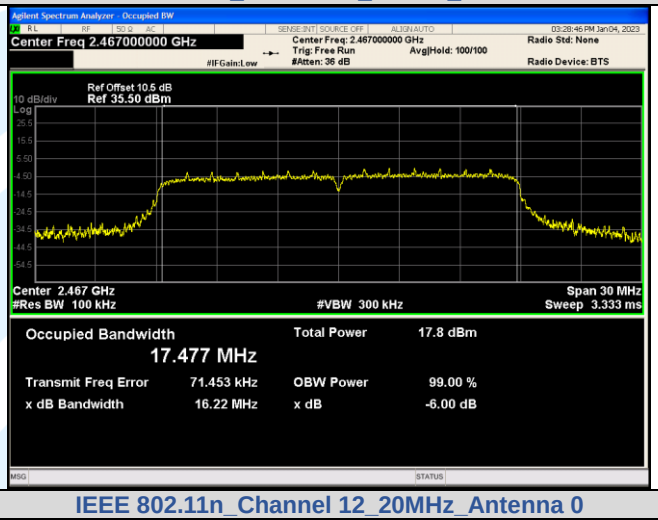
IEEE 802.11n_Channel 1_20MHz_Antenna 0



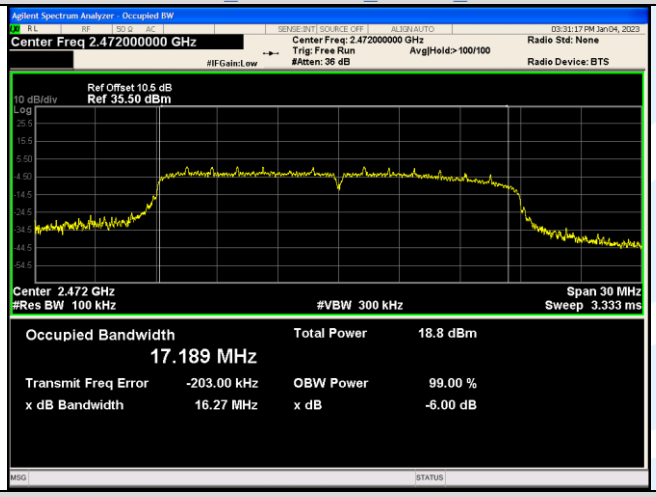
IEEE 802.11n_Channel 6_20MHz_Antenna 0



IEEE 802.11n_Channel 11_20MHz_Antenna 0



IEEE 802.11n_Channel 12_20MHz_Antenna 0

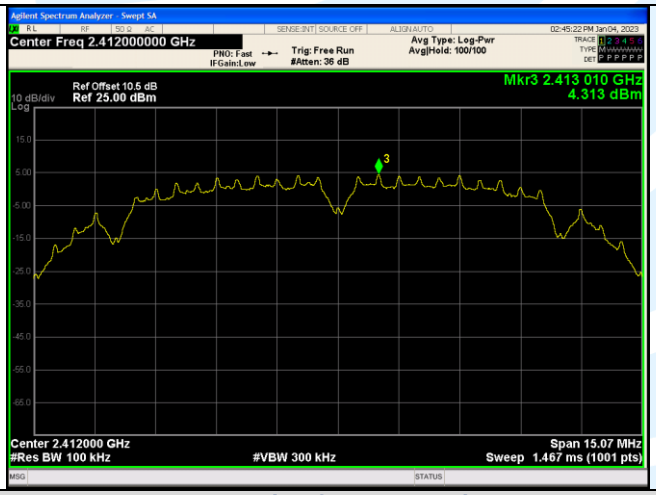


IEEE 802.11n_Channel 13_20MHz_Antenna 0

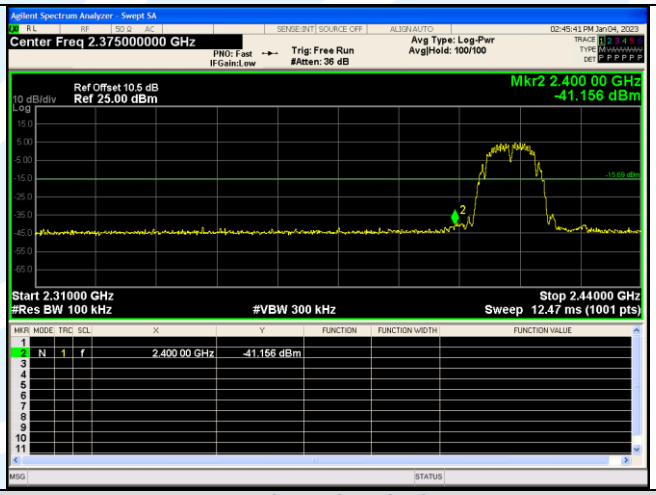
Void

A.3 CONDUCTED OUT OF BAND EMISSION

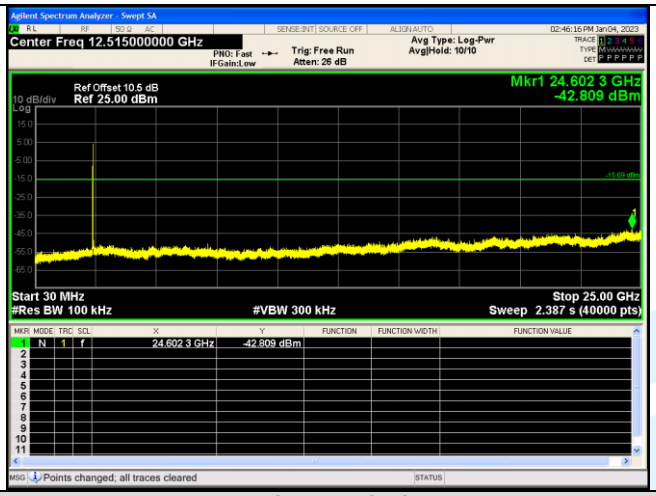
Mode	Channel	Ant.	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
IEEE 802.11b	1	0	2400.00	-41.156	-15.69	-25	PASS
			24602.3	-42.809	-15.69	-27.119	PASS
	6		24267.1	-43.013	-12.59	-30.423	PASS
	11		2483.50	-42.657	-16.99	-26	PASS
			24917.6	-42.776	-16.99	-25.786	PASS
	12		2483.50	-44.482	-15.9	-29	PASS
			24341.4	-42.914	-15.9	-27.014	PASS
	13		2483.50	-38.758	-14.43	-24	PASS
			24163.5	-42.544	-14.43	-28.114	PASS
IEEE 802.11g	1		2483.50	-44.257	-17.74	-27	PASS
			24246.5	-43.343	-17.74	-25.603	PASS
	6		24613.6	-42.940	-15.64	-27.300	PASS
	11		2483.50	-40.227	-18.03	-22	PASS
			24151.0	-43.087	-18.03	-25.056	PASS
	12		2483.50	-40.197	-18.47	-22	PASS
			24420.1	-42.975	-18.47	-24.505	PASS
	13		2483.50	-38.047	-17.93	-20	PASS
			24900.1	-42.884	-17.93	-24.954	PASS
IEEE 802.11n_20	1		2400.00	-35.017	-19.04	-15.977	PASS
			2398.27	-33.214	-19.04	-14.174	PASS
			24290.8	-43.012	-19.04	-23.972	PASS
	6		24333.9	-42.363	-17.1	-25.263	PASS
	11		2483.50	-40.346	-19.9	-20	PASS
			24302.7	-43.265	-19.9	-23.365	PASS
	12		2483.50	-40.212	-19.46	-21	PASS
			24260.2	-43.615	-19.46	-24.155	PASS
	13		2483.50	-35.184	-18.37	-17	PASS
			24541.2	-43.431	-18.37	-25.061	PASS



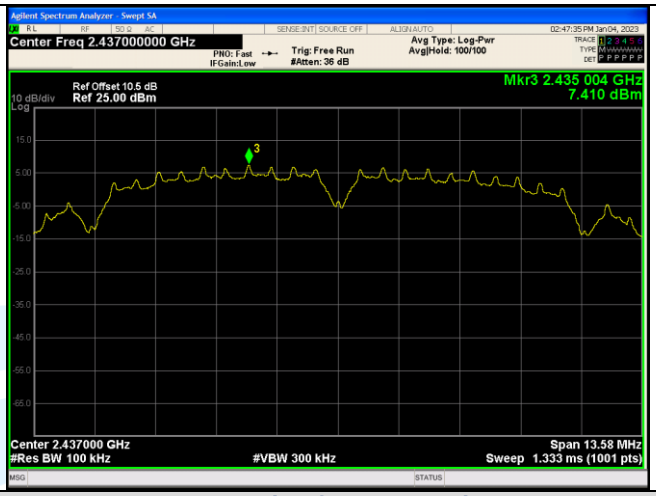
In-Band Reference Level
IEEE 802.11b_Channel 1_20MHz_Antenna 0



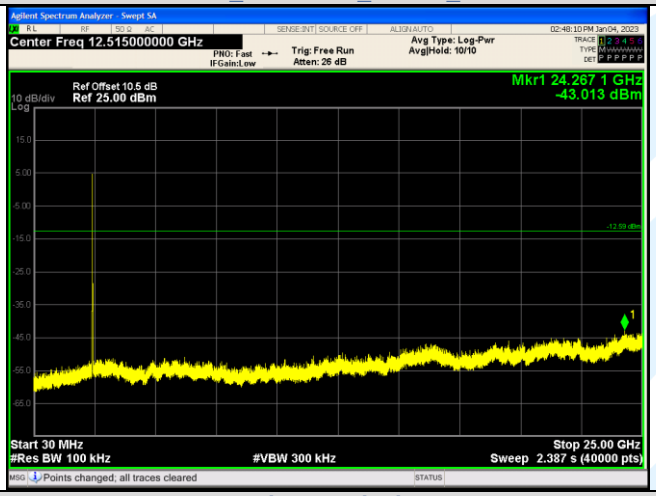
Out Of Band Emission
IEEE 802.11b_Channel 1_20MHz_Antenna 0



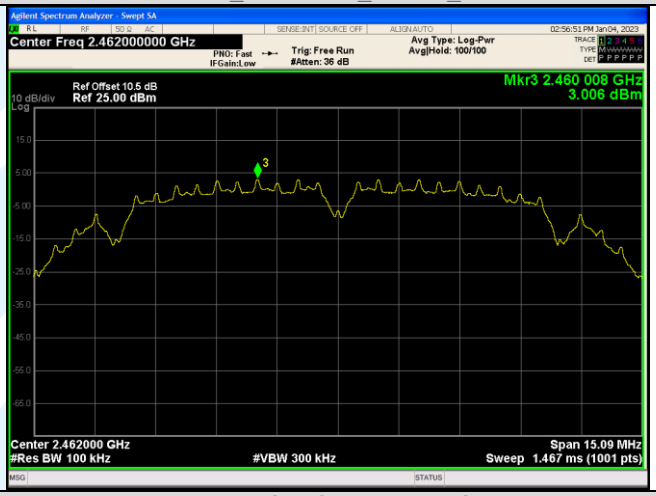
Spurious Emission
IEEE 802.11b_Channel 1_20MHz_Antenna 0



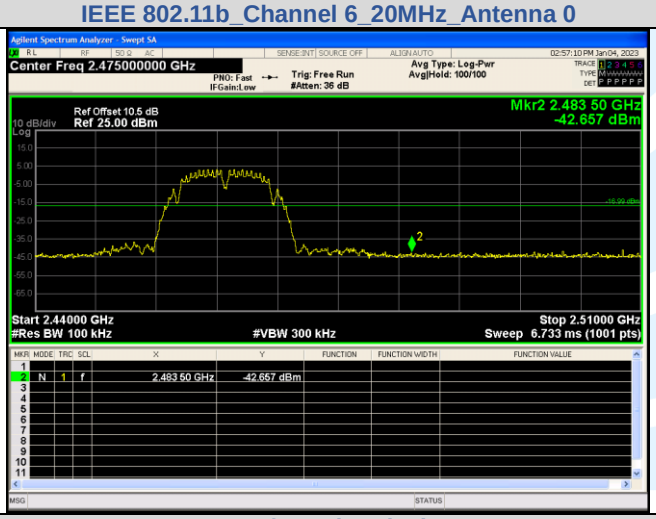
In-Band Reference Level
IEEE 802.11b_Channel 6_20MHz_Antenna 0



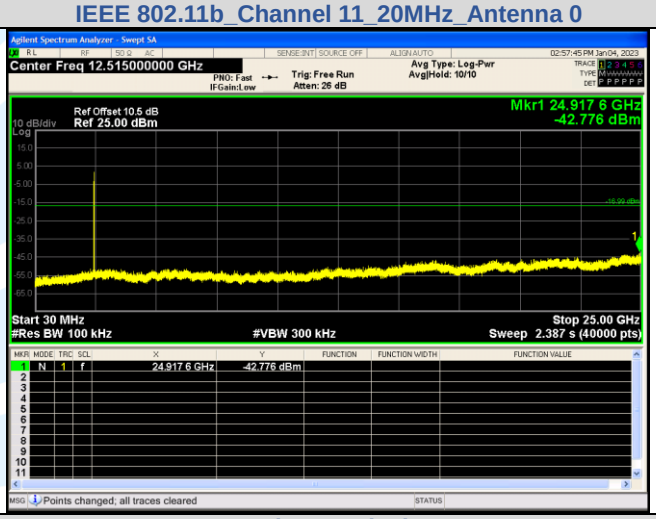
Spurious Emissions
IEEE 802.11b_Channel 6_20MHz_Antenna 0



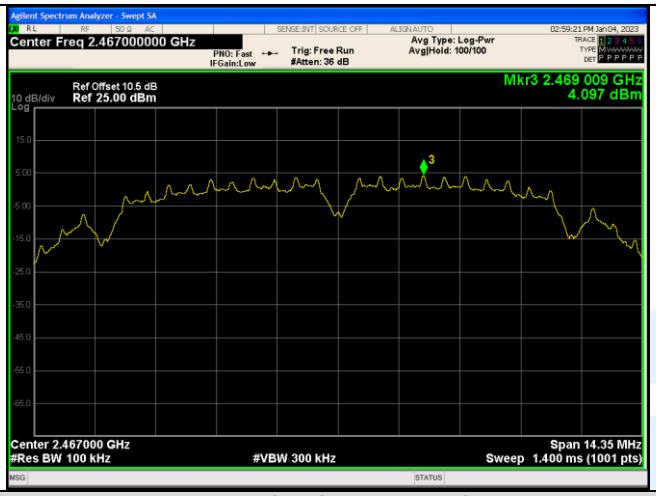
In-Band Reference Level
IEEE 802.11b_Channel 11_20MHz_Antenna 0



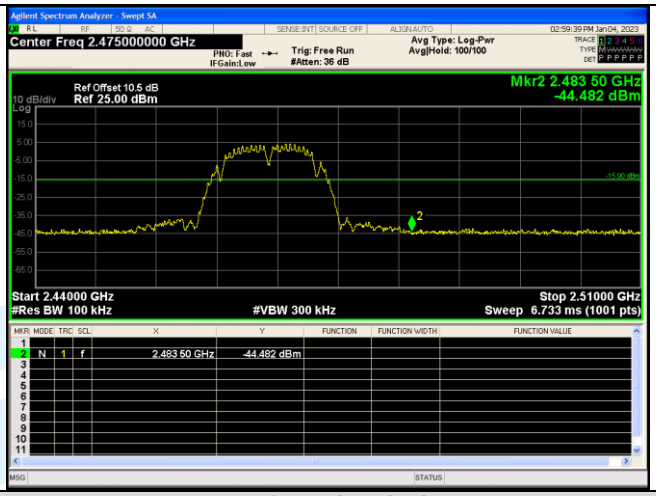
Out Of Band Emission
IEEE 802.11b_Channel 11_20MHz_Antenna 0



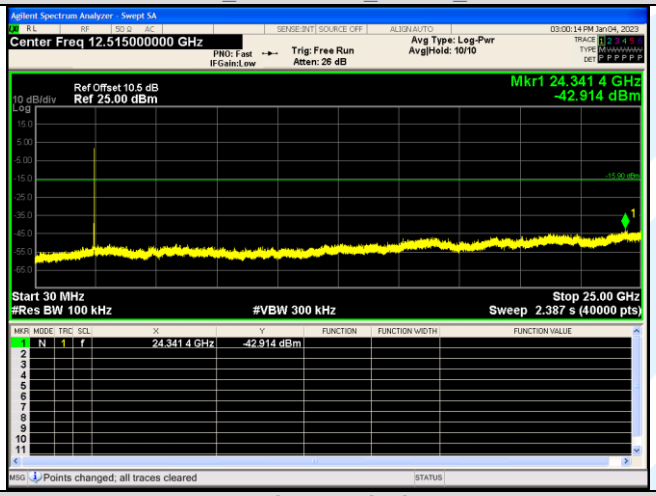
Spurious Emission
IEEE 802.11b_Channel 11_20MHz_Antenna 0



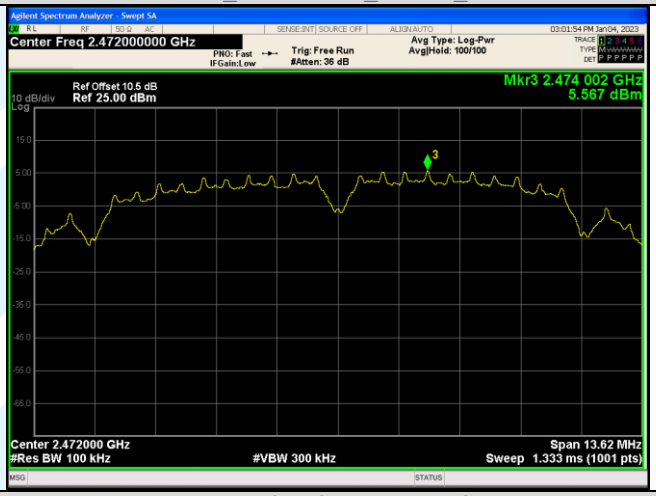
In-Band Reference Level
IEEE 802.11b_Channel 12_20MHz_Antenna 0



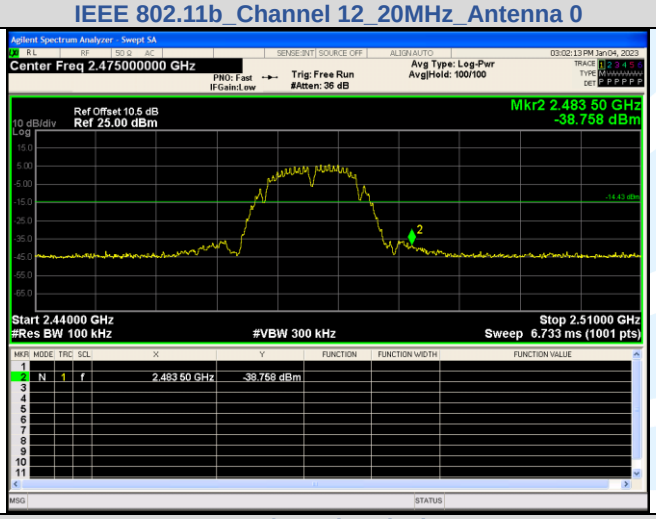
Out Of Band Emission
IEEE 802.11b_Channel 12_20MHz_Antenna 0



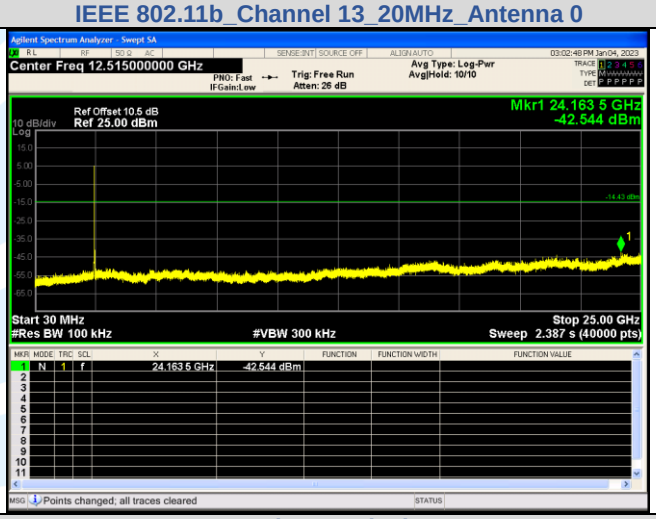
Spurious Emission
IEEE 802.11b_Channel 12_20MHz_Antenna 0



In-Band Reference Level
IEEE 802.11b_Channel 13_20MHz_Antenna 0



Out Of Band Emission
IEEE 802.11b_Channel 13_20MHz_Antenna 0



Spurious Emission
IEEE 802.11b_Channel 13_20MHz_Antenna 0