RF TEST REPORT

For

Shenzhen GuangShunMeng Technology Co., LTD.
Product Name: Dash Cam
Test Model(s).: A313

Report Reference No.	:	**DACE240429001RF001**
FCC ID	:	**2BGFW-A313**
Applicant's Name	:	Shenzhen GuangShunMeng Technology Co., LTD.
Address	:	Rm. 331, Bld.4, Xinghui Technology Industrial Park, 52 HuaNing Road, Dalang Street, Longhua District, Shenzhen.
Testing Laboratory	:	Shenzhen DACE Testing Technology Co., Ltd.
Address	:	101-102, H5 Building & floor 1, Building H, Hongfa Science and Technology Park, Tangtou, Shiyan, Bao'An District, Shenzhen, China
Test Specification Standard	:	**47 CFR Part 15.247** **ANSI C63.10-2013 & KDB 558074 D01 15.247 Meas Guidance v05r02**
Date of Receipt	:	April 29, 2024
Date of Test	:	April 29, 2024 to May 14, 2024
Data of Issue	:	May 14, 2024
Result	:	**Pass**

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Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	DACE240429001RF001	May 14, 2024

NOTE1:

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Compiled by:	Supervised by:	Approved by:
Keren Huang	Stone Yin	Tom Chen
Keren Huang / Test Engineer	Stone Yin / Project Engineer	Tom Chen / Manager

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

47 CFR Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

1.2 Summary of Test Result

Item	Method	Requirement	Result
Antenna requirement	/	47 CFR 15.203	Pass
Conducted Emission at AC power line	ANSI C63.10-2013 section 6.2	47 CFR 15.207(a)	N/A
Occupied Bandwidth	ANSI C63.10-2013, section 11.8	47 CFR 15.247(a)(2)	Pass
Maximum Conducted Output Power	ANSI C63.10-2013, section 11.9.1	47 CFR 15.247(b)(3)	Pass
Power Spectral Density	ANSI C63.10-2013, section 11.10	47 CFR 15.247(e)	Pass
Emissions in non-restricted frequency bands	ANSI C63.10-2013 section 11.11	47 CFR 15.247(d), 15.209, 15.205	Pass
Band edge emissions (Radiated)	ANSI C63.10-2013 section 6.10	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (below 1GHz)	ANSI C63.10-2013 section 6.6.4	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (above 1GHz)	ANSI C63.10-2013 section 6.6.4	47 CFR 15.247(d), 15.209, 15.205	Pass

Note: 1.N/A -this device(EUT) is not applicable to this testing item
2. RF-conducted test results including cable loss.

2 GENERAL INFORMATION

2.1 Client Information

Applicant's Name : Shenzhen GuangShunMeng Technology Co., LTD.
Address : Rm. 331, Bld.4, Xinghui Technology Industrial Park, 52 HuaNing Road, Dalang Street, Longhua District, Shenzhen.

Manufacturer : Shenzhen GuangShunMeng Technology Co., LTD.
Address : Rm. 331, Bld.4, Xinghui Technology Industrial Park, 52 HuaNing Road, Dalang Street, Longhua District, Shenzhen.

2.2 Description of Device (EUT)

Product Name:	Dash Cam
Model/Type reference:	A313
Series Model:	A311, A339, A341, A349, A394, A399, A994, V339, V349, V394, V399, V994
Model Difference:	There are multiple models of the product, and the difference between these models is the difference in appearance (camera position difference), but the PCB, BOM, etc. of the main board circuit and button circuit of the product are the same. Therefore, it is believed that the series model can be used, with the main test being A313
Trade Mark:	N/A
Product Description:	Dash Cam
Power Supply:	DC12.0V from Battery
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz; 802.11n(HT40): 2422MHz to 2452MHz
Number of Channels:	802.11b/g/n(HT20): 11 Channels; 802.11n(HT40): 7 Channels
Modulation Type:	802.11b: DSSS(CCK, DQPSK, DBPSK); 802.11g: OFDM(BPSK, QPSK, 16QAM, 64QAM); 802.11n(HT20 and HT40): OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type:	PCB ANTENNA
Antenna Gain:	2.16dBi
Hardware Version:	V0.5
Software Version:	V1.25

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz	/	

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	**Frequency (MHz)**	
	20MHz	40MHz

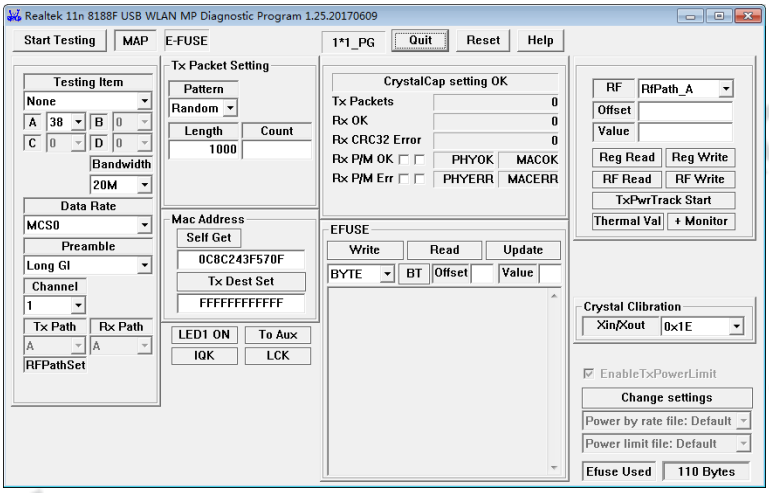
Lowest channel(L)	2412MHz	2422MHz
Middle channel(M)	2437MHz	2437MHz
Highest channel(H)	2462MHz	2452MHz

2.3 Description of Test Modes

No	Title	Description
TM1	802.11b mode	Keep the EUT in 802.11b transmitting mode.
TM2	802.11g mode	Keep the EUT in 802.11g transmitting mode.
TM3	802.11n(HT20) mode	Keep the EUT in 802.11n(HT20) transmitting mode.
TM4	802.11n(HT40) mode	Keep the EUT in 802.11n(HT40) transmitting mode.

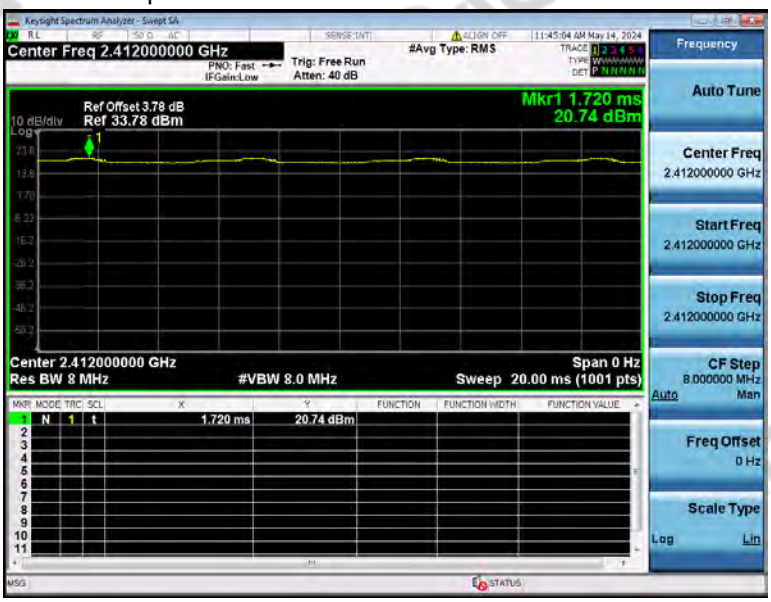
☒Special software is used.
☐Through engineering command into the engineering mode.
engineering command: *#*#3646633#*#*
☐Other method:

Special software:



Duty cycle:

Using the maximum continuous transmission signal, the duty cycle should reach 100% as much as possible.



2.4 Description of Support Units

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

Title	Manufacturer	Model No.	Serial No.
Battery	CAMEL	DC12V	/
/	/	/	/

2.5 Equipments Used During The Test

Emissions in non-restricted frequency bands
Occupied Bandwidth
Maximum Conducted Output Power
Power Spectral Density

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Test Software	TACHOY	RTS-01	V2.0.0.0	/	/
High Pass filter	ZHINAN	OQHPF1-M1.5-18G-224	6210075	/	/
Power divider	MIDEWEST	PWD-2533	SMA-79	2023-05-11	2026-05-10
RF Sensor Unit	Tachoy Information Technology(shen zhen) Co.,Ltd.	TR1029-2	000001	/	/
Wideband radio communication tester	R&S	CMW500	113410	2023-06-13	2024-06-12
Vector signal generator	Keysight	N5181A	MY48180415	2023-11-09	2024-11-08
Signal generator	Keysight	N5182A	MY50143455	2023-11-09	2024-11-08
Spectrum Analyzer	Keysight	N9020A	MY53420323	2023-12-12	2024-12-11

Band edge emissions (Radiated)
Emissions in frequency bands (below 1GHz)
Emissions in frequency bands (above 1GHz)

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test software	Farad	EZ -EMC	V1.1.42	/	/
Positioning Controller	/	MF-7802	/	/	/
High Pass filter	ZHINAN	OQHPF1-M1.5-18G-224	6210075	/	/
Amplifier(18-40G)	COM-POWER	AH-1840	10100008-1	2022-04-05	2025-04-04
Horn antenna	COM-POWER	AH-1840 (18-40G)	10100008	2023-04-05	2025-04-04
Loop antenna	ZHINAN	ZN30900C	ZN30900C	2021-07-05	2024-07-04
Cable(LF)#2	Schwarzbeck	/	/	2024-02-19	2025-02-18
Cable(LF)#1	Schwarzbeck	/	/	2024-02-19	2025-02-18
Cable(HF)#2	Schwarzbeck	AK9515E	96250	2024-03-20	2025-03-19
Cable(HF)#1	Schwarzbeck	SYV-50-3-1	/	2024-03-20	2025-03-19

Power amplifier(LF)	Schwarzbeck	BBV9743	9743-151	2023-06-13	2024-06-12
Power amplifier(HF)	Schwarzbeck	BBV9718	9718-282	2023-06-13	2024-06-12
Wideband radio communication tester	R&S	CMW500	113410	2023-06-13	2024-06-12
Spectrum Analyzer	R&S	FSP30	1321.3008K40-101729-jR	2023-06-14	2024-06-13
Horn Antenna	Sunol Sciences	DRH-118	A091114	2023-05-13	2025-05-12
Broadband Antenna	Sunol Sciences	JB6 Antenna	A090414	2023-05-21	2025-05-20
Test Receiver	R&S	ESCI	102109	2023-06-13	2024-06-12

2.6 Statement Of The Measurement Uncertainty

Test Item	**Measurement Uncertainty**
Conducted Disturbance (0.15~30MHz)	±3.41dB
Occupied Bandwidth	±3.63%
RF conducted power	±0.733dB
RF power density	±0.234%
Conducted Spurious emissions	±1.98dB
Radiated Emission (Above 1GHz)	±5.46dB
Radiated Emission (Below 1GHz)	±5.79dB
Note: (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

2.7 Identification of Testing Laboratory

Company Name:	Shenzhen DACE Testing Technology Co., Ltd.
Address:	101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252

Identification of the Responsible Testing Location

Company Name:	Shenzhen DACE Testing Technology Co., Ltd.
Address:	101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252
FCC Registration Number:	0032847402
Designation Number:	CN1342
Test Firm Registration No.:	778666
A2LA Certificate Number:	6270.01

2.8 Announcement

(1) The test report reference to the report template version v0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) This document may not be altered or revised in any way unless done so by DACE and all revisions are duly noted in the revisions section.

(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

(6) We hereby declare that the laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant. the laboratory is not responsible for the accuracy of the information provided by the client. When the information provided by the customer may affect the effectiveness of the results, the responsibility lies with the customer, and the laboratory does not assume any responsibility.

3 Evaluation Results (Evaluation)

3.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 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.

3.1.1 Conclusion:

4 Radio Spectrum Matter Test Results (RF)

4.1 Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator 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, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	

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

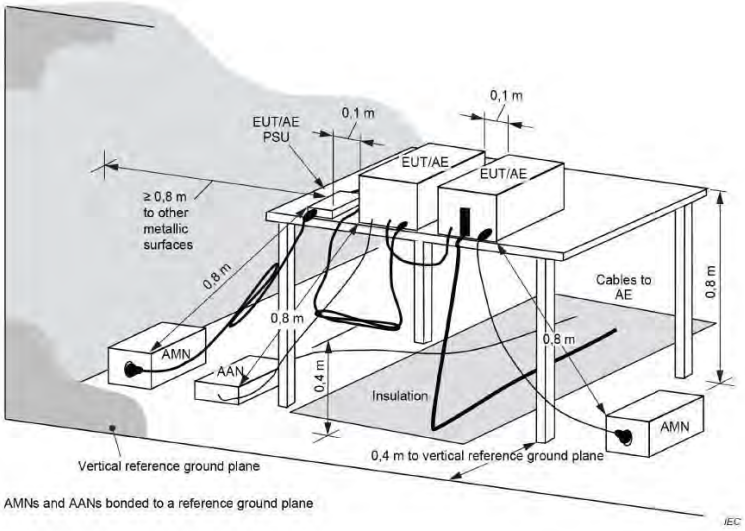
*Decreases with the logarithm of the frequency.

Test Method:	ANSI C63.10-2013 section 6.2
Procedure:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.1.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	46.6 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.1.2 Test Setup Diagram:



4.1.3 Test Data:

N/A

(not applicable to this test item,which is powered by DC12.0V battery.)

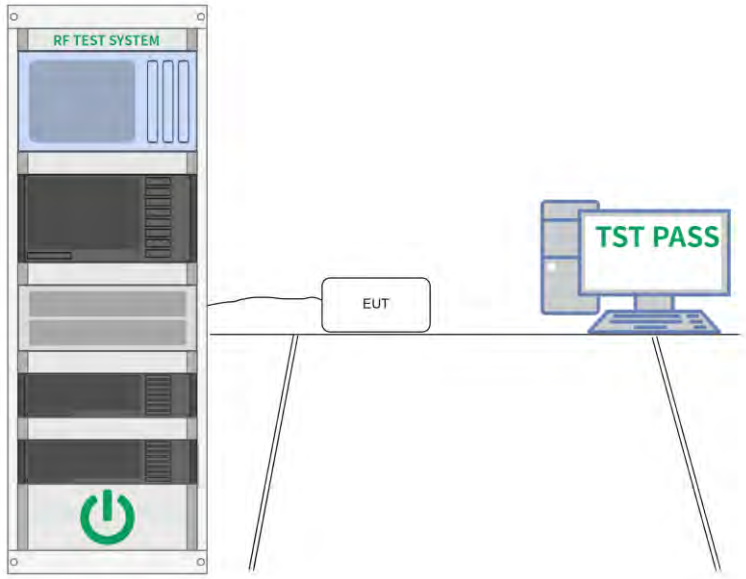
4.2 Occupied Bandwidth

Test Requirement:	47 CFR 15.247(a)(2)
Test Limit:	Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	ANSI C63.10-2013, section 11.8
Procedure:	a) Set RBW = 100 kHz. b) Set the VBW >= [3 × 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.

4.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	46.6 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1, TM2, TM3, TM4				

4.2.2 Test Setup Diagram:



4.2.3 Test Data:

Please Refer to Appendix for Details.

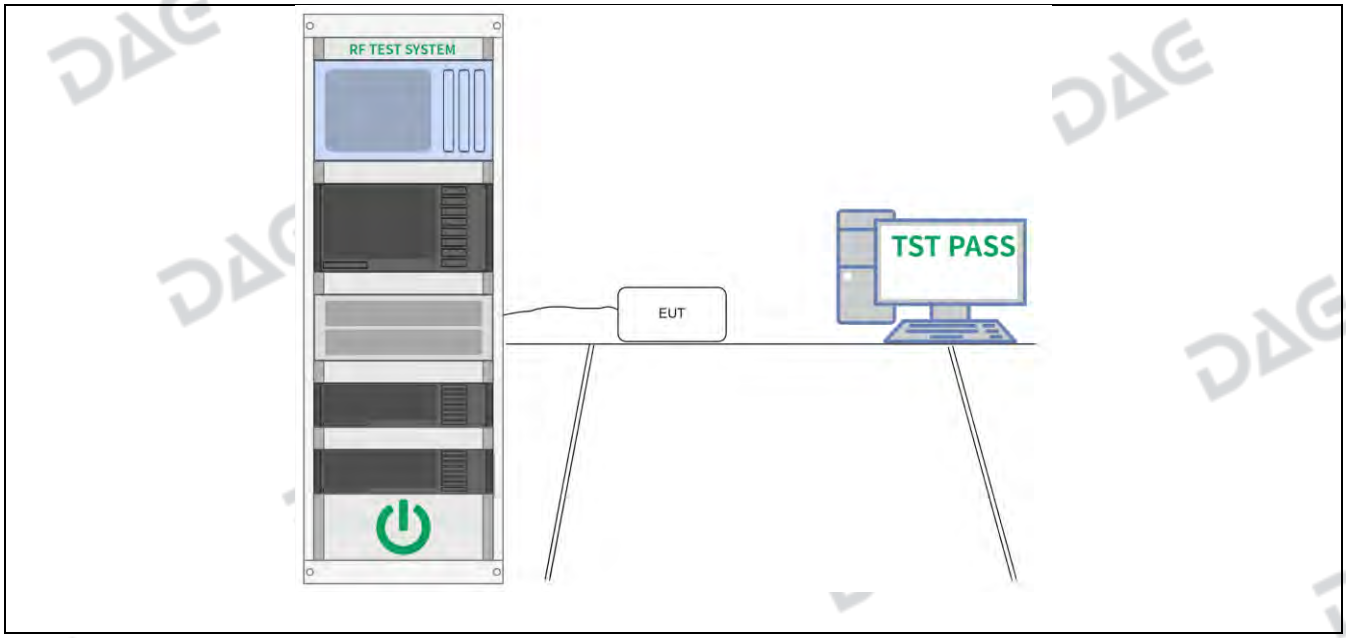
4.3 Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(3)
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	ANSI C63.10-2013, section 11.9.1
Procedure:	ANSI C63.10-2013, section 11.9.1 Maximum peak conducted output power Note: Per ANSI C63.10-2013, if there are two or more antnnas, the conducted powers at Core 0, Core 1,…, Core i were first measured separately, as shown in the section above(this product olny have one antenna). The measured values were then summed in linear power units then converted back to dBm. Per ANSI C63.10-2013 Section 14.4.3.2.3, the directional gain is calculated using the following formula, where GN is the gain of the nth antenna and NANT, the total number of antennas used. For correlated unequal antenna gain Directional gain = 10*log[(10G1/20 + 10G2/20 + … + 10GN/20)2 / NANT] dBi For completely uncorrelated unequal antenna gain Directional gain = 10*log[(10G1/10 + 10G2/10 + … + 10GN/10)/ NANT] dBi Sample Multiple antennas Calculation: Core 0 + Core 1 +…Core i. = MIMO/CDD (i is the number of antennas) (#VALUE! mW + mW) = #VALUE! mW = dBm Sample e.i.r.p. Calculation: e.i.r.p. (dBm) = Conducted Power (dBm) + Ant gain (dBi)

4.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	46.6 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1, TM2, TM3, TM4				

4.3.2 Test Setup Diagram:



4.3.3 Test Data:

Please Refer to Appendix for Details.

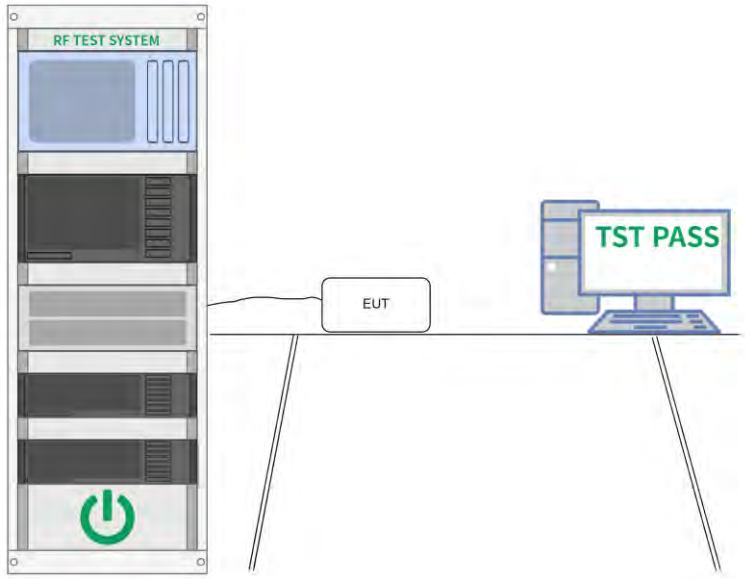
4.4 Power Spectral Density

Test Requirement:	47 CFR 15.247(e)
Test Limit:	Refer to 47 CFR 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	ANSI C63.10-2013, section 11.10
Procedure:	ANSI C63.10-2013, section 11.10, Maximum power spectral density level in the fundamental emission

4.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	46.6 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1, TM2, TM3, TM4				

4.4.2 Test Setup Diagram:



4.4.3 Test Data:

Please Refer to Appendix for Details.

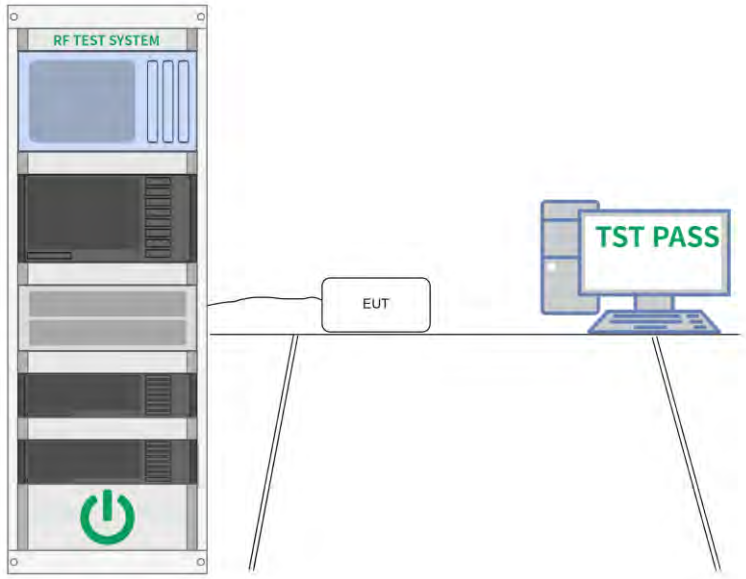
4.5 Emissions in non-restricted frequency bands

Test Requirement:	47 CFR 15.247(d), 15.209, 15.205
Test Limit:	Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Test Method:	ANSI C63.10-2013 section 11.11
Procedure:	ANSI C63.10-2013 Section 11.11.1, Section 11.11.2, Section 11.11.3

4.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	46.6 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1, TM2, TM3, TM4				

4.5.2 Test Setup Diagram:



4.5.3 Test Data:

Please Refer to Appendix for Details.

4.6 Band edge emissions (Radiated)

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Limit:	

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

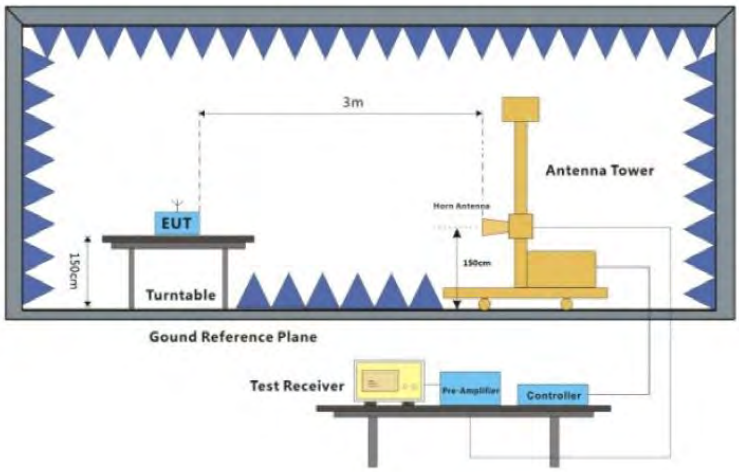
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method:	ANSI C63.10-2013 section 6.10
Procedure:	ANSI C63.10-2013 section 6.10.5.2

4.6.1 E.U.T. Operation:

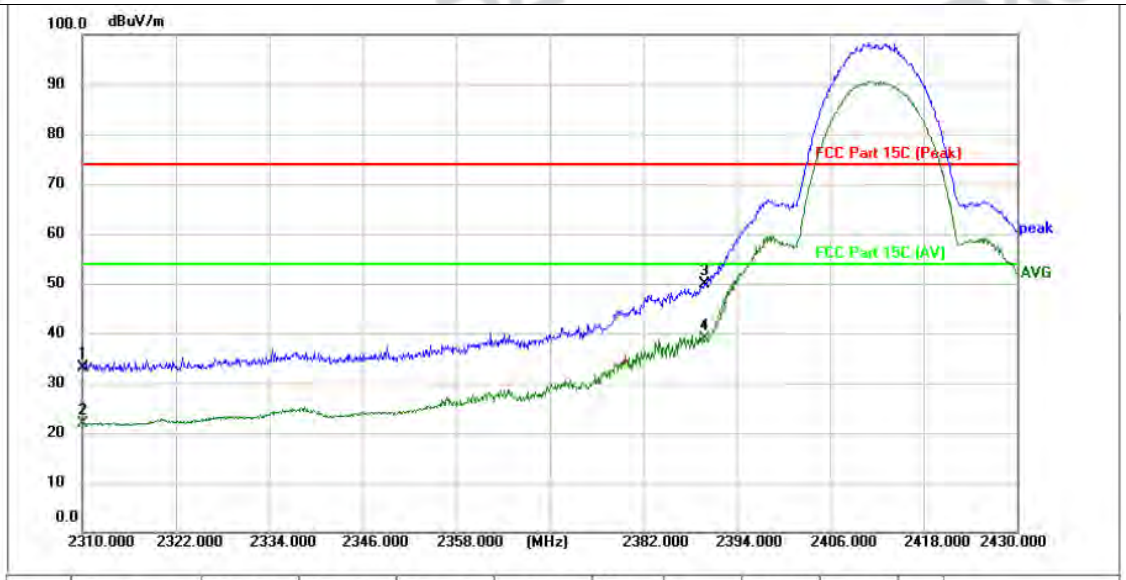
Operating Environment:					
Temperature:	23.2 °C	Humidity:	46.6 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1, TM2, TM3, TM4				

4.6.2 Test Setup Diagram:



4.6.3 Test Data:

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: L

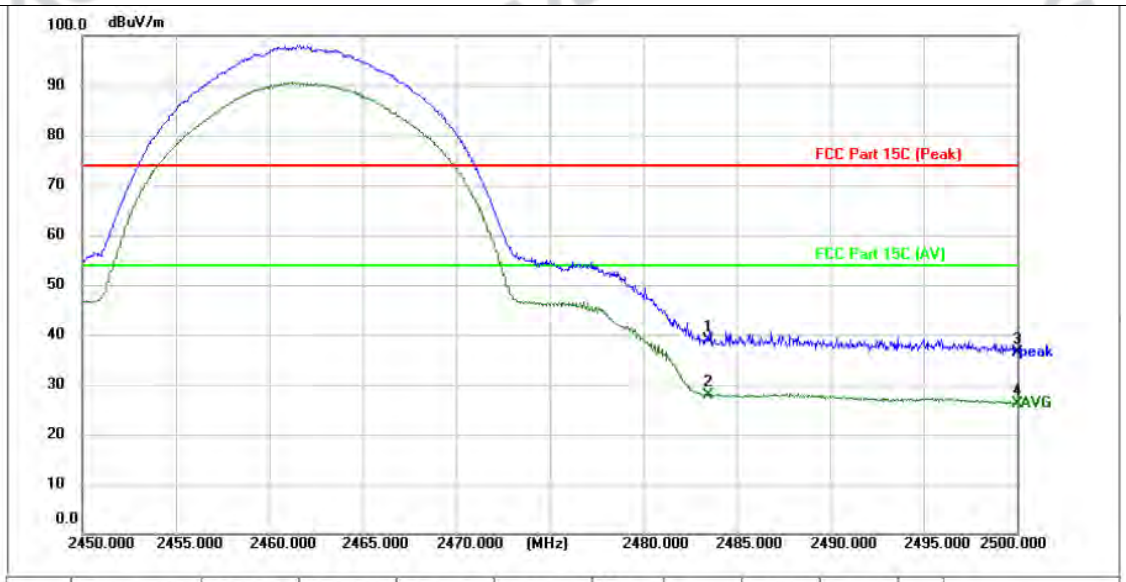


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	40.07	-6.93	33.14	74.00	-40.86	peak			P	
2	2310.000	28.70	-6.93	21.77	54.00	-32.23	AVG			P	
3	2390.000	56.55	-6.72	49.83	74.00	-24.17	peak			P	
4 *	2390.000	45.64	-6.72	38.92	54.00	-15.08	AVG			P	

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: L

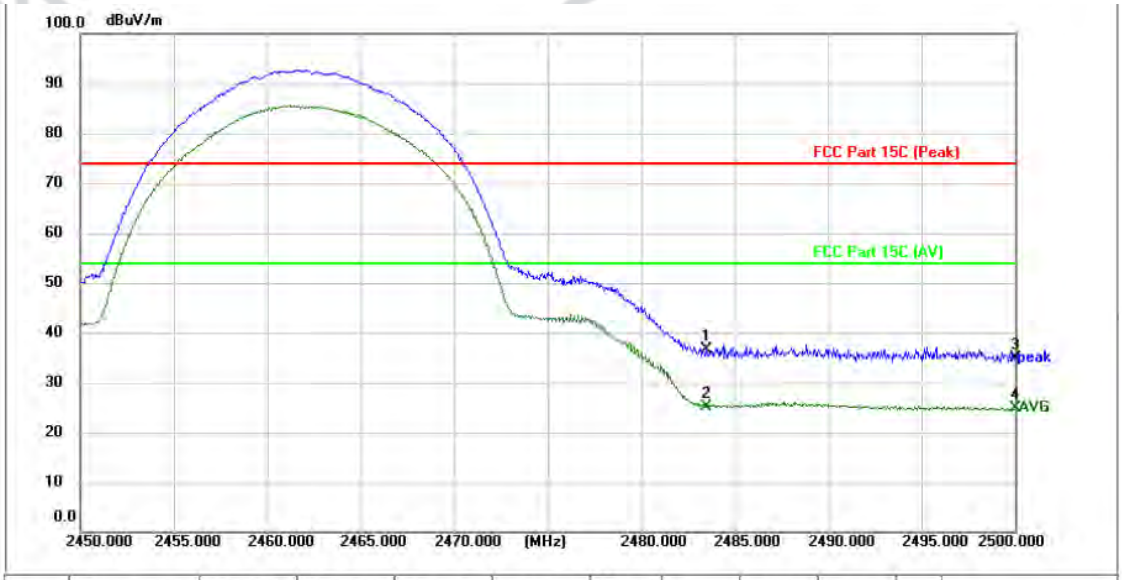
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	40.96	-8.23	32.73	74.00	-41.27	peak	150		P	
2	2310.000	29.55	-8.23	21.32	54.00	-32.68	AVG	150		P	
3	2390.000	54.33	-7.91	46.42	74.00	-27.58	peak	150		P	
4 *	2390.000	45.10	-7.91	37.19	54.00	-16.81	AVG	150		P	

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	45.27	-6.47	38.80	74.00	-35.20	peak	150		P	
2 *	2483.500	34.42	-6.47	27.95	54.00	-26.05	AVG	150		P	
3	2500.000	42.85	-6.43	36.42	74.00	-37.58	peak	150		P	
4	2500.000	32.54	-6.43	26.11	54.00	-27.89	AVG	150		P	

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	44.07	-7.54	36.53	74.00	-37.47	peak	150		P	
2 *	2483.500	32.75	-7.54	25.21	54.00	-28.79	AVG	150		P	
3	2500.000	42.48	-7.48	35.00	74.00	-39.00	peak	150		P	
4	2500.000	32.30	-7.48	24.82	54.00	-29.18	AVG	150		P	

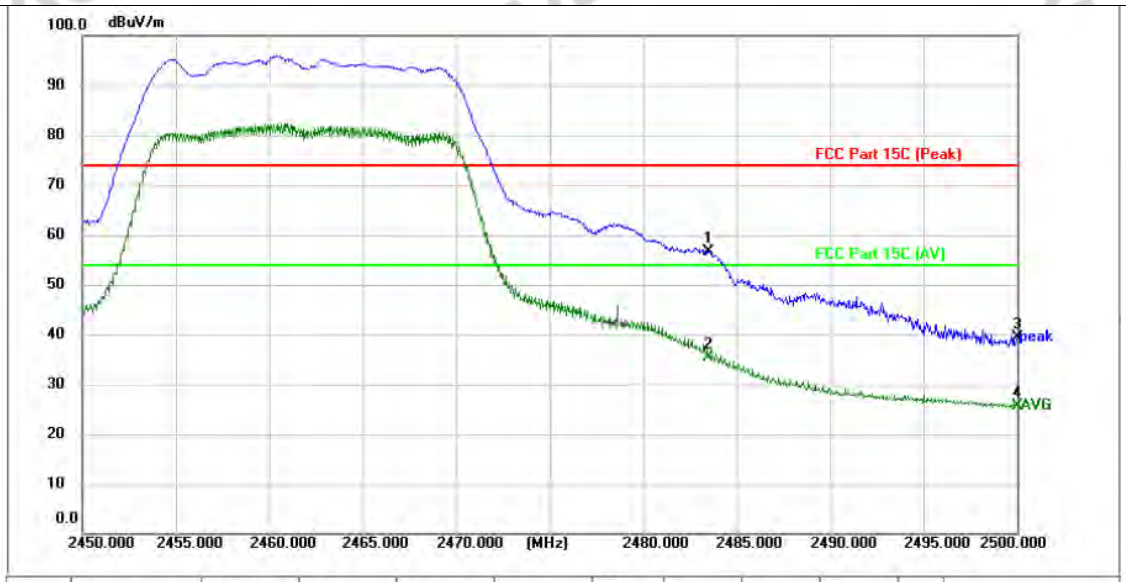
TM2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.44	-6.93	34.51	74.00	-39.49	peak	150		P	
2	2310.000	29.43	-6.93	22.50	54.00	-31.50	AVG	150		P	
3 *	2390.000	75.78	-6.72	69.06	74.00	-4.94	peak	150		P	
4	2390.000	53.71	-6.72	46.99	54.00	-7.01	AVG	150		P	

TM2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: L

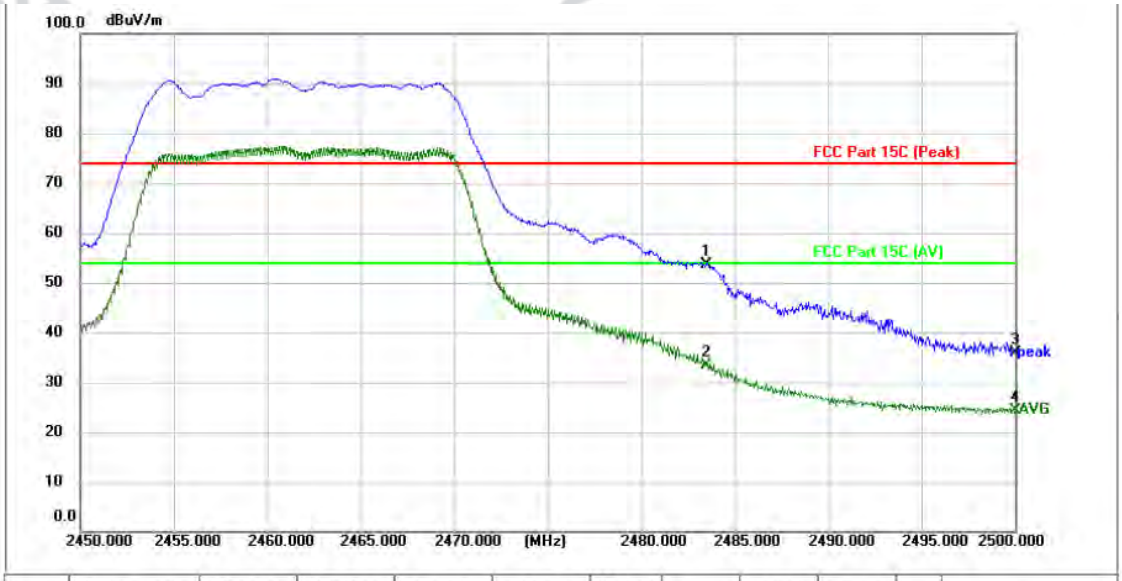
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.21	-8.23	32.98	74.00	-41.02	peak	150		P	
2	2310.000	29.66	-8.23	21.43	54.00	-32.57	AVG	150		P	
3 *	2390.000	72.67	-7.91	64.76	74.00	-9.24	peak	150		P	
4	2390.000	51.74	-7.91	43.83	54.00	-10.17	AVG	150		P	

TM2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2483.500	62.98	-6.47	56.51	74.00	-17.49	peak	150		P	
2	2483.500	41.96	-6.47	35.49	54.00	-18.51	AVG	150		P	
3	2500.000	45.93	-6.43	39.50	74.00	-34.50	peak	150		P	
4	2500.000	32.02	-6.43	25.59	54.00	-28.41	AVG	150		P	

TM2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2483.500	61.11	-7.54	53.57	74.00	-20.43	peak	150		P	
2	2483.500	40.91	-7.54	33.37	54.00	-20.63	AVG	150		P	
3	2500.000	43.42	-7.48	35.94	74.00	-38.06	peak	150		P	
4	2500.000	31.83	-7.48	24.35	54.00	-29.65	AVG	150		P	

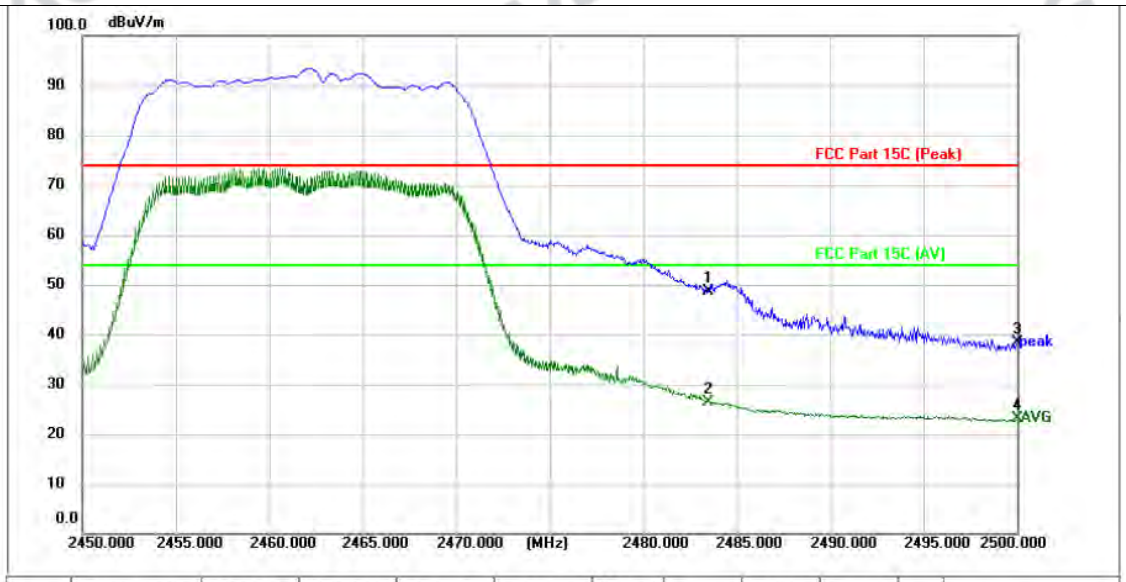
TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.20	-6.93	34.27	74.00	-39.73	peak	150		P	
2	2310.000	28.37	-6.93	21.44	54.00	-32.56	AVG	150		P	
3 *	2390.000	65.61	-6.72	58.89	74.00	-15.11	peak	150		P	
4	2390.000	37.63	-6.72	30.91	54.00	-23.09	AVG	150		P	

TM3 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: L

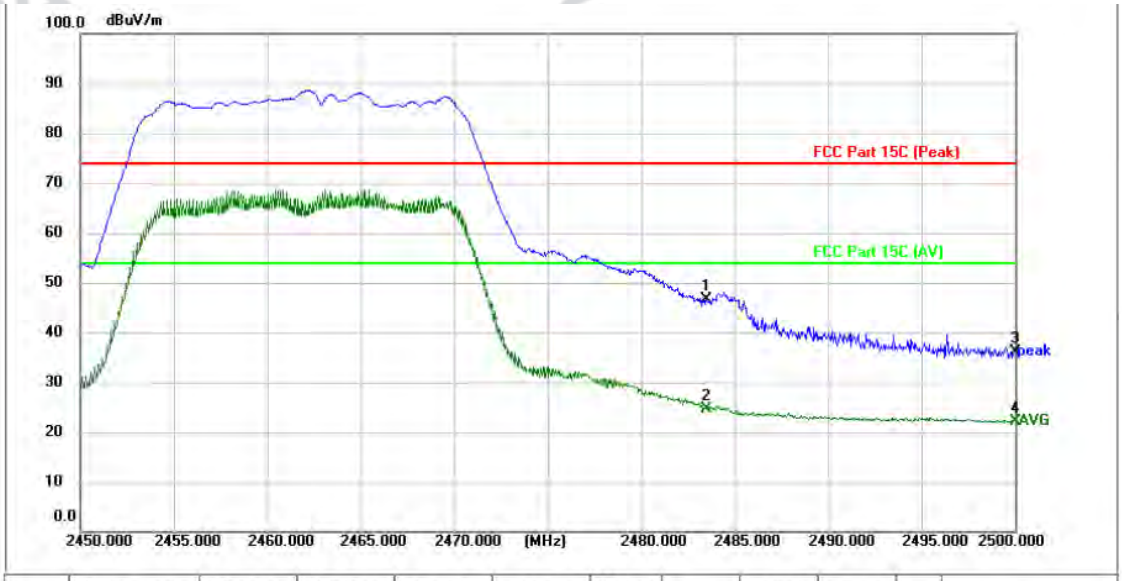
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	40.30	-8.23	32.07	74.00	-41.93	peak	150		P	
2	2310.000	29.01	-8.23	20.78	54.00	-33.22	AVG	150		P	
3 *	2390.000	63.04	-7.91	55.13	74.00	-18.87	peak	150		P	
4	2390.000	36.14	-7.91	28.23	54.00	-25.77	AVG	150		P	

TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2483.500	55.01	-6.47	48.54	74.00	-25.46	peak	150		P	
2	2483.500	32.97	-6.47	26.50	54.00	-27.50	AVG	150		P	
3	2500.000	44.82	-6.43	38.39	74.00	-35.61	peak	150		P	
4	2500.000	29.46	-6.43	23.03	54.00	-30.97	AVG	150		P	

TM3 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2483.500	54.05	-7.54	46.51	74.00	-27.49	peak	150		P	
2	2483.500	32.06	-7.54	24.52	54.00	-29.48	AVG	150		P	
3	2500.000	43.58	-7.48	36.10	74.00	-37.90	peak	150		P	
4	2500.000	29.67	-7.48	22.19	54.00	-31.81	AVG	150		P	

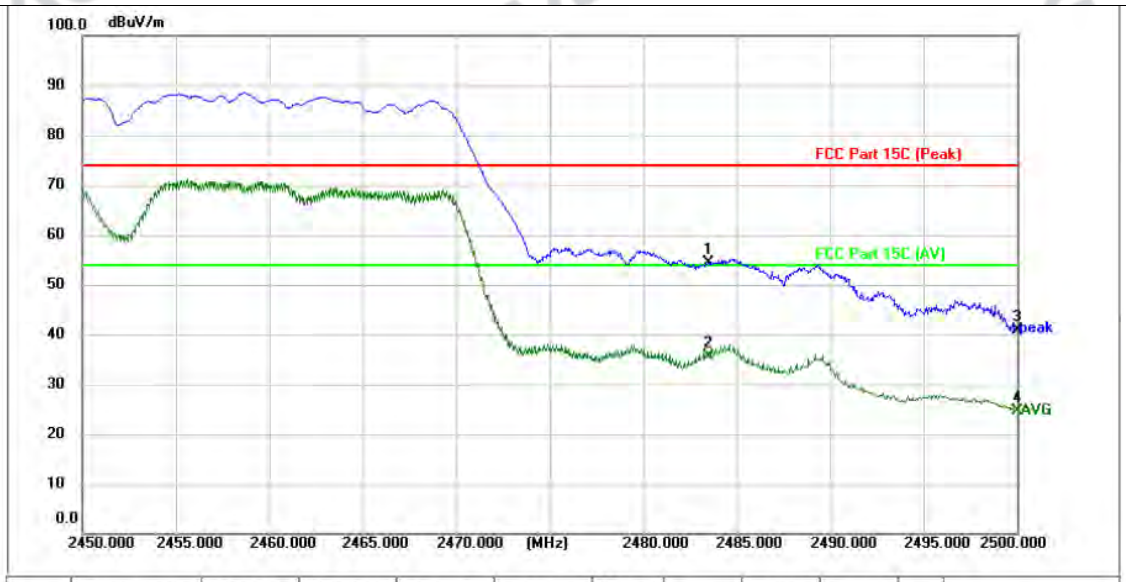
TM4 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 40 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.46	-6.93	34.53	74.00	-39.47	peak	150		P	
2	2310.000	28.84	-6.93	21.91	54.00	-32.09	AVG	150		P	
3	2390.000	62.06	-6.72	55.34	74.00	-18.66	peak	150		P	
4 *	2390.000	45.53	-6.72	38.81	54.00	-15.19	AVG	150		P	

TM4 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 40 / CH: L

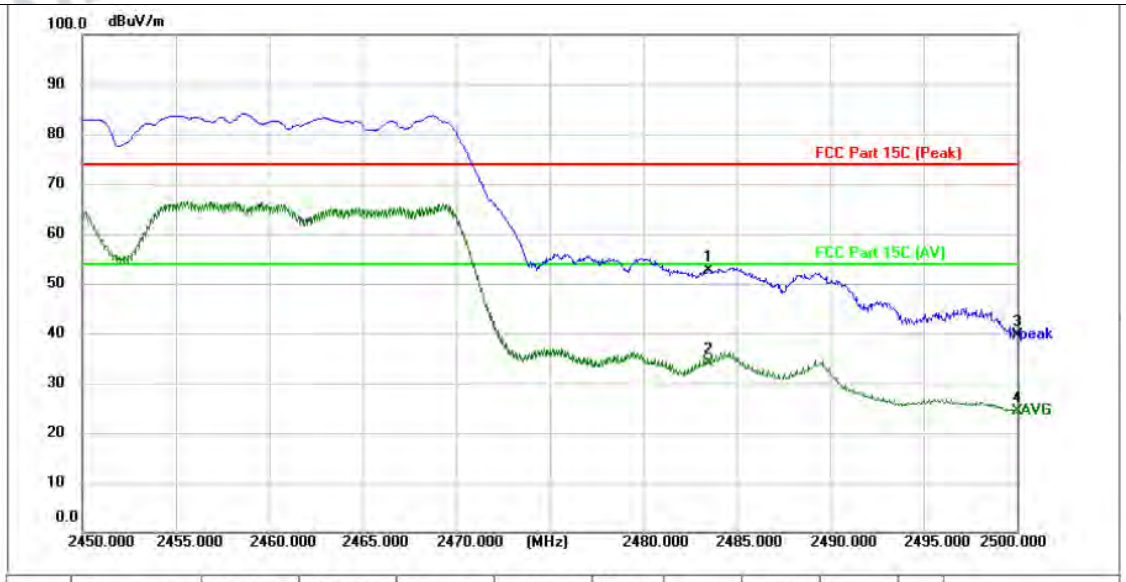
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	40.69	-8.23	32.46	74.00	-41.54	peak	150		P	
2	2310.000	29.13	-8.23	20.90	54.00	-33.10	AVG	150		P	
3	2390.000	59.20	-7.91	51.29	74.00	-22.71	peak	150		P	
4 *	2390.000	42.66	-7.91	34.75	54.00	-19.25	AVG	150		P	

TM4 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 40 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	60.77	-6.47	54.30	74.00	-19.70	peak	150		P	
2 *	2483.500	42.17	-6.47	35.70	54.00	-18.30	AVG	150		P	
3	2500.000	47.43	-6.43	41.00	74.00	-33.00	peak	150		P	
4	2500.000	31.13	-6.43	24.70	54.00	-29.30	AVG	150		P	

TM4 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 40 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	60.05	-7.54	52.51	74.00	-21.49	peak	150		P	
2 *	2483.500	41.57	-7.54	34.03	54.00	-19.97	AVG	150		P	
3	2500.000	47.01	-7.48	39.53	74.00	-34.47	peak	150		P	
4	2500.000	31.78	-7.48	24.30	54.00	-29.70	AVG	150		P	

1. Margin = Measurement Level - Limit ; Measurement Level=Test receiver reading + correction factor
2. The test software will only record the worst test angle and height, and only the worst case will be recorded in the test report.

4.7 Emissions in frequency bands (below 1GHz)

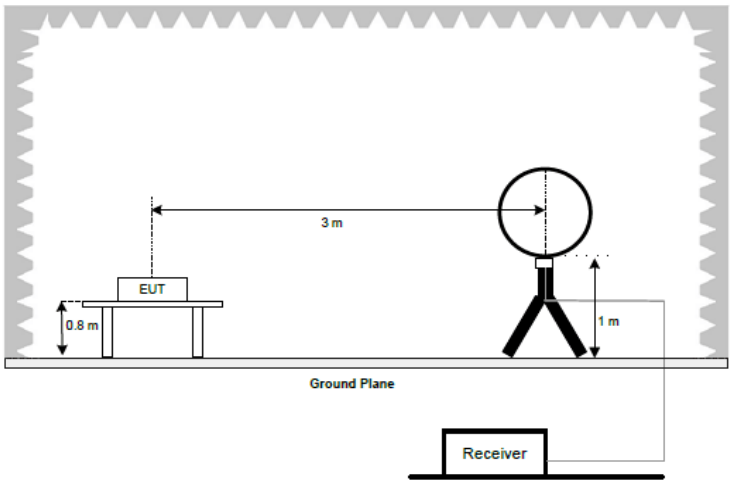
<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2013 section 6.6.4</td></tr>
<tr><td>Procedure:</td><td>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. 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.
e. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. 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.
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark:
1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.</td></tr>
</table>

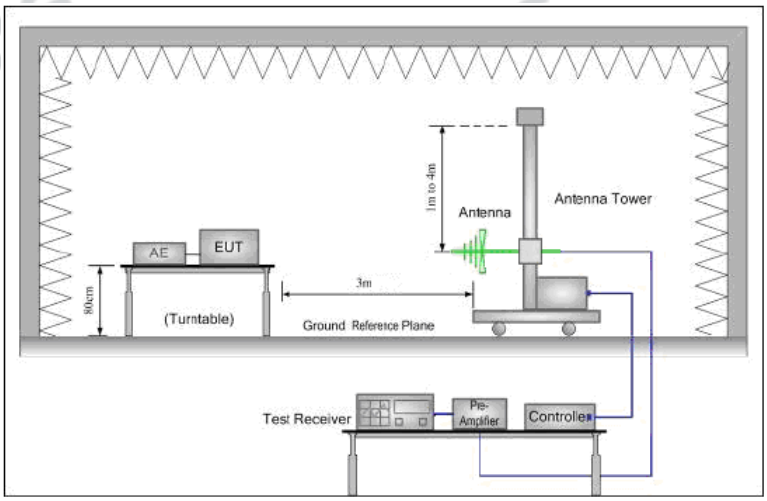
	2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Final Test Level =Receiver Reading + Antenna Factor + Cable Factor ¨C Preamplifier Factor 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. Fundamental frequency is blocked by filter, and only spurious emission is shown.

4.7.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	46.6 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM1(worse case)				

4.7.2 Test Setup Diagram:





4.7.3 Test Data:

Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Test Data: Between 30MHz – 1000MHz:

TM2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	185.7882	37.72	-3.07	34.65	43.50	-8.85	QP	100	283	P	
2	246.8149	38.23	-2.17	36.06	46.00	-9.94	QP	100	137	P	
3 *	263.8190	41.92	-1.34	40.58	46.00	-5.42	QP	100	164	P	
4 !	385.2805	38.83	1.49	40.32	46.00	-5.68	QP	100	55	P	
5	729.3583	28.68	5.74	34.42	46.00	-11.58	QP	100	231	P	
6	942.1305	24.24	8.89	33.13	46.00	-12.87	QP	100	66	P	

TM2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	86.5029	33.57	-6.57	27.00	40.00	-13.00	QP	100	319	P	
2 *	191.0738	39.96	-3.01	36.95	43.50	-6.55	QP	100	31	P	
3	245.9509	40.05	-2.19	37.86	46.00	-8.14	QP	100	25	P	
4	431.0316	37.02	1.22	38.24	46.00	-7.76	QP	100	76	P	
5	689.5644	29.94	4.84	34.78	46.00	-11.22	QP	100	205	P	
6	938.8326	25.00	8.76	33.76	46.00	-12.24	QP	100	96	P	

Remark: 1.Margin= Mesurement Level- Limit; Measurement Level=Test receiver reading + correction factor
2.The EMC test software will only record the worst test angle and height, and only the worst case will be record edin the test report.

4.8 Emissions in frequency bands (above 1GHz)

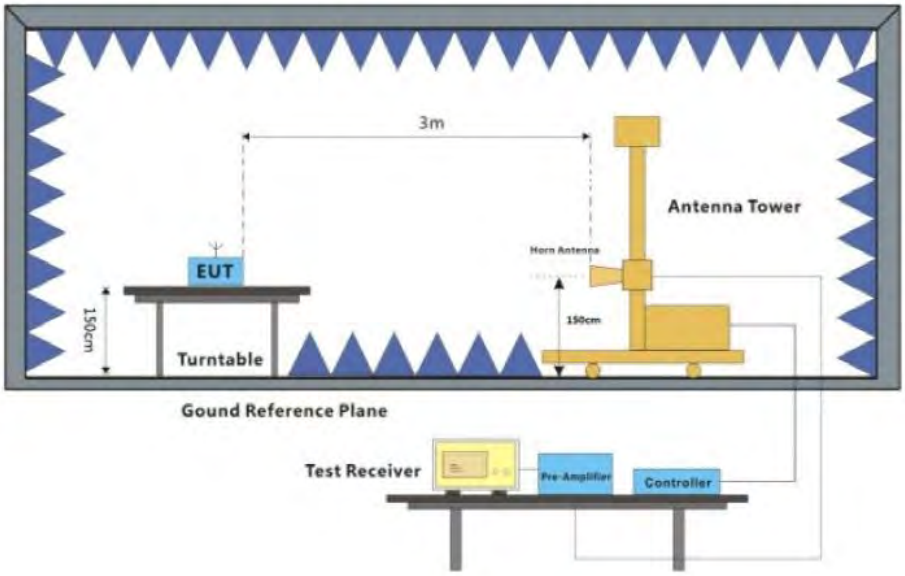
<table>
<tr><td>Test Requirement:</td><td>In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2013 section 6.6.4</td></tr>
<tr><td>Procedure:</td><td>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. 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.
e. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. 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.
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark:
1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor &</td></tr>
</table>

	Preamplifier. The basic equation with a sample calculation is as follows: Final Test Level =Receiver Reading + Antenna Factor + Cable Factor ¨C Preamplifier Factor 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. Fundamental frequency is blocked by filter, and only spurious emission is shown.

4.8.1 E.U.T. Operation:

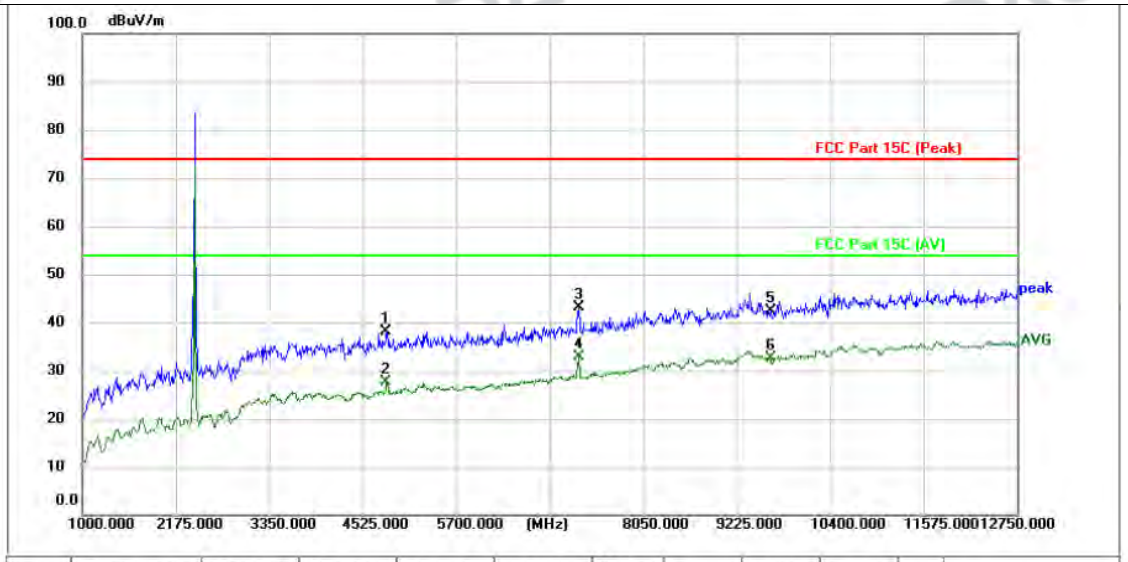
Operating Environment:					
Temperature:	23.2 °C	Humidity:	46.6 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1, TM2, TM3, TM4				
Final test mode:	TM2(worse case)				

4.8.2 Test Setup Diagram:



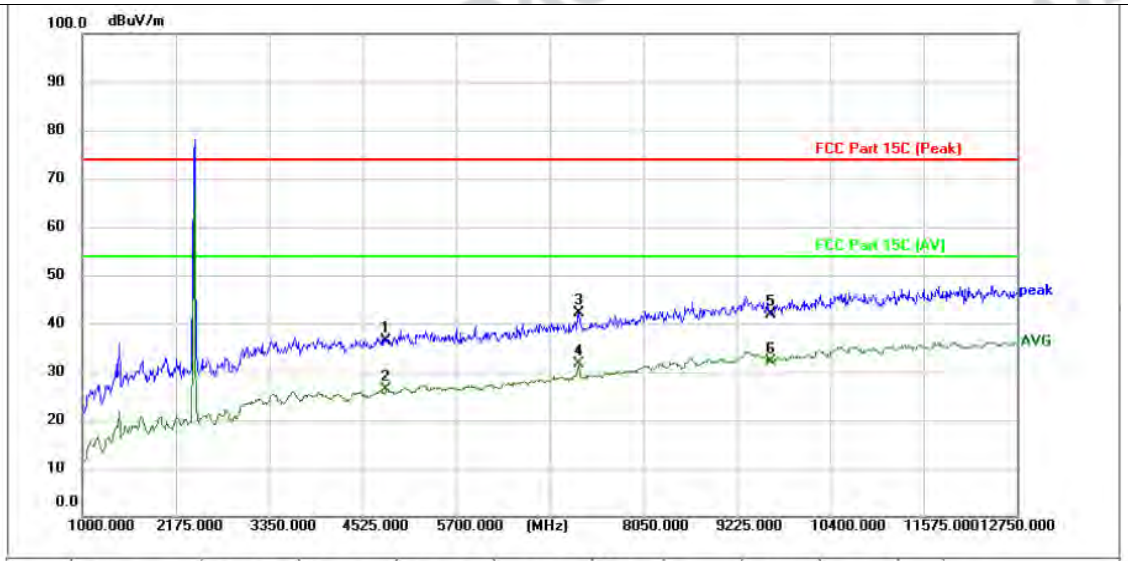
4.8.3 Test Data:

TM2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: L



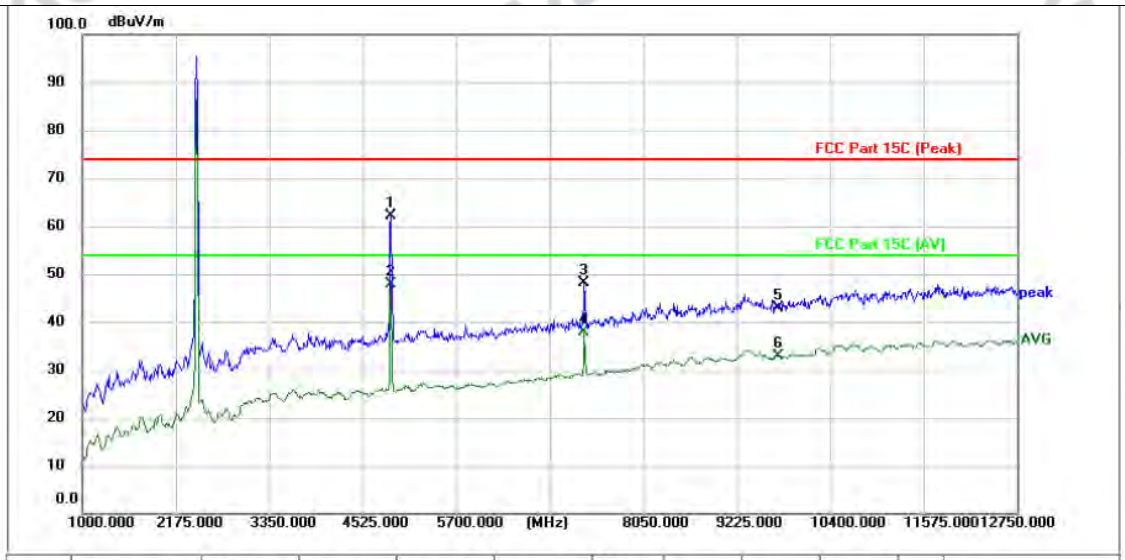
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4824.000	38.99	-0.84	38.15	74.00	-35.85	peak	150		P	
2	4824.000	28.47	-0.84	27.63	54.00	-26.37	AVG	150		P	
3	7239.250	38.98	4.17	43.15	74.00	-30.85	peak	150		P	
4 *	7239.250	28.66	4.17	32.83	54.00	-21.17	AVG	150		P	
5	9648.000	34.28	8.10	42.38	74.00	-31.62	peak	150		P	
6	9648.000	24.42	8.10	32.52	54.00	-21.48	AVG	150		P	

TM2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: L



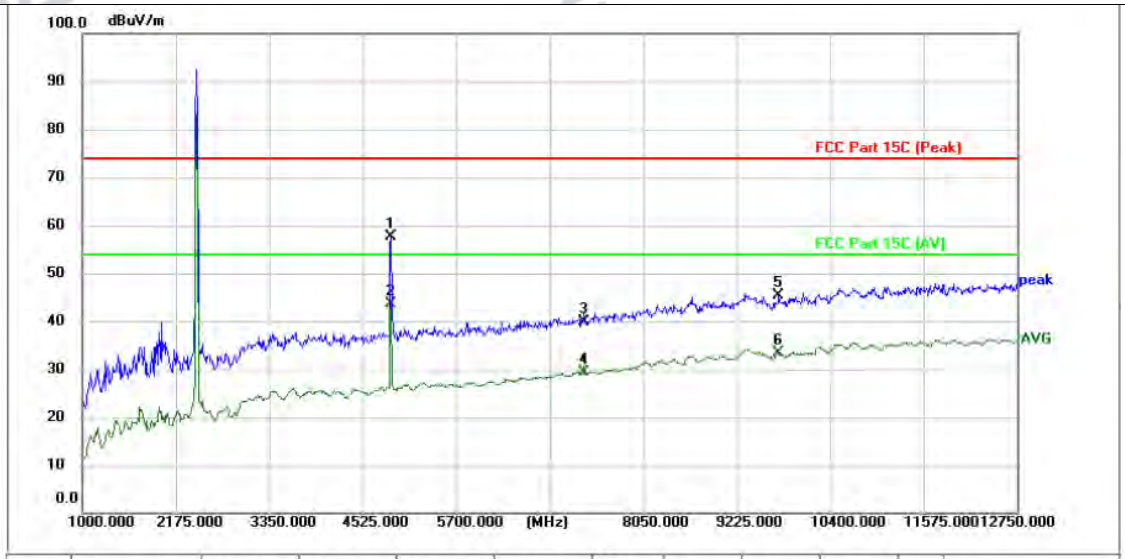
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4824.000	36.67	-0.22	36.45	74.00	-37.55	peak	150		P	
2	4824.000	26.65	-0.22	26.43	54.00	-27.57	AVG	150		P	
3	7239.250	37.87	4.16	42.03	74.00	-31.97	peak	150		P	
4	7239.250	27.50	4.16	31.66	54.00	-22.34	AVG	150		P	
5	9648.000	33.74	8.05	41.79	74.00	-32.21	peak	150		P	
6 *	9648.000	23.99	8.05	32.04	54.00	-21.96	AVG	150		P	

TM2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: M



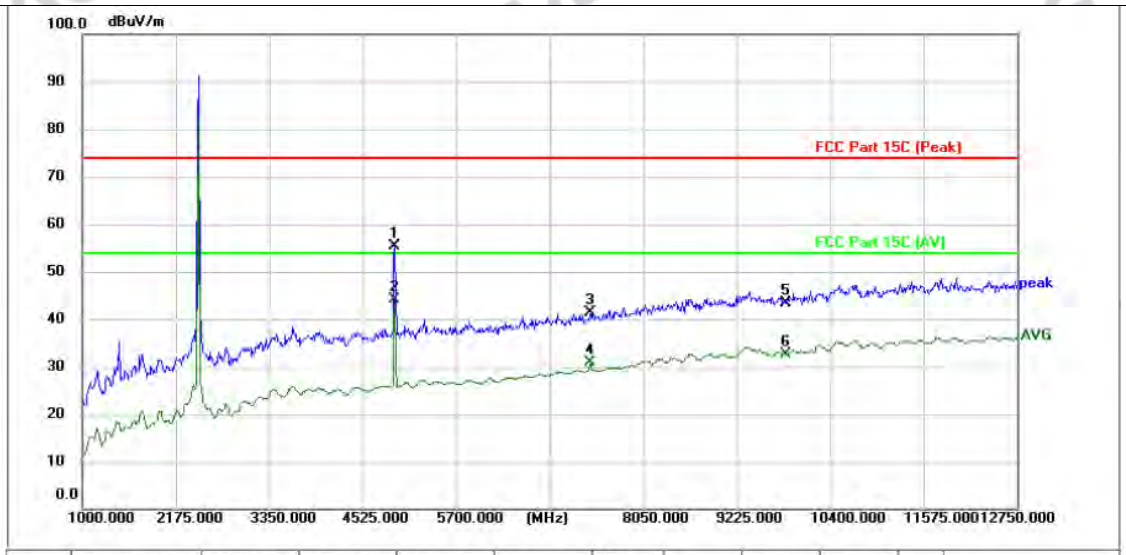
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4877.500	62.72	-0.65	62.07	74.00	-11.93	peak	150		P	
2 *	4877.500	48.54	-0.65	47.89	54.00	-6.11	AVG	150		P	
3	7309.750	43.92	4.29	48.21	74.00	-25.79	peak	150		P	
4	7309.750	33.48	4.29	37.77	54.00	-16.23	AVG	150		P	
5	9748.000	34.82	8.10	42.92	74.00	-31.08	peak	150		P	
6	9748.000	24.81	8.10	32.91	54.00	-21.09	AVG	150		P	

TM2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: M



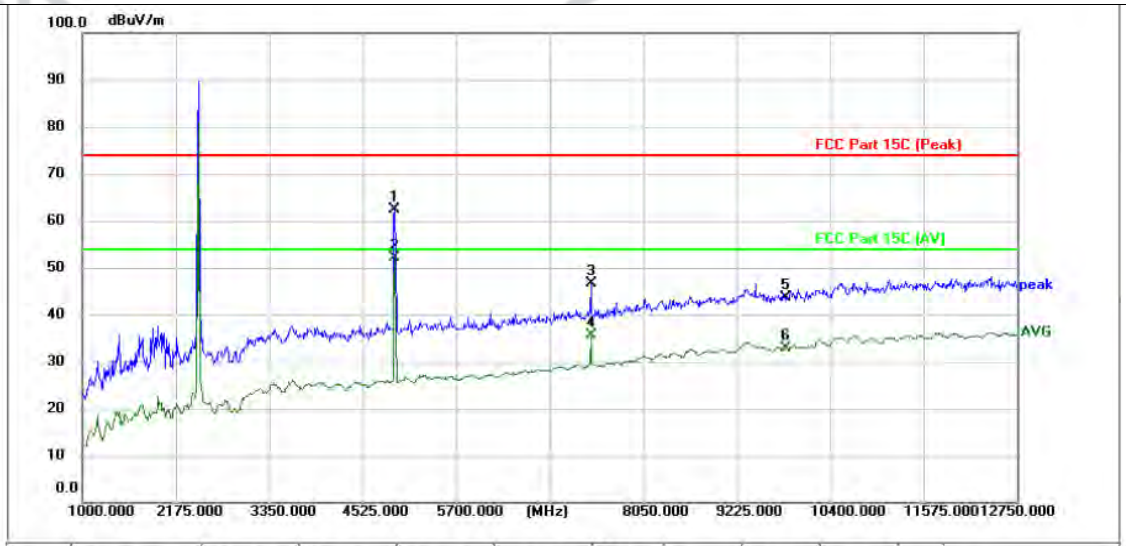
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4877.500	57.77	-0.04	57.73	74.00	-16.27	peak	150		P	
2 *	4877.500	43.79	-0.04	43.75	54.00	-10.25	AVG	150		P	
3	7311.000	35.64	4.34	39.98	74.00	-34.02	peak	150		P	
4	7311.000	25.05	4.34	29.39	54.00	-24.61	AVG	150		P	
5	9748.000	37.18	8.12	45.30	74.00	-28.70	peak	150		P	
6	9748.000	25.14	8.12	33.26	54.00	-20.74	AVG	150		P	

TM2 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 20 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4924.500	55.98	-0.50	55.48	74.00	-18.52	peak	150		P	
2 *	4924.500	44.67	-0.50	44.17	54.00	-9.83	AVG	150		P	
3	7386.000	36.94	4.41	41.35	74.00	-32.65	peak	150		P	
4	7386.000	26.35	4.41	30.76	54.00	-23.24	AVG	150		P	
5	9848.000	35.26	8.10	43.36	74.00	-30.64	peak	150		P	
6	9848.000	24.60	8.10	32.70	54.00	-21.30	AVG	150		P	

TM2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4924.500	62.22	0.11	62.33	74.00	-11.67	peak	150		P	
2 *	4924.500	51.96	0.11	52.07	54.00	-1.93	AVG	150		P	
3	7392.000	42.05	4.54	46.59	74.00	-27.41	peak	150		P	
4	7392.000	31.19	4.54	35.73	54.00	-18.27	AVG	150		P	
5	9848.000	35.40	8.19	43.59	74.00	-30.41	peak	150		P	
6	9848.000	24.74	8.19	32.93	54.00	-21.07	AVG	150		P	

Remark: 1.Margin= Level – Limit; Level=Test receiver reading + correction factor

2.The test software will only record the worst test angle and height, and only the worst case will be recorded in the test report.

5 TEST SETUP PHOTOS

Please Refer to test setup file for Details.

6 PHOTOS OF THE EUT

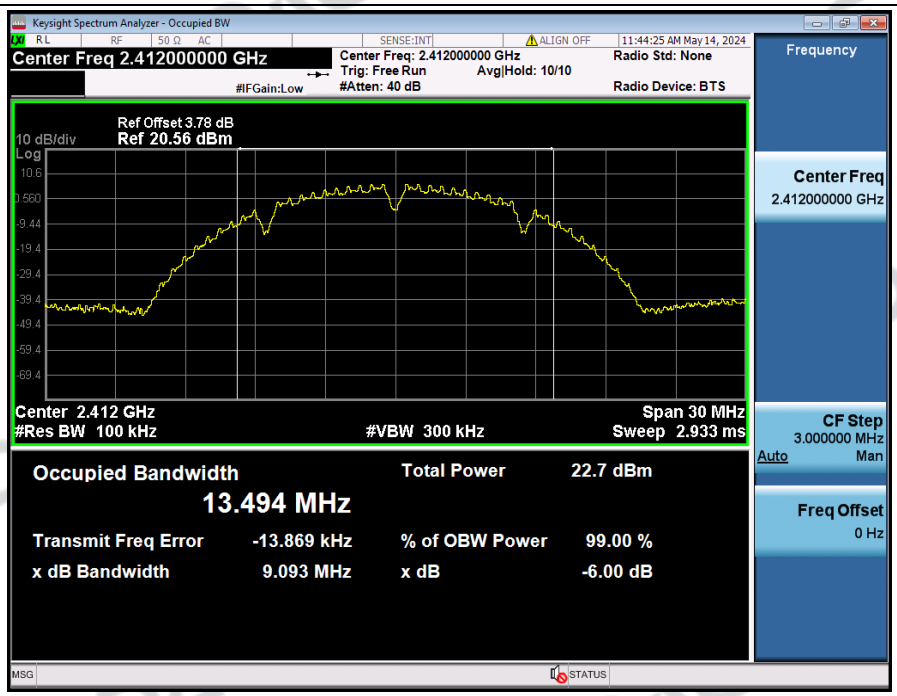
Please Refer to external photos file and internal photos file for Details.

Appendix

1. -6dB Bandwidth

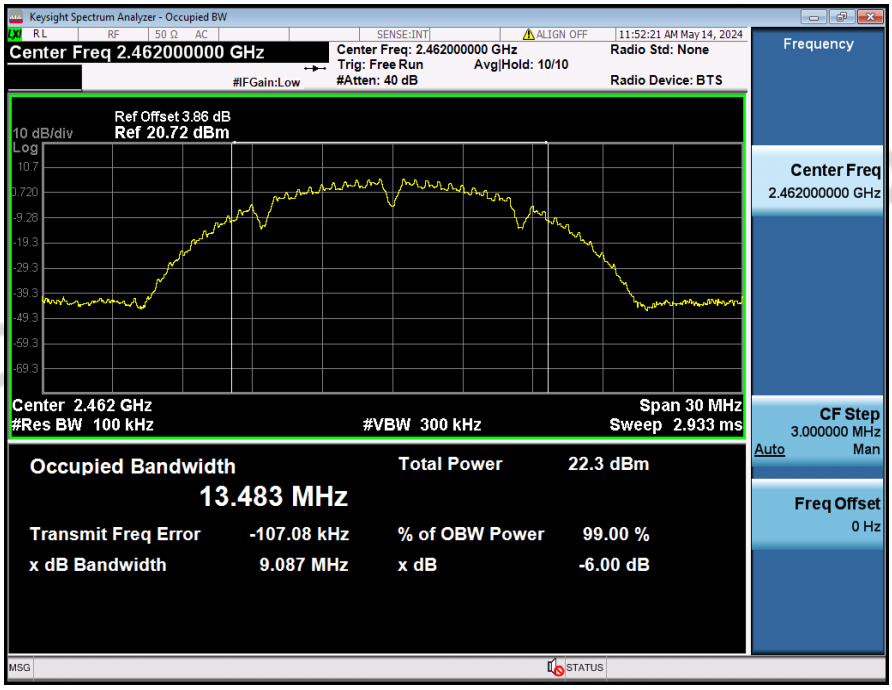
Condition	Antenna	Modulation	Frequency (MHz)	-6dB BW(MHz)	limit(kHz)	Result
NVNT	ANT1	802.11b	2412.00	9.09	500	Pass
NVNT	ANT1	802.11b	2437.00	9.09	500	Pass
NVNT	ANT1	802.11b	2462.00	9.09	500	Pass
NVNT	ANT1	802.11g	2412.00	16.55	500	Pass
NVNT	ANT1	802.11g	2437.00	16.55	500	Pass
NVNT	ANT1	802.11g	2462.00	16.55	500	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	17.81	500	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	17.80	500	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	17.80	500	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	36.50	500	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	36.51	500	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	36.52	500	Pass

-6dB_Bandwidth_NVNT_ANT1_802_11b_2412

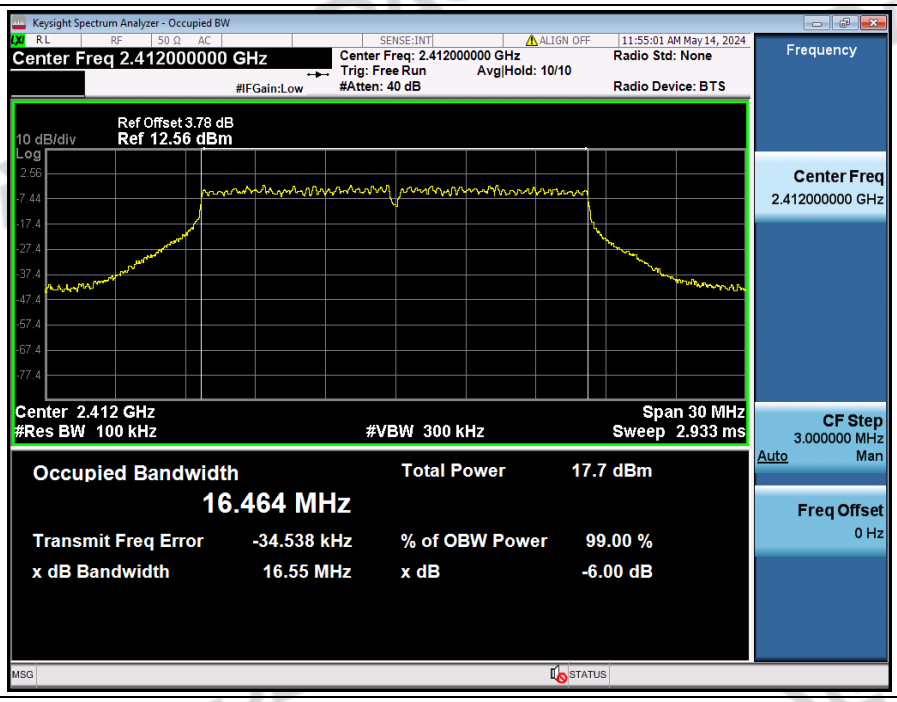


-6dB_Bandwidth_NVNT_ANT1_802_11b_2437

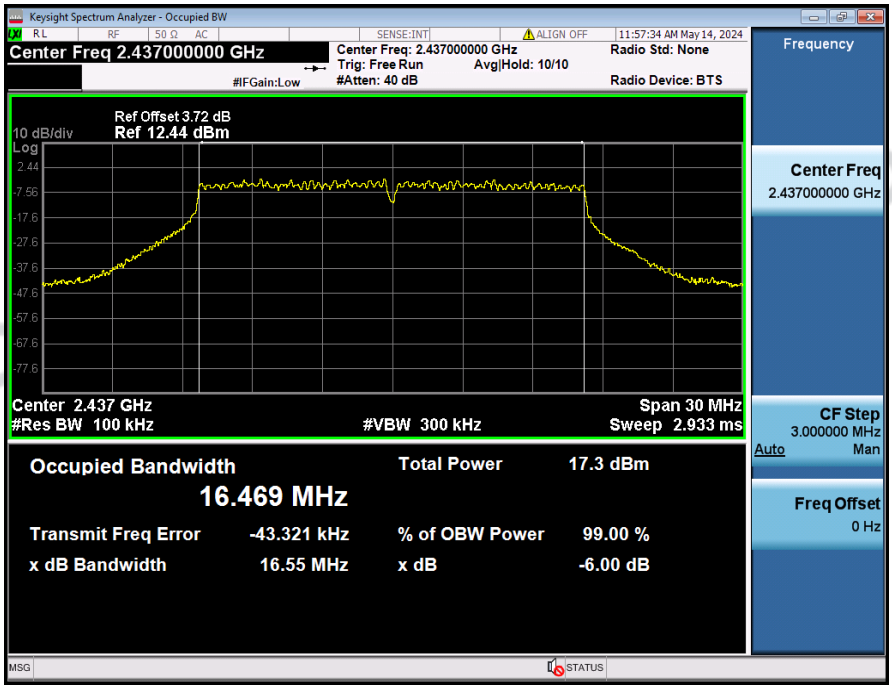
-6dB_Bandwidth_NVNT_ANT1_802_11b_2462



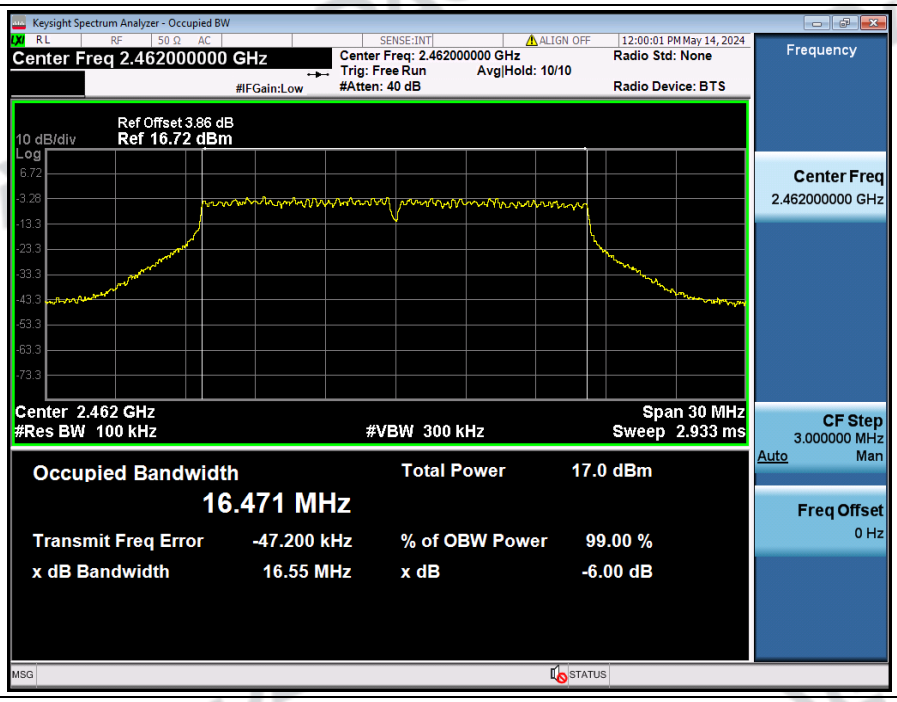
-6dB_Bandwidth_NVNT_ANT1_802_11g_2412



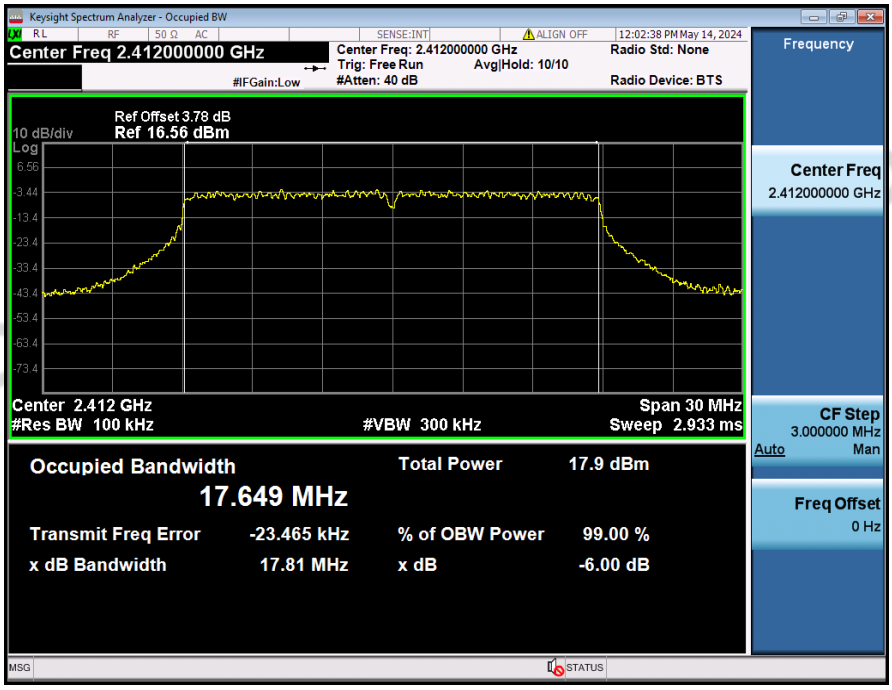
-6dB_Bandwidth_NVNT_ANT1_802_11g_2437



-6dB_Bandwidth_NVNT_ANT1_802_11g_2462

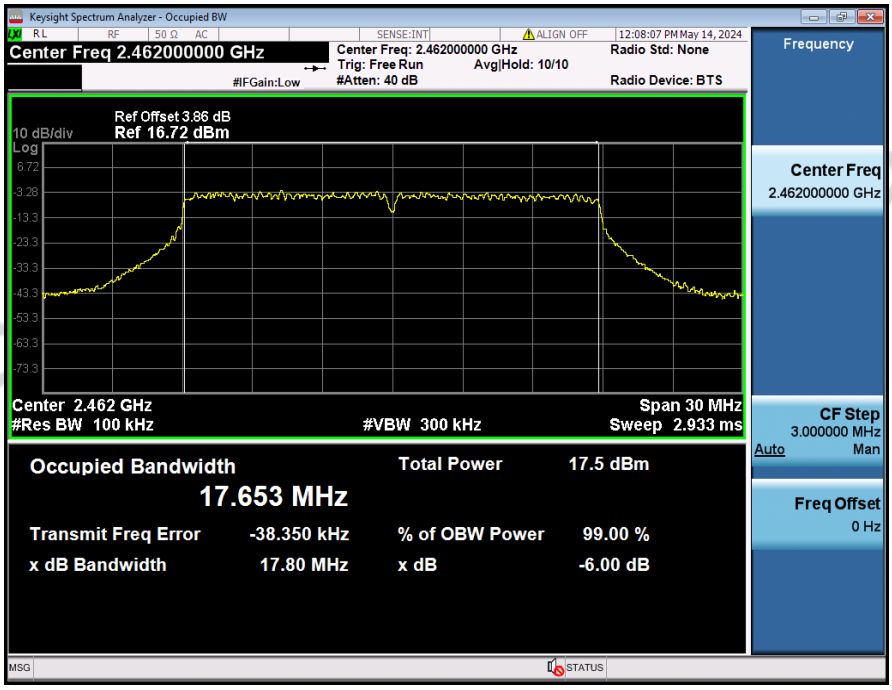


-6dB_Bandwidth_NVNT_ANT1_802_11n(HT20)_2412



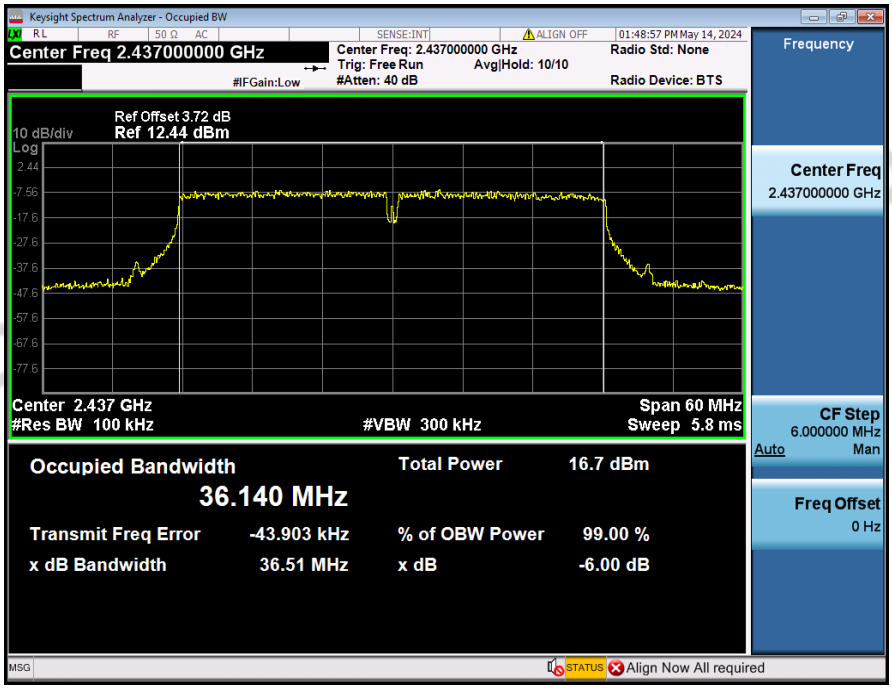
-6dB_Bandwidth_NVNT_ANT1_802_11n(HT20)_2437

-6dB_Bandwidth_NVNT_ANT1_802_11n(HT20)_2462

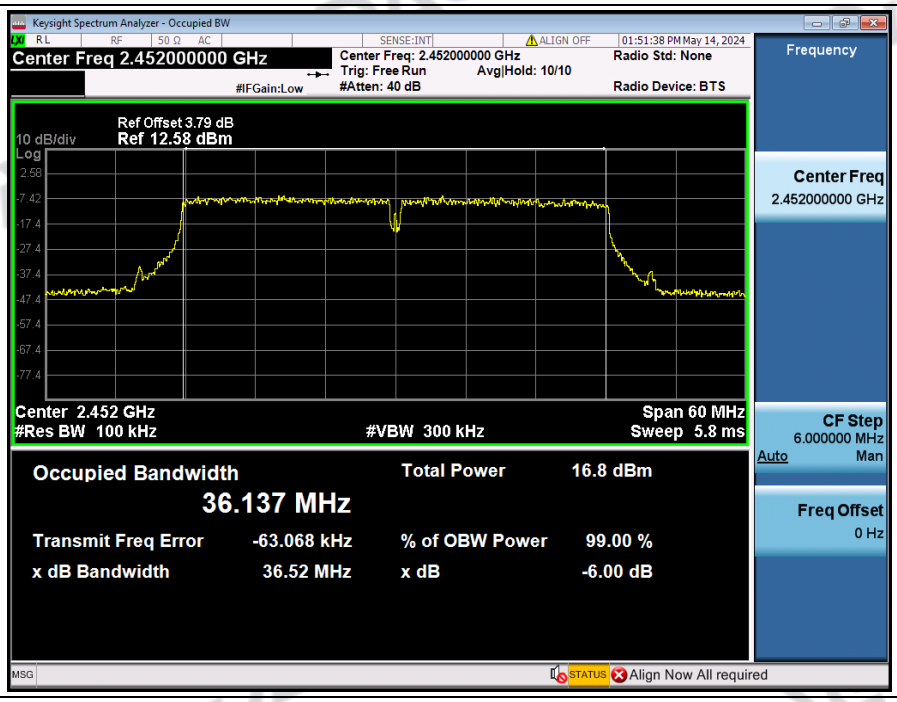


-6dB_Bandwidth_NVNT_ANT1_802_11n(HT40)_2422

-6dB_Bandwidth_NVNT_ANT1_802_11n(HT40)_2437



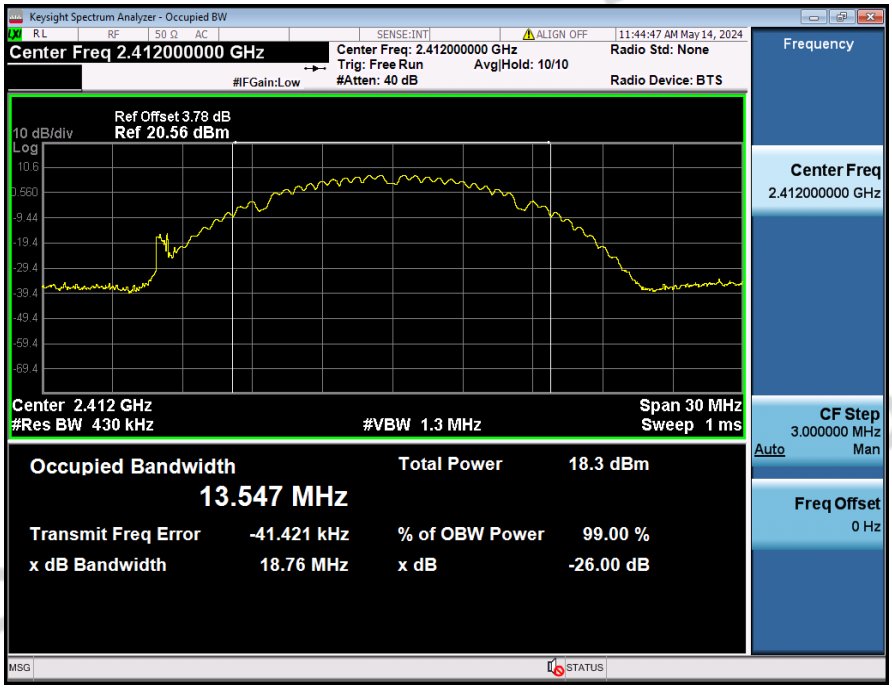
-6dB_Bandwidth_NVNT_ANT1_802_11n(HT40)_2452



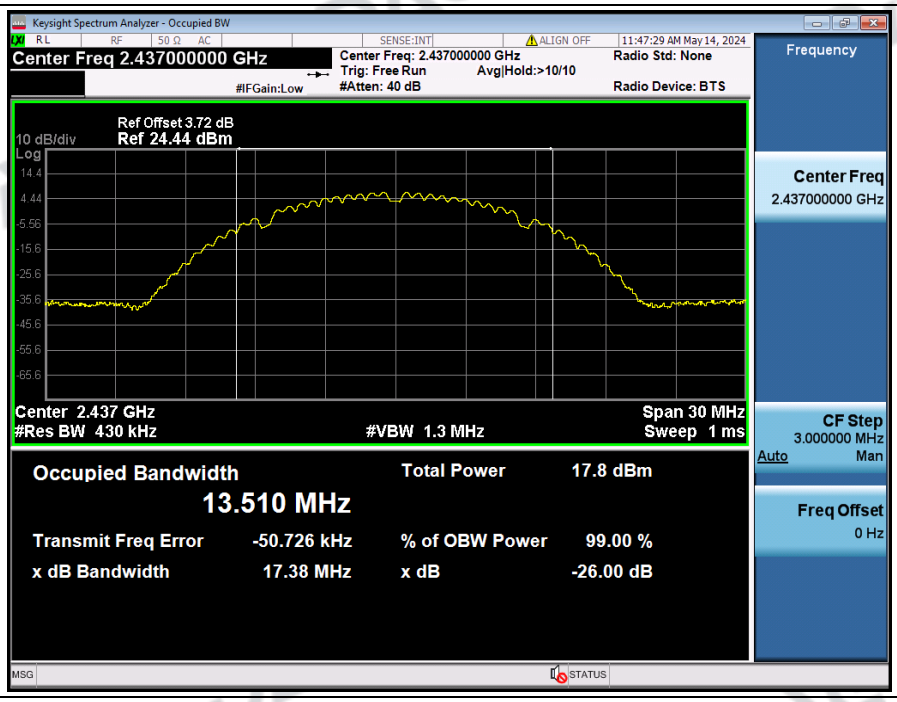
2. 99% Occupied Bandwidth

Condition	Antenna	Modulation	Frequency (MHz)	99%%BW(MHz)
NVNT	ANT1	802.11b	2412.00	13.547
NVNT	ANT1	802.11b	2437.00	13.510
NVNT	ANT1	802.11b	2462.00	13.500
NVNT	ANT1	802.11g	2412.00	17.018
NVNT	ANT1	802.11g	2437.00	17.038
NVNT	ANT1	802.11g	2462.00	17.043
NVNT	ANT1	802.11n(HT20)	2412.00	17.976
NVNT	ANT1	802.11n(HT20)	2437.00	17.983
NVNT	ANT1	802.11n(HT20)	2462.00	17.984
NVNT	ANT1	802.11n(HT40)	2422.00	36.588
NVNT	ANT1	802.11n(HT40)	2437.00	36.597
NVNT	ANT1	802.11n(HT40)	2452.00	36.598

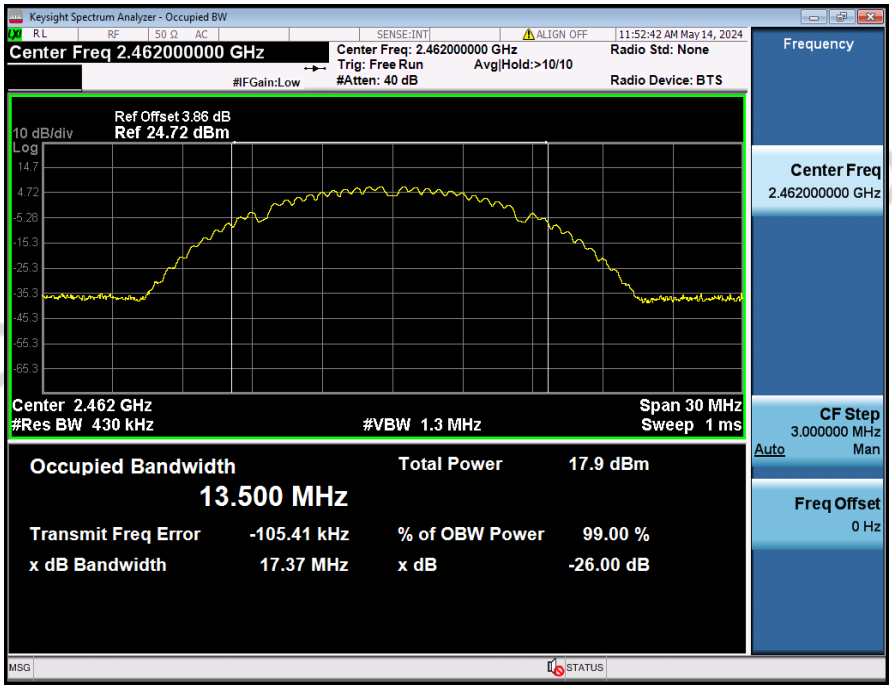
99%_Occupied_Bandwidth_NVNT_ANT1_802_11b_2412



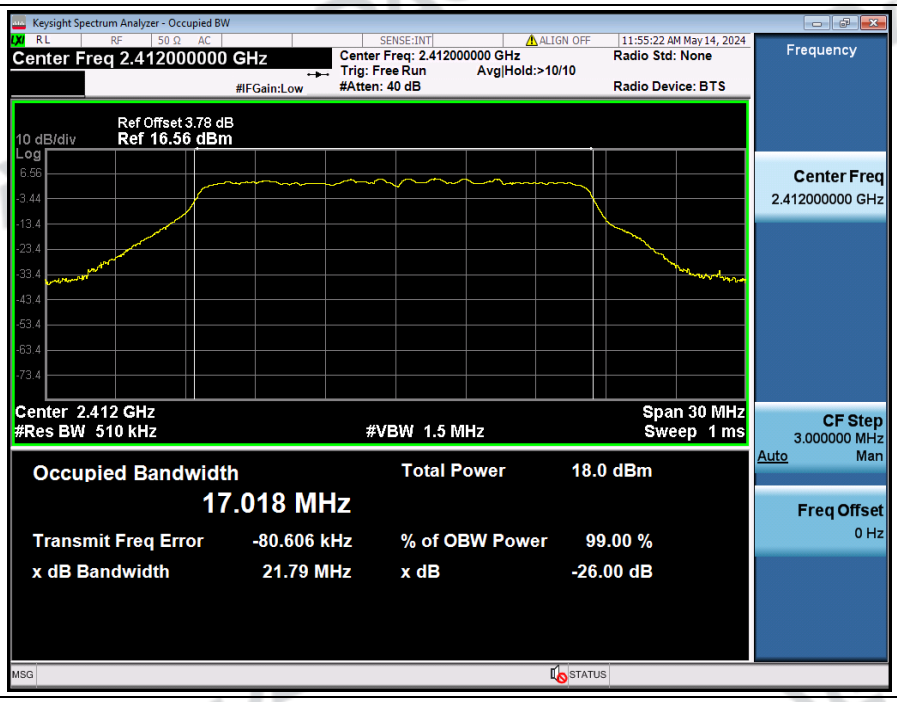
99%_Occupied_Bandwidth_NVNT_ANT1_802_11b_2437



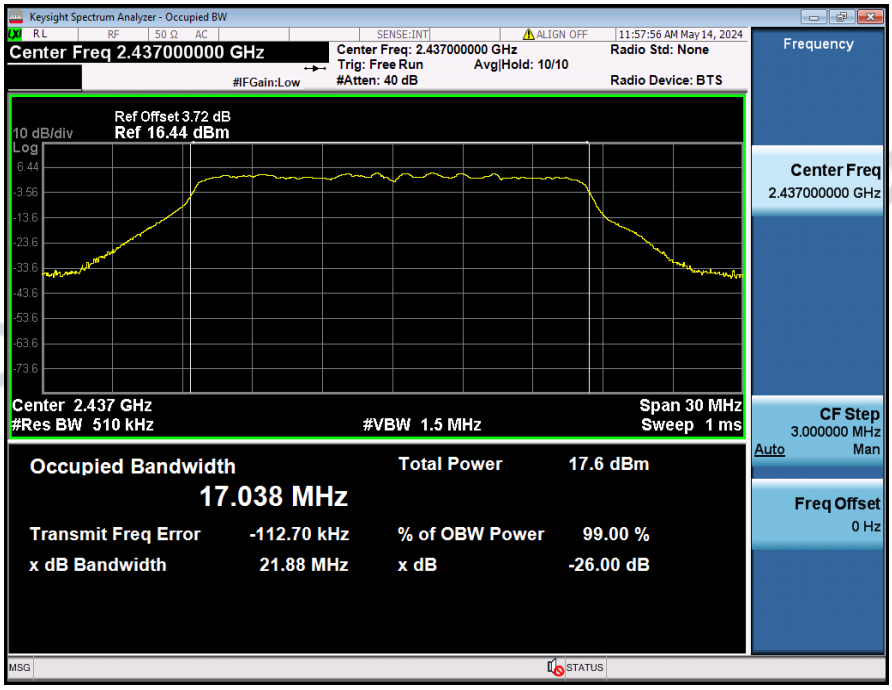
99%_Occupied_Bandwidth_NVNT_ANT1_802_11b_2462



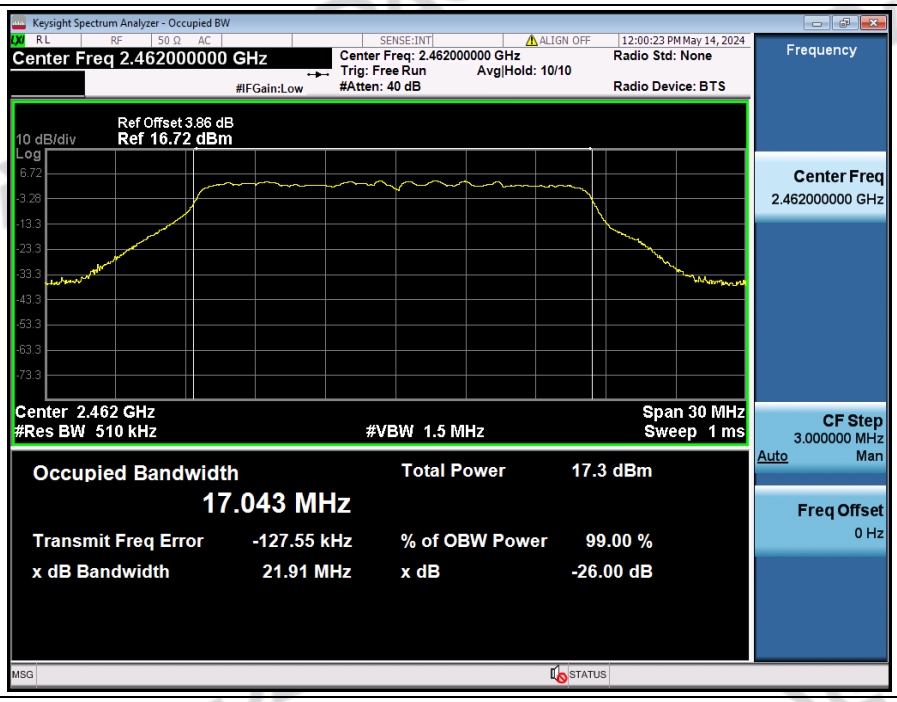
99%_Occupied_Bandwidth_NVNT_ANT1_802_11g_2412



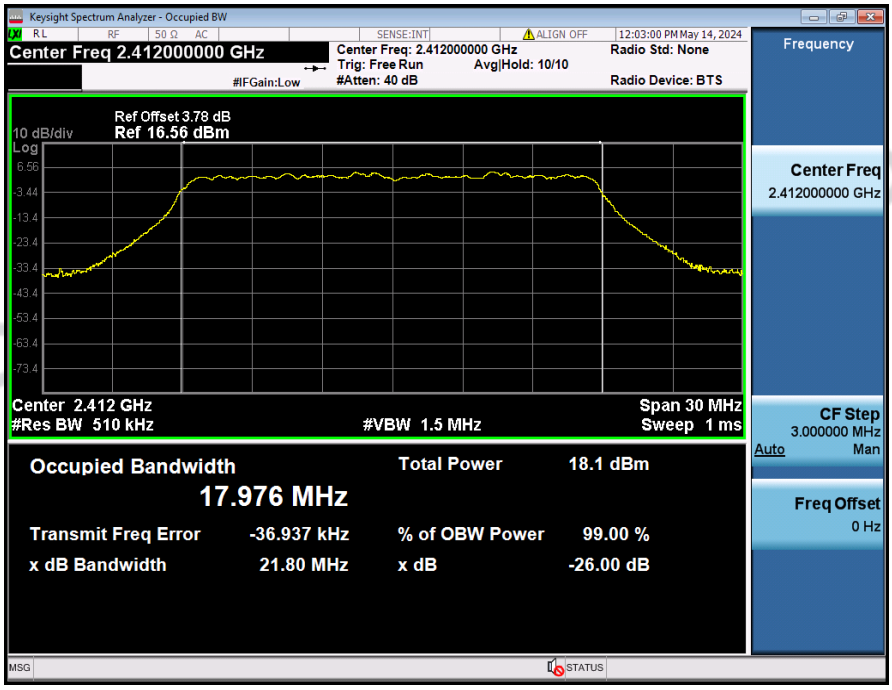
99%_Occupied_Bandwidth_NVNT_ANT1_802_11g_2437



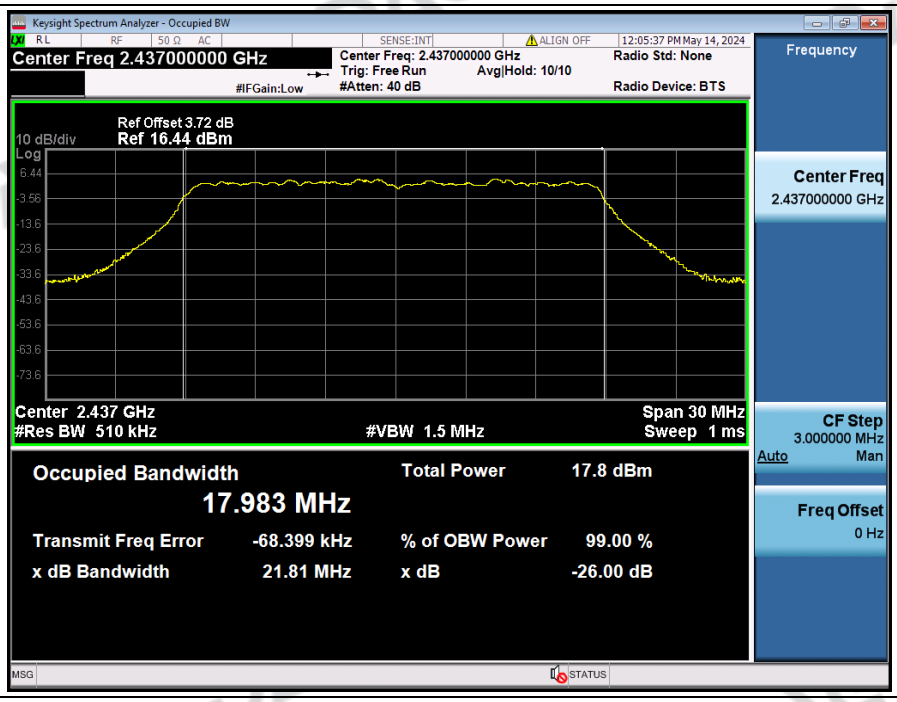
99%_Occupied_Bandwidth_NVNT_ANT1_802_11g_2462



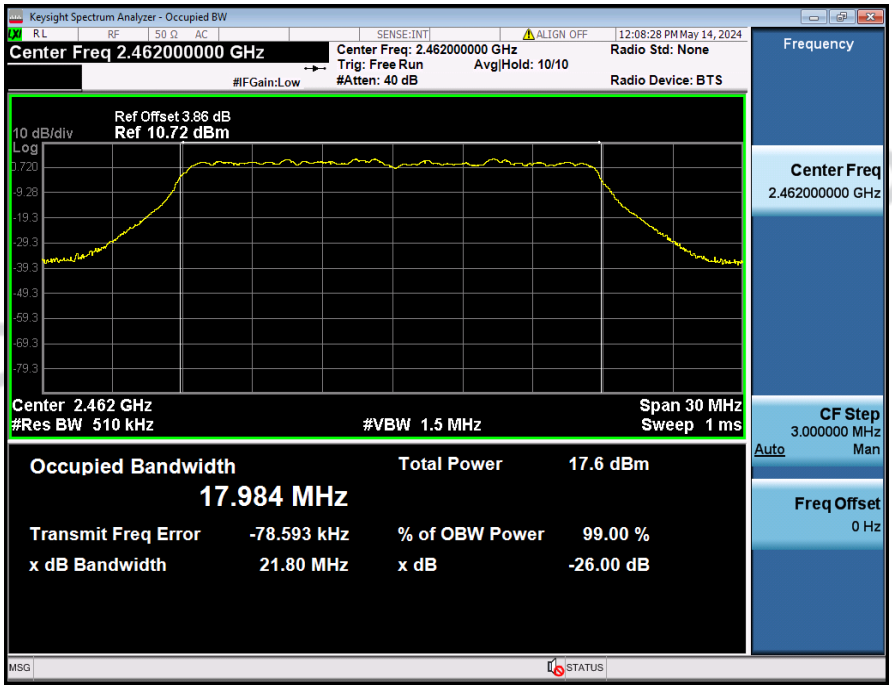
99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT20)_2412



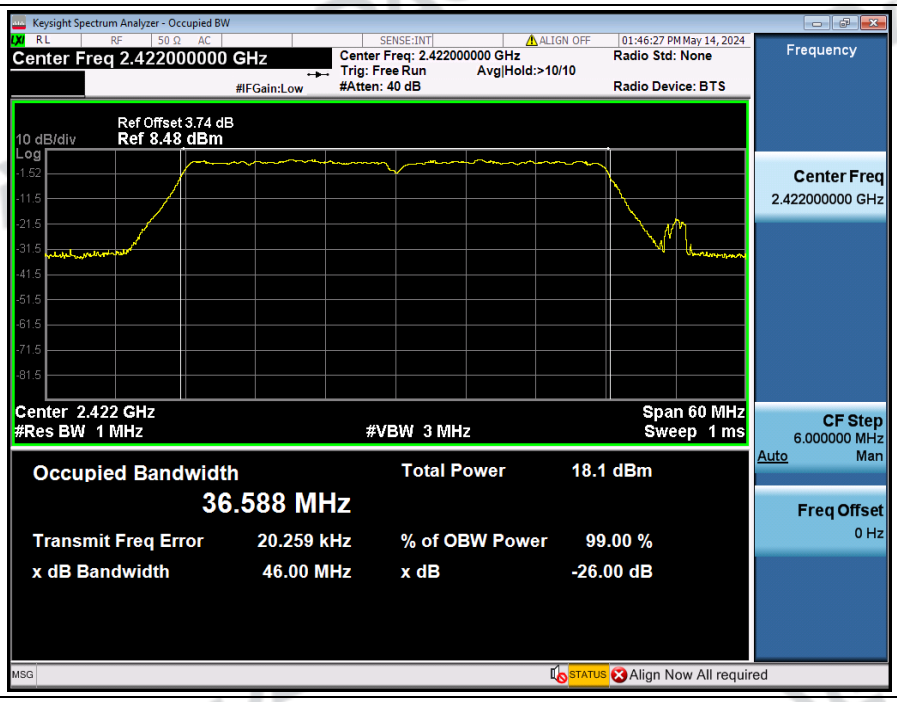
99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT20)_2437



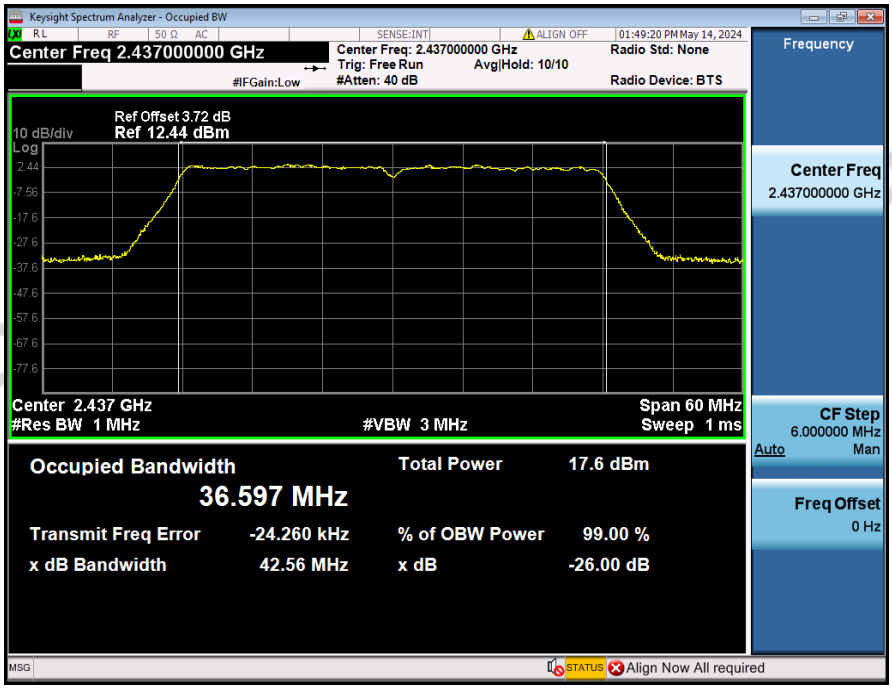
99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT20)_2462



99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT40)_2422



99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT40)_2437

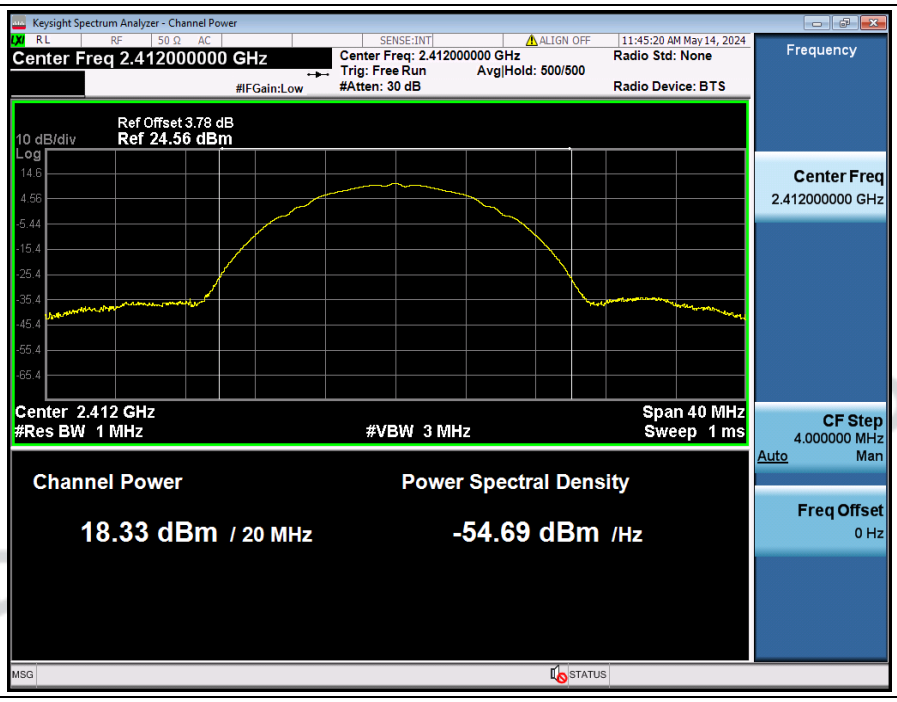


99%_Occupied_Bandwidth_NVNT_ANT1_802_11n(HT40)_2452

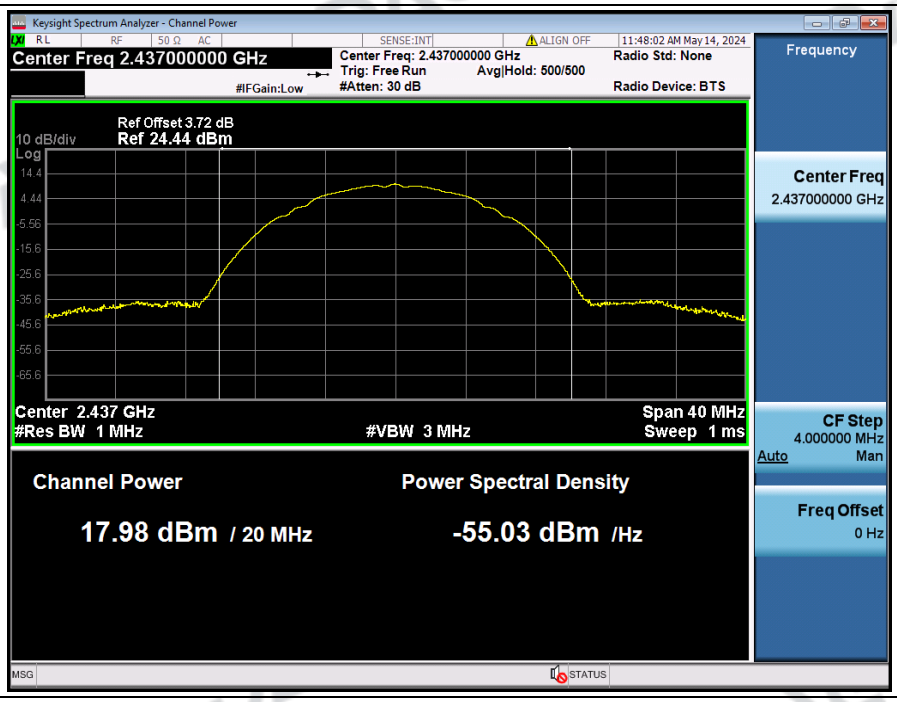
3. MAX. Output Power

Condition	Antenna	Modulation	Frequency (MHz)	Detector	Conducted Power(dBm)	limit(dBm)	Result
NVNT	ANT1	802.11b	2412.00	Peak	18.33	30	Pass
NVNT	ANT1	802.11b	2437.00	Peak	17.98	30	Pass
NVNT	ANT1	802.11b	2462.00	Peak	17.88	30	Pass
NVNT	ANT1	802.11g	2412.00	Peak	18.71	30	Pass
NVNT	ANT1	802.11g	2437.00	Peak	18.31	30	Pass
NVNT	ANT1	802.11g	2462.00	Peak	18.05	30	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	Peak	18.51	30	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	Peak	18.11	30	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	Peak	17.74	30	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	Peak	17.70	30	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	Peak	17.33	30	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	Peak	17.47	30	Pass

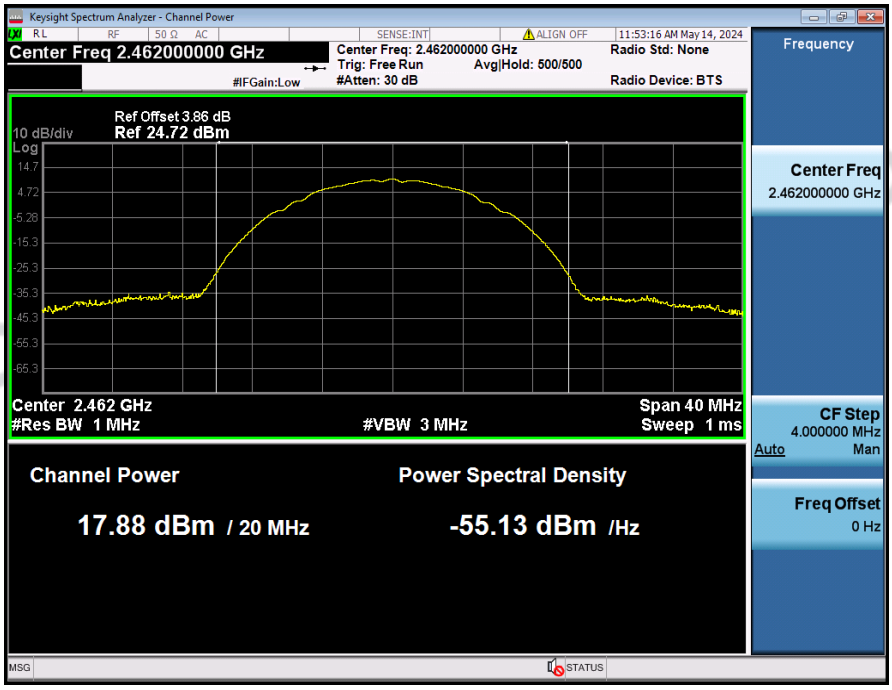
MAX__Output_Power_NVNT_ANT1_802_11b_2412



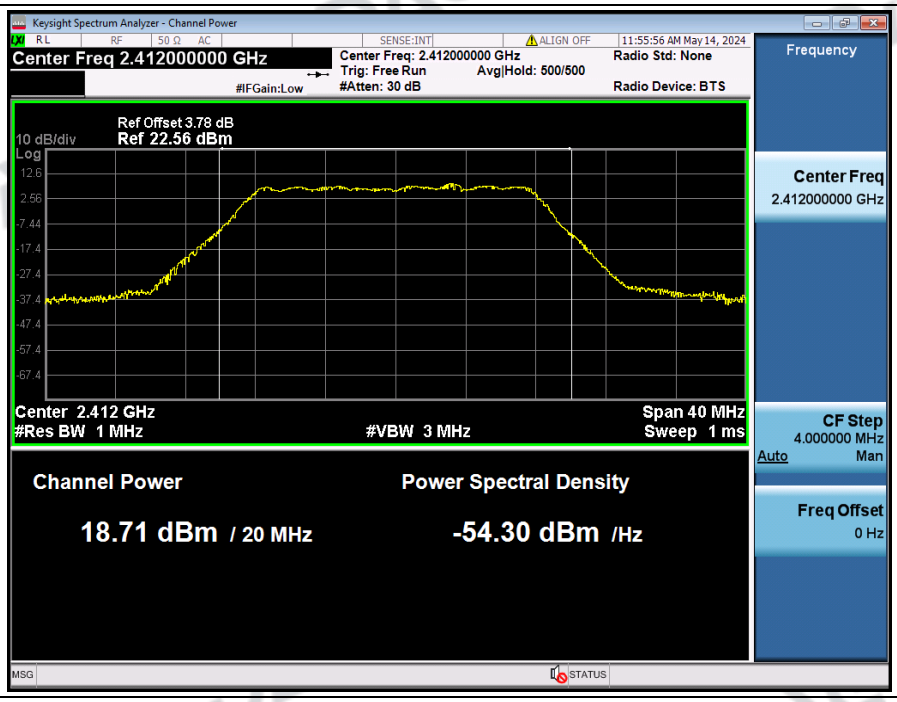
MAX__Output_Power_NVNT_ANT1_802_11b_2437



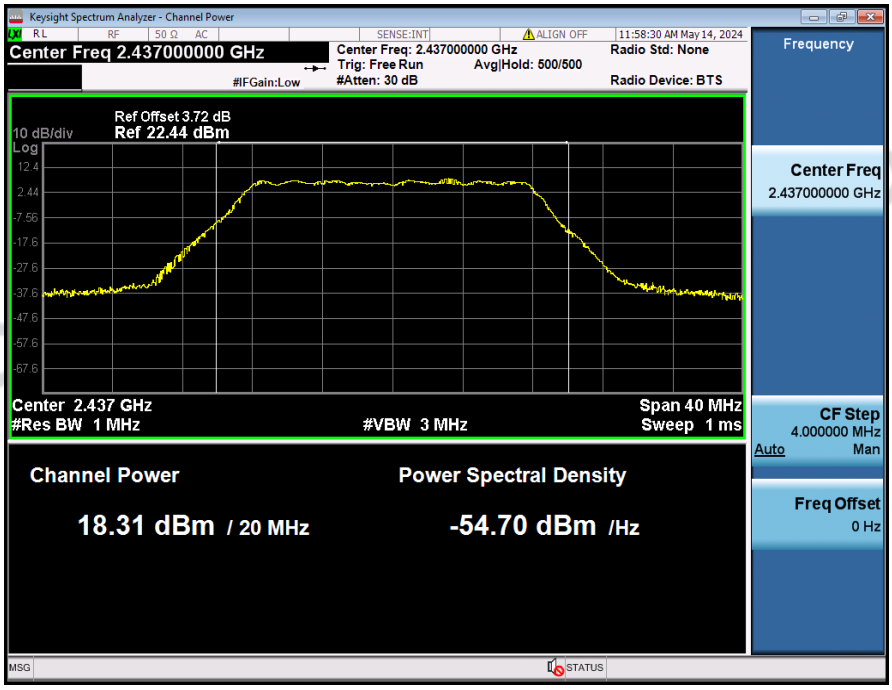
MAX__Output_Power_NVNT_ANT1_802_11b_2462



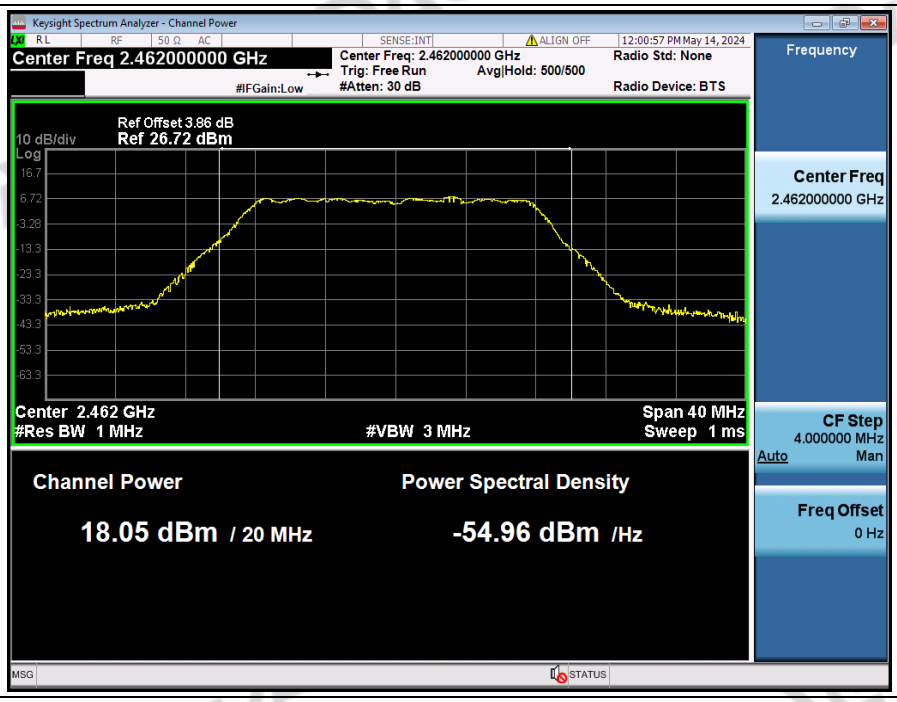
MAX__Output_Power_NVNT_ANT1_802_11g_2412



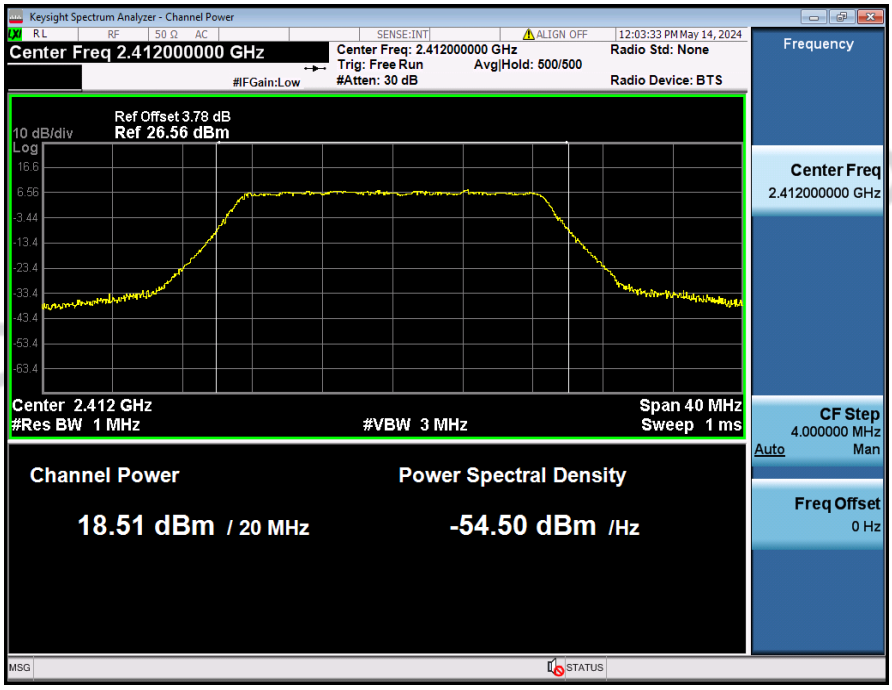
MAX__Output_Power_NVNT_ANT1_802_11g_2437



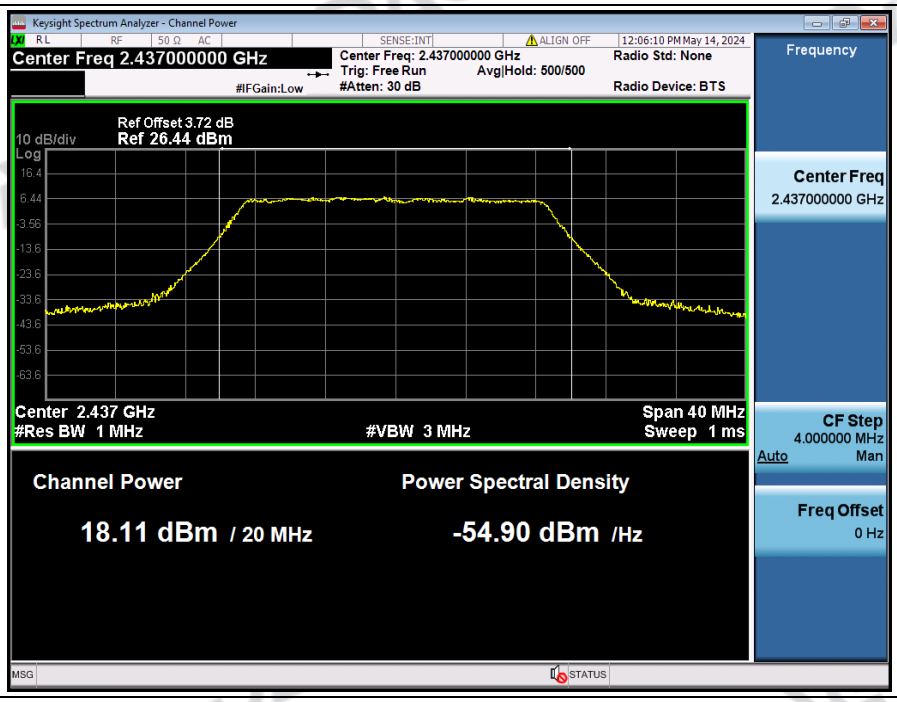
MAX__Output_Power_NVNT_ANT1_802_11g_2462



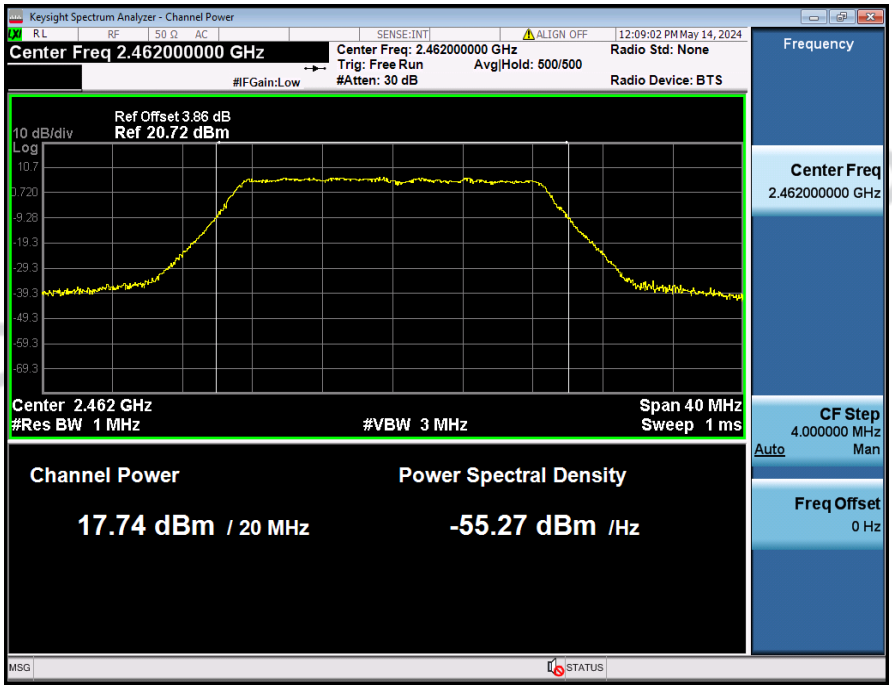
MAX__Output_Power_NVNT_ANT1_802_11n(HT20)_2412



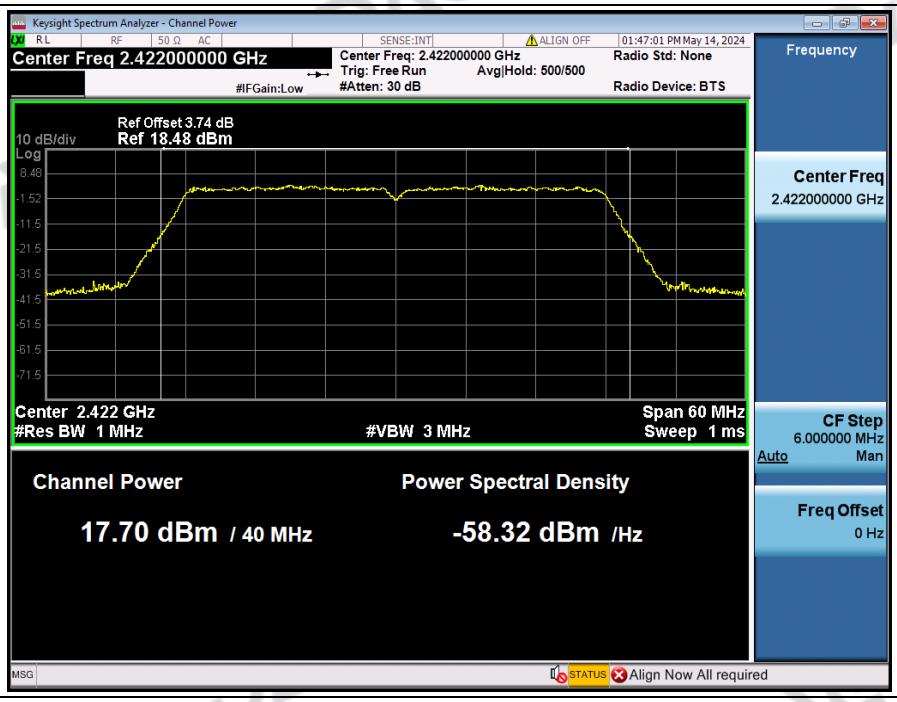
MAX__Output_Power_NVNT_ANT1_802_11n(HT20)_2437



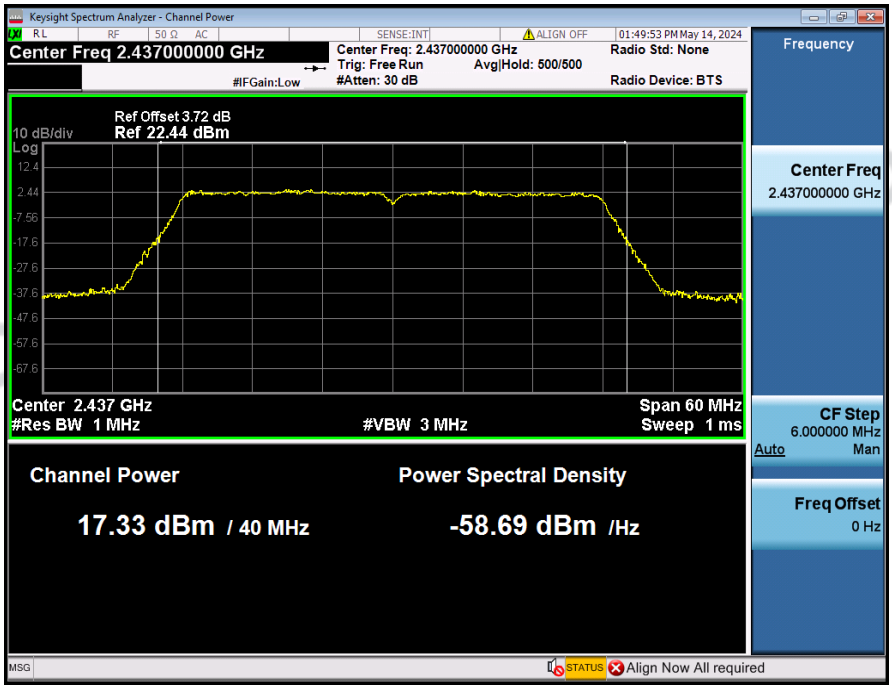
MAX__Output_Power_NVNT_ANT1_802_11n(HT20)_2462



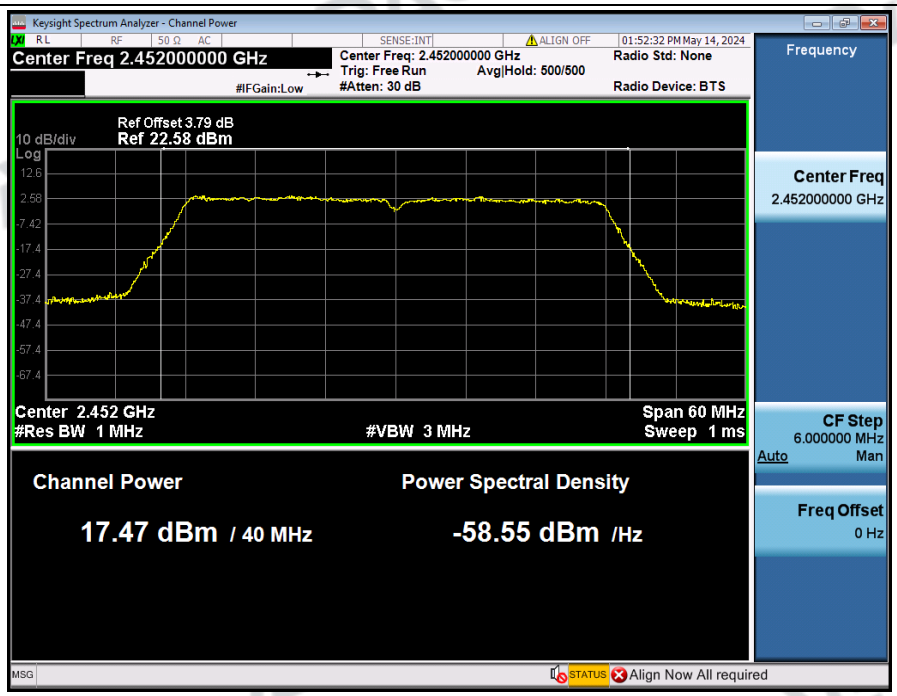
MAX__Output_Power_NVNT_ANT1_802_11n(HT40)_2422



MAX__Output_Power_NVNT_ANT1_802_11n(HT40)_2437



MAX__Output_Power_NVNT_ANT1_802_11n(HT40)_2452



4. Power Spectral Density

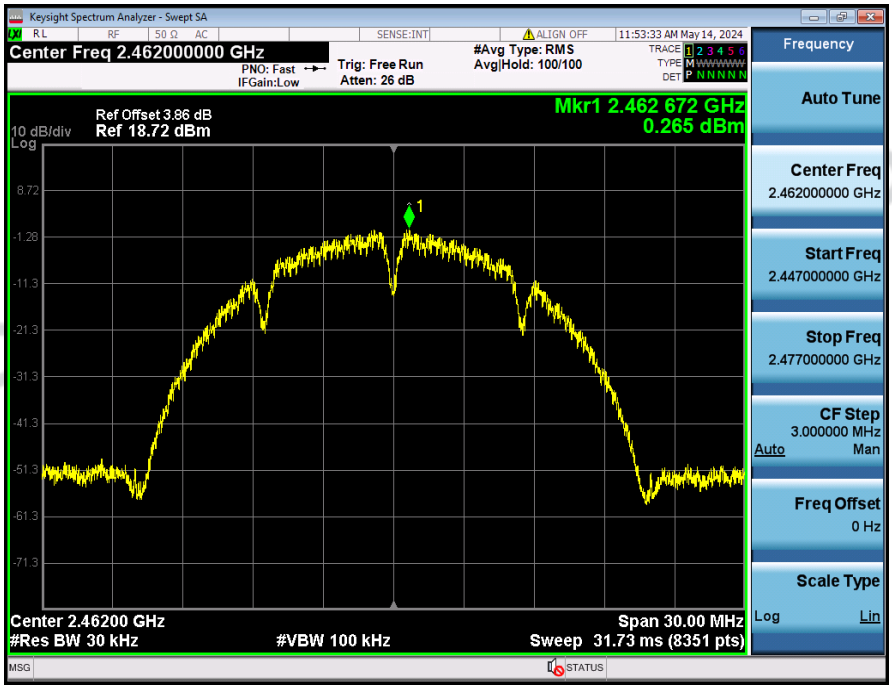
Condition	Antenna	Modulation	Frequency (MHz)	PSD dBm/30kHz)	RB factor(dB)	PSD(dBm/3kHz)	limit(dBm/3kHz)	Result
NVNT	ANT1	802.11b	2412.00	0.76	-10.00	-9.24	8	Pass
NVNT	ANT1	802.11b	2437.00	0.44	-10.00	-9.56	8	Pass
NVNT	ANT1	802.11b	2462.00	0.27	-10.00	-9.73	8	Pass
NVNT	ANT1	802.11g	2412.00	-5.67	-10.00	-15.68	8	Pass
NVNT	ANT1	802.11g	2437.00	-5.80	-10.00	-15.80	8	Pass
NVNT	ANT1	802.11g	2462.00	-6.08	-10.00	-16.08	8	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	-6.16	-10.00	-16.16	8	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	-6.53	-10.00	-16.53	8	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	-7.04	-10.00	-17.04	8	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	-9.31	-10.00	-19.31	8	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	-9.76	-10.00	-19.76	8	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	-9.17	-10.00	-19.17	8	Pass

Note: PSDdBm/30kHz)+RB factor(dB)=PSD(dBm/3kHz); RB factor(dB)=10*log(3/30)=-10dB

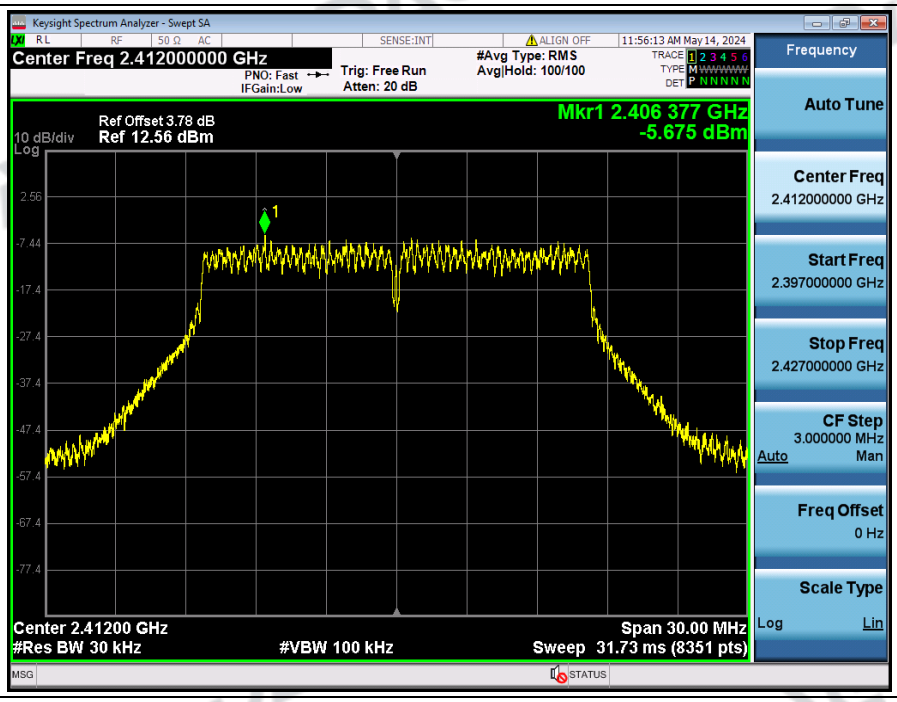
Power_Spectral_Density_NVNT_ANT1_802_11b_2412

Power_Spectral_Density_NVNT_ANT1_802_11b_2437

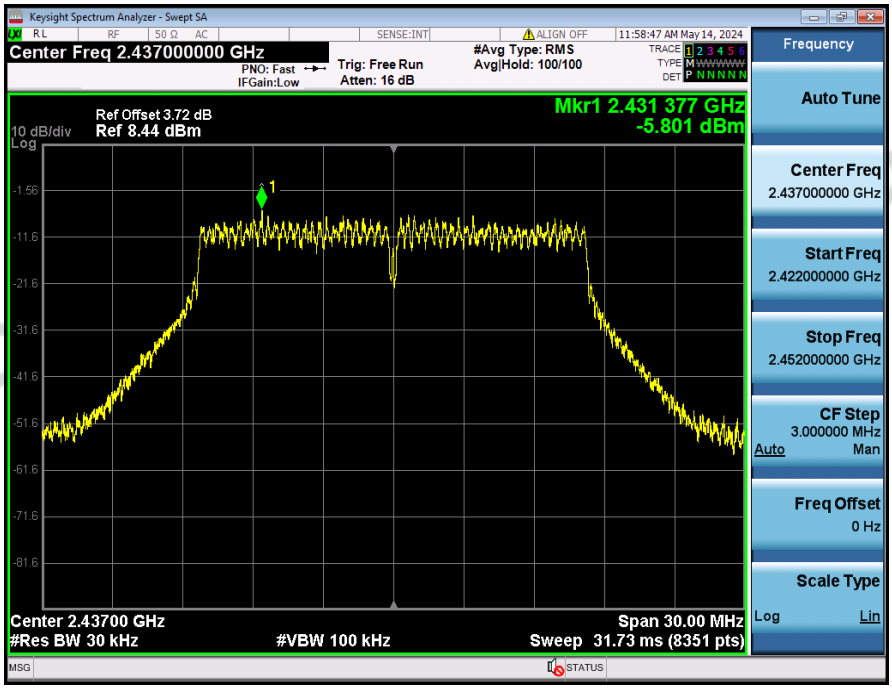
Power_Spectral_Density_NVNT_ANT1_802_11b_2462



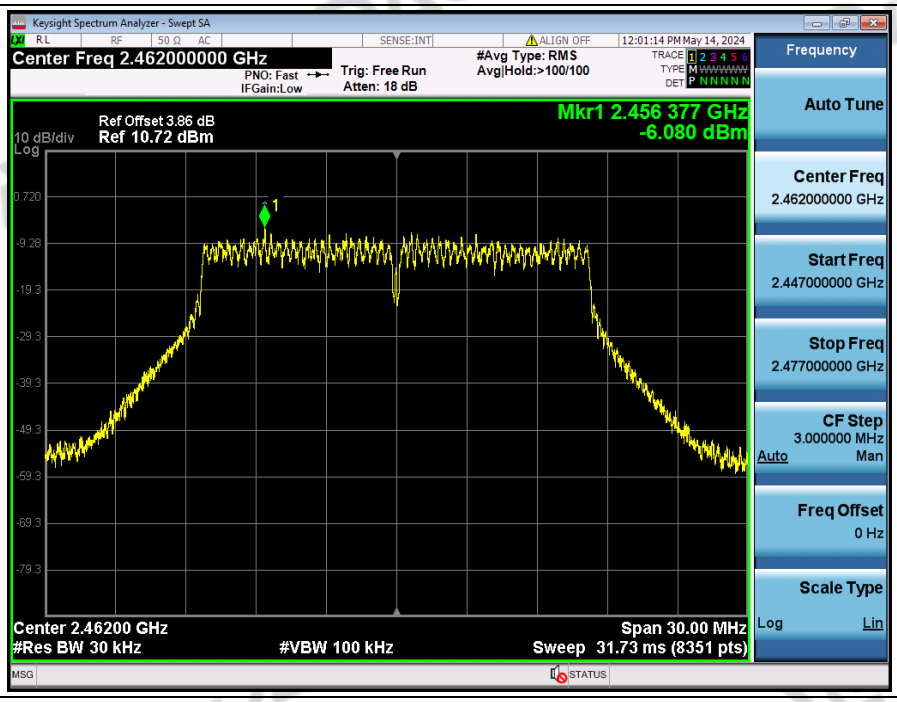
Power_Spectral_Density_NVNT_ANT1_802_11g_2412



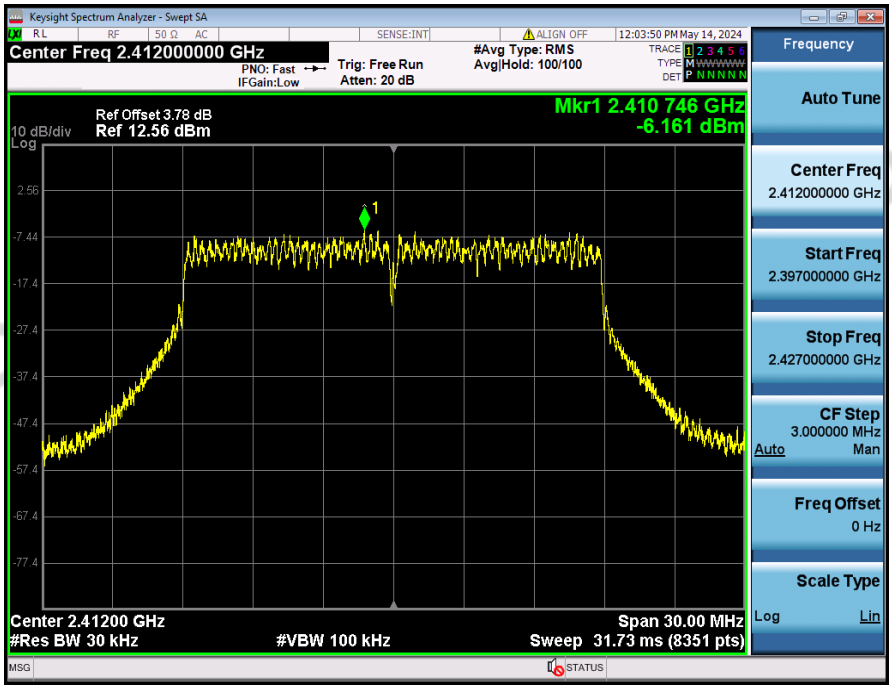
Power_Spectral_Density_NVNT_ANT1_802_11g_2437



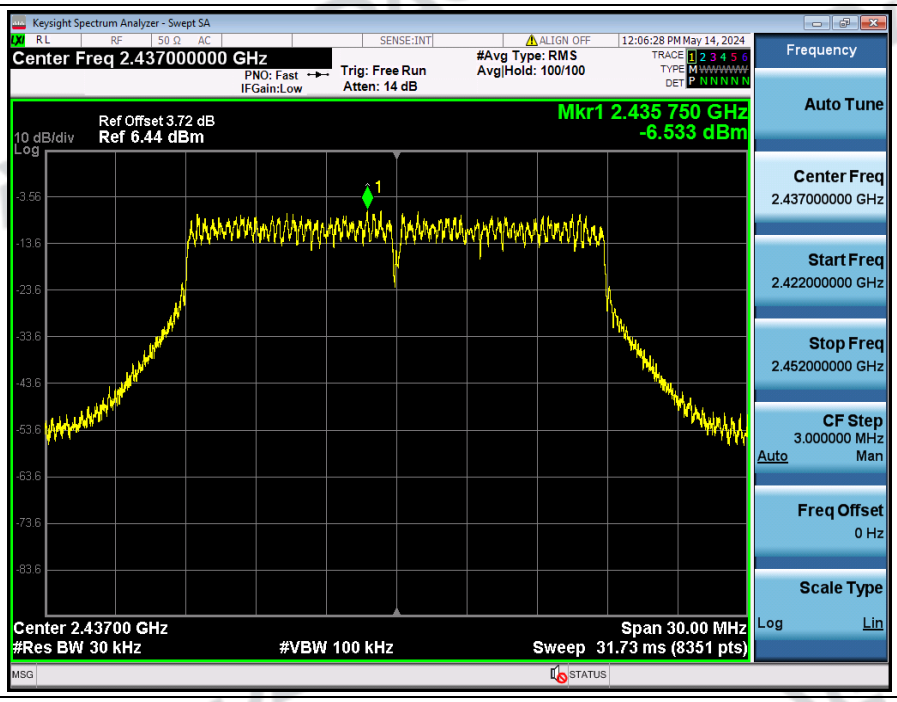
Power_Spectral_Density_NVNT_ANT1_802_11g_2462



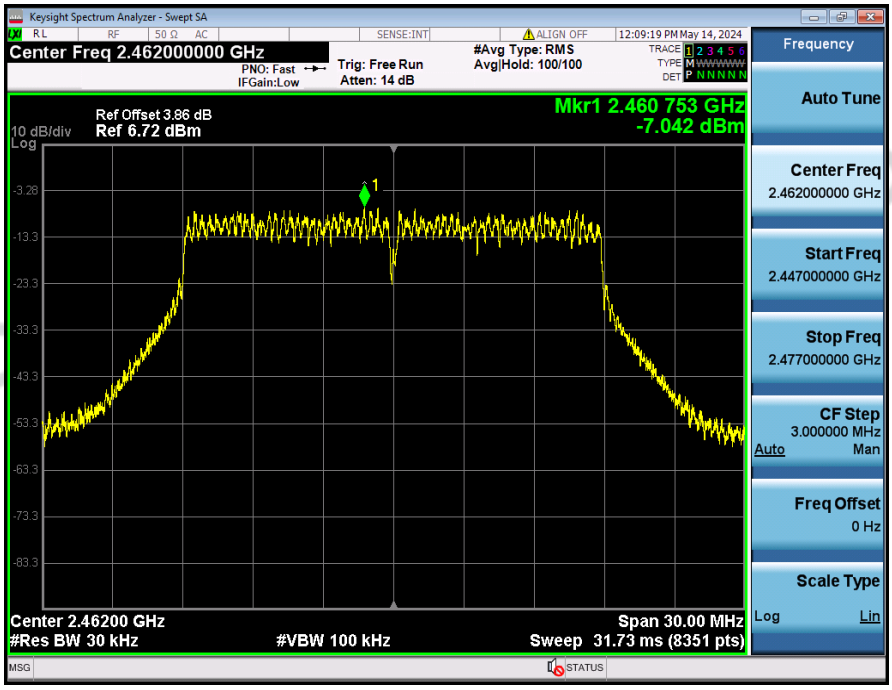
Power_Spectral_Density_NVNT_ANT1_802_11n(HT20)_2412



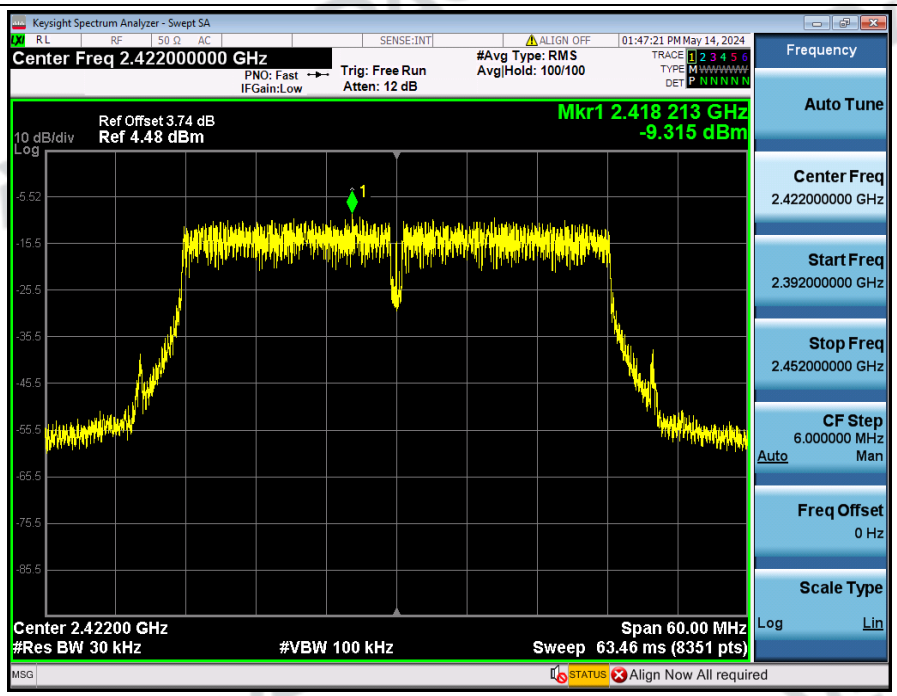
Power_Spectral_Density_NVNT_ANT1_802_11n(HT20)_2437



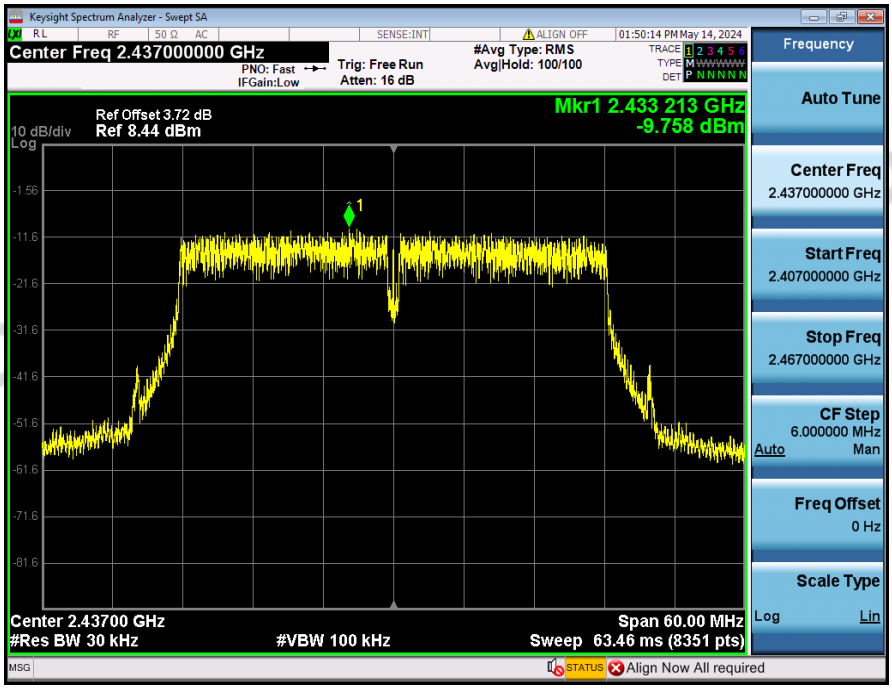
Power_Spectral_Density_NVNT_ANT1_802_11n(HT20)_2462



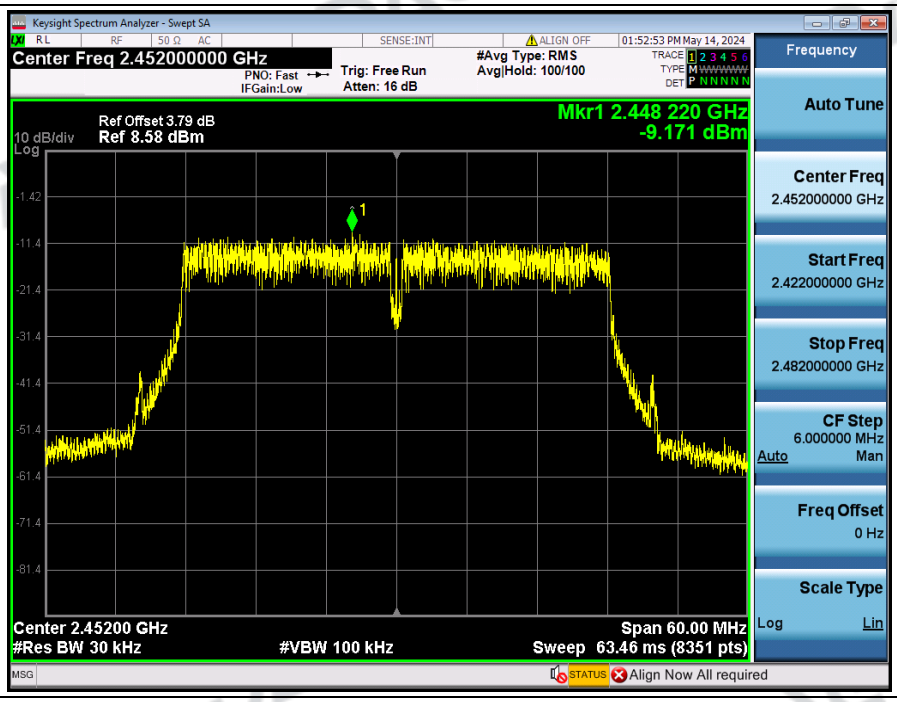
Power_Spectral_Density_NVNT_ANT1_802_11n(HT40)_2422



Power_Spectral_Density_NVNT_ANT1_802_11n(HT40)_2437



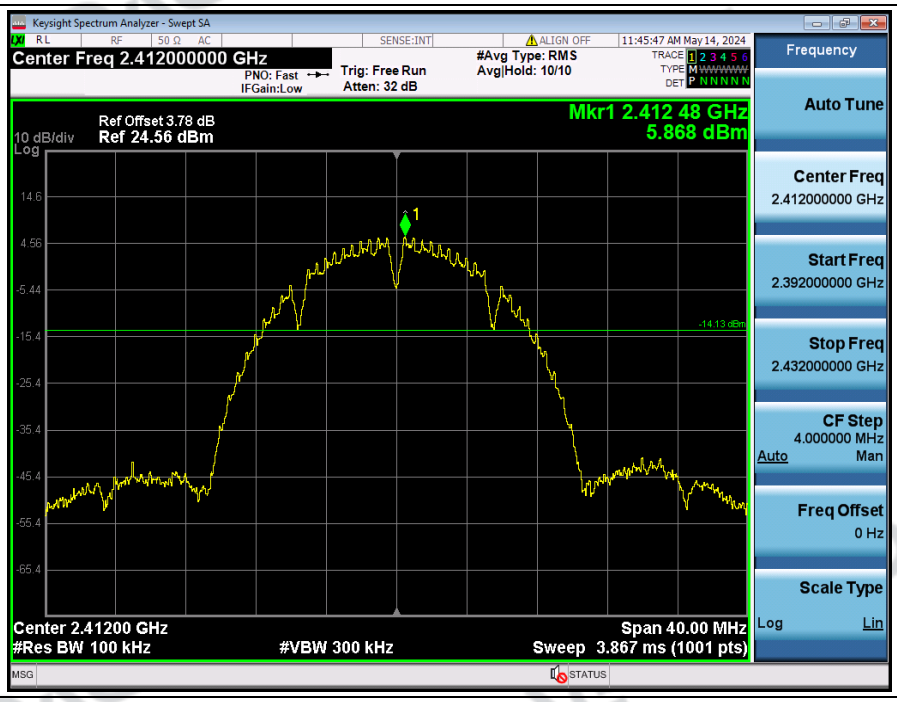
Power_Spectral_Density_NVNT_ANT1_802_11n(HT40)_2452



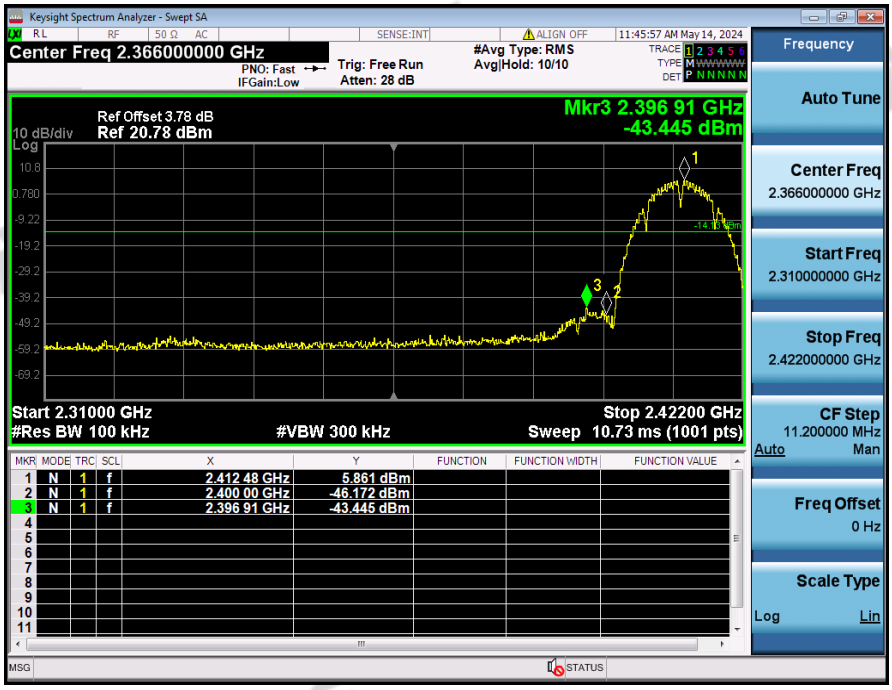
5. Bandedge

Condition	Antenna	Modulation	TX_Frequency (MHz)	Max. Mark_frequency(MHz)	Spurious level(dBm)	limit(dBm)	Result
NVNT	ANT1	802.11b	2412.00	2396.912	-43.445	-14.132	Pass
NVNT	ANT1	802.11b	2462.00	2487.424	-52.459	-14.580	Pass
NVNT	ANT1	802.11g	2412.00	2399.824	-39.926	-22.056	Pass
NVNT	ANT1	802.11g	2462.00	2484.016	-55.275	-22.959	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	2399.936	-40.478	-22.511	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	2484.016	-54.604	-23.116	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	2399.892	-38.784	-26.438	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	2483.544	-51.848	-26.423	Pass

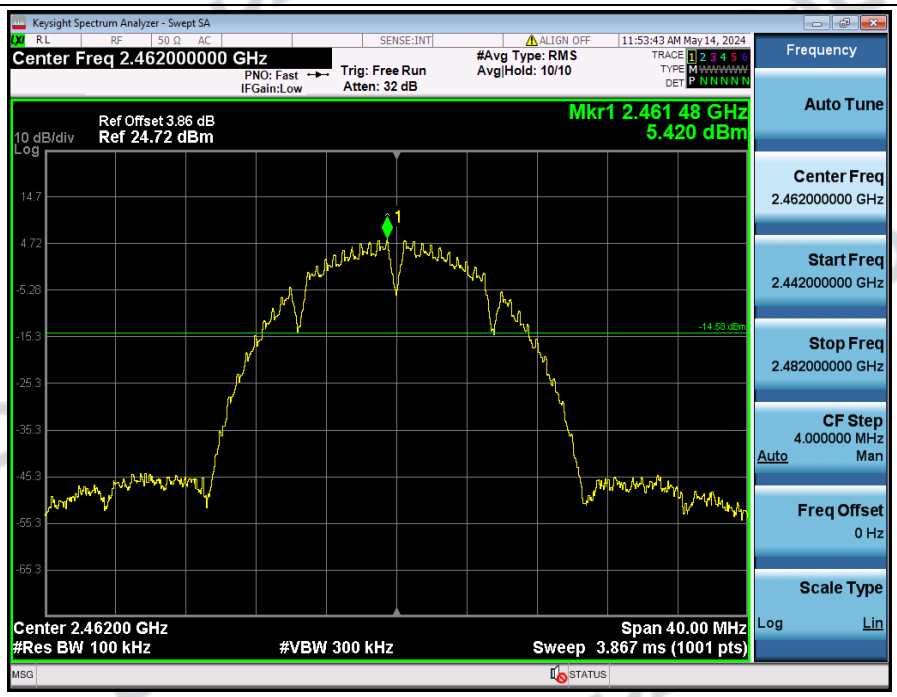
1_Reference_Level_NVNT_ANT1_802_11b_2412



2_Bandedge_NVNT_ANT1_802_11b_2412

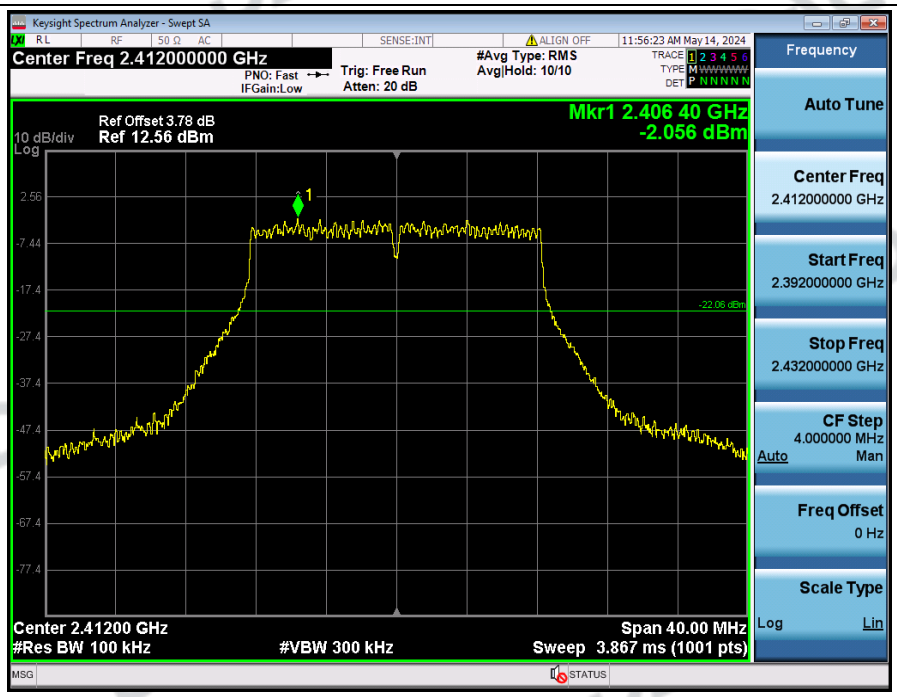


1_Reference_Level_NVNT_ANT1_802_11b_2462

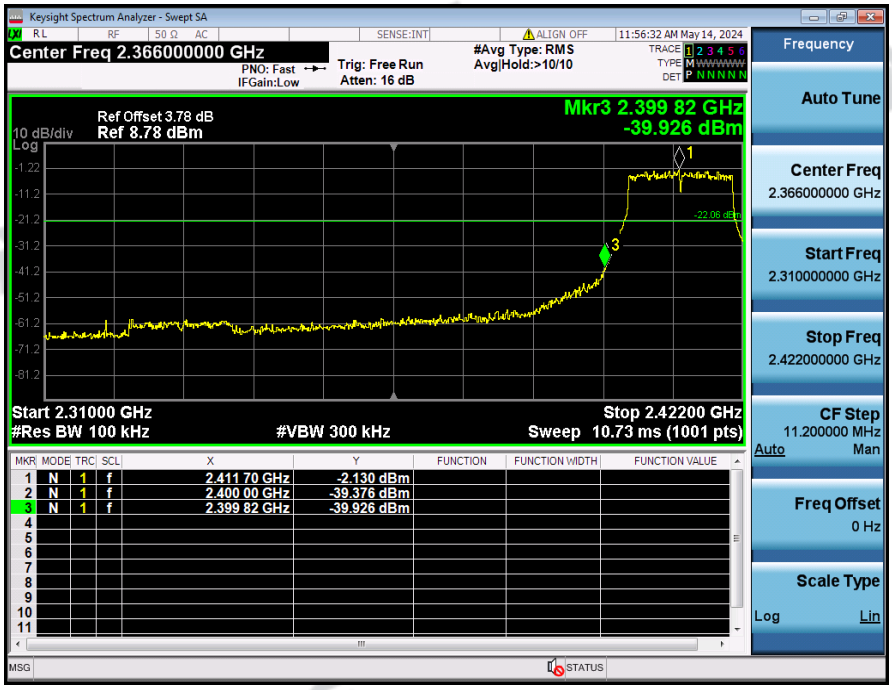


2_Bandedge_NVNT_ANT1_802_11b_2462

1_Reference_Level_NVNT_ANT1_802_11g_2412

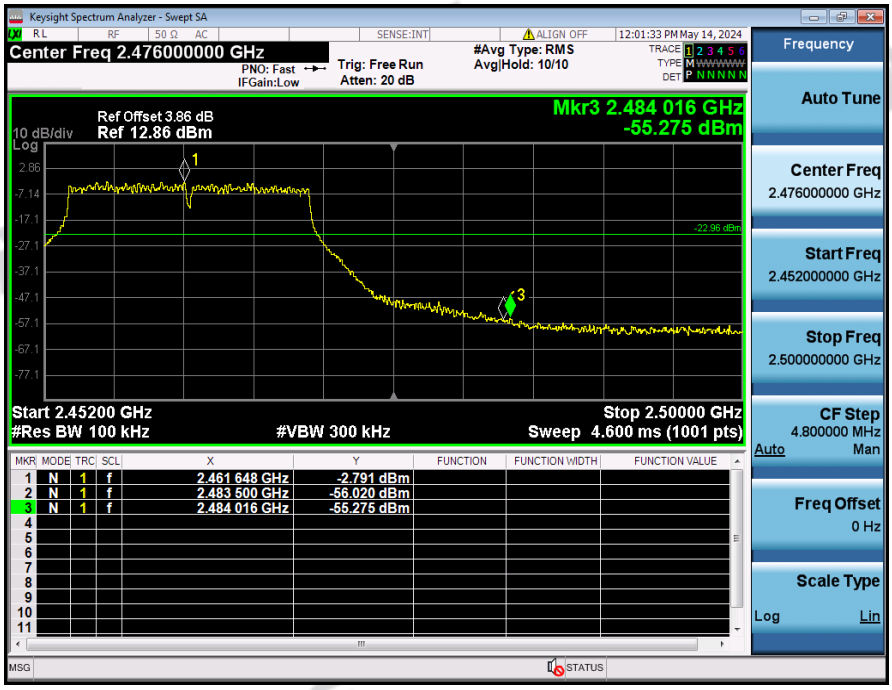


2_Bandedge_NVNT_ANT1_802_11g_2412

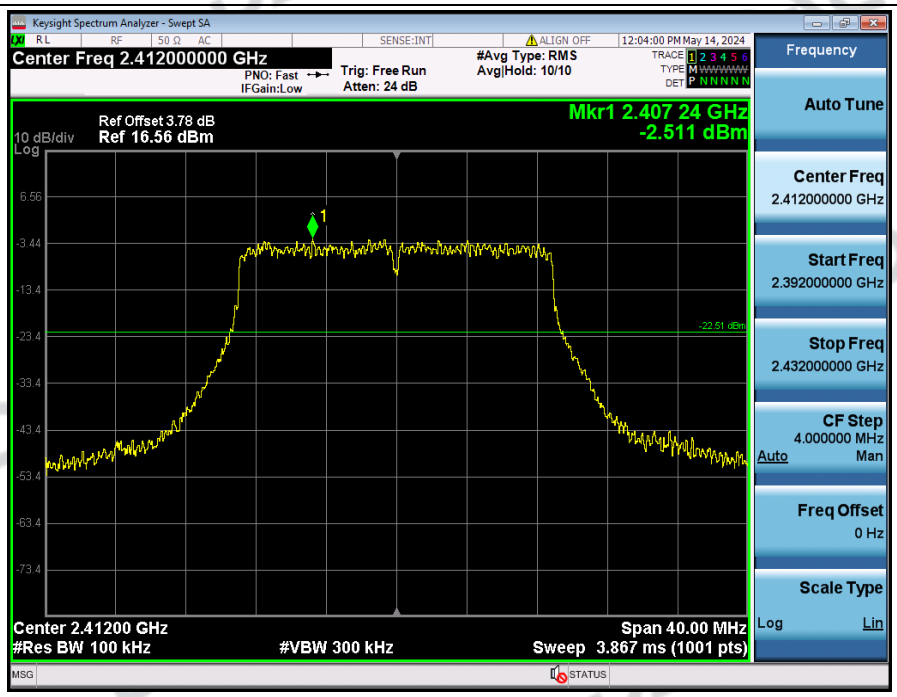


1_Reference_Level_NVNT_ANT1_802_11g_2462

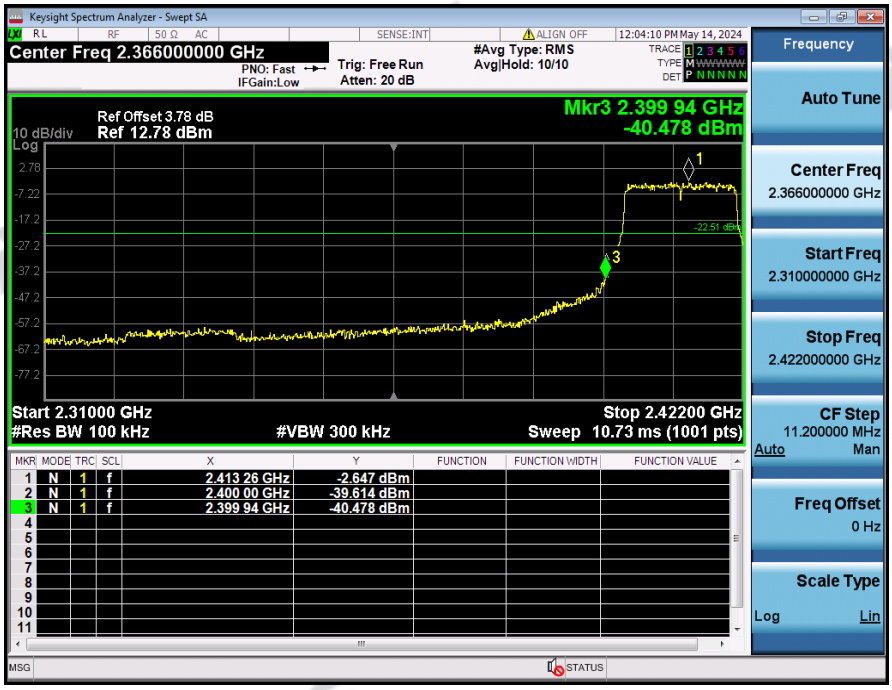
2_Bandedge_NVNT_ANT1_802_11g_2462



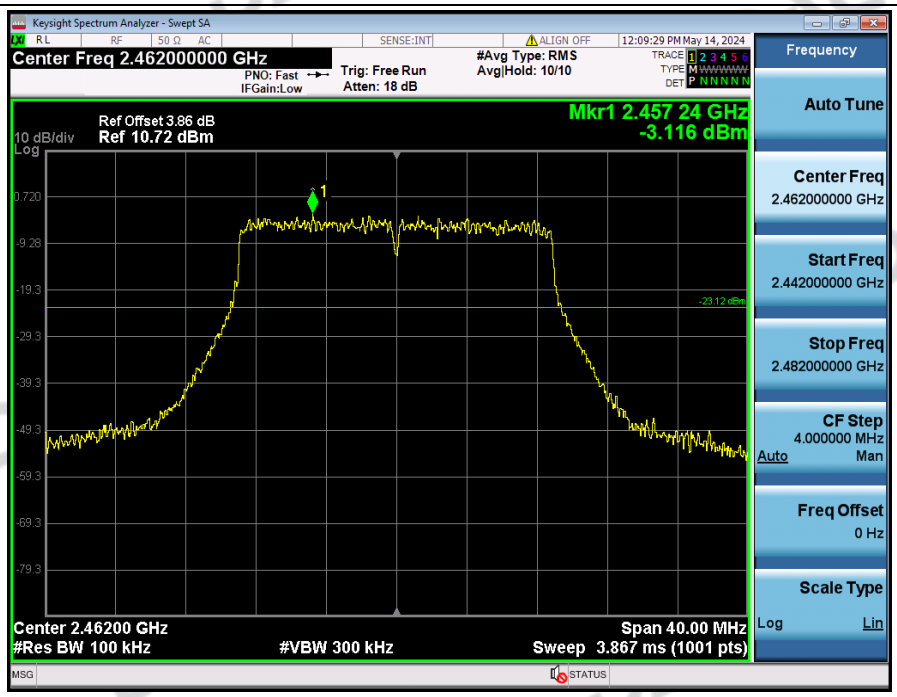
1_Reference_Level_NVNT_ANT1_802_11n(HT20)_2412



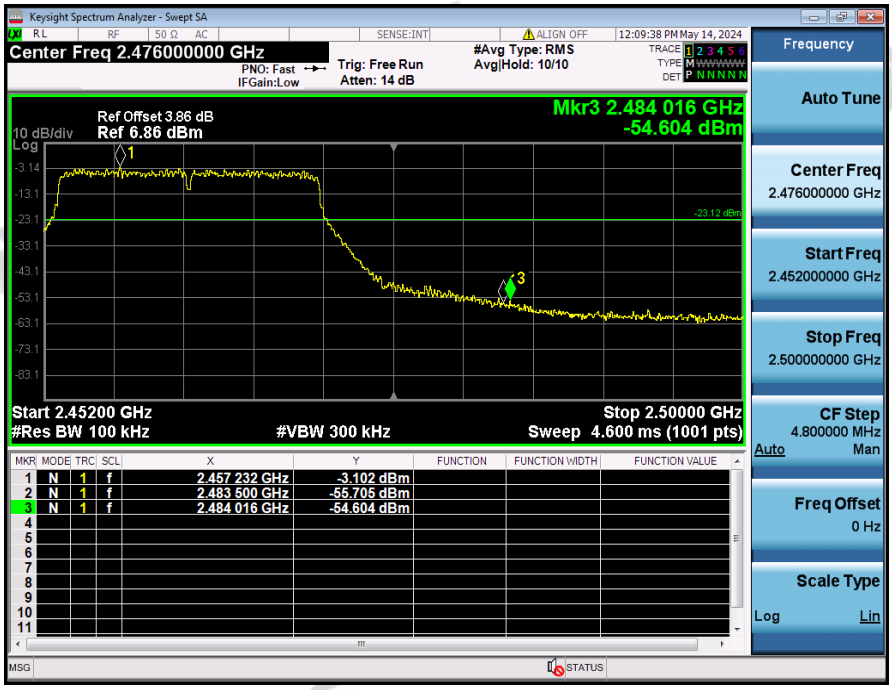
2_Bandedge_NVNT_ANT1_802_11n(HT20)_2412



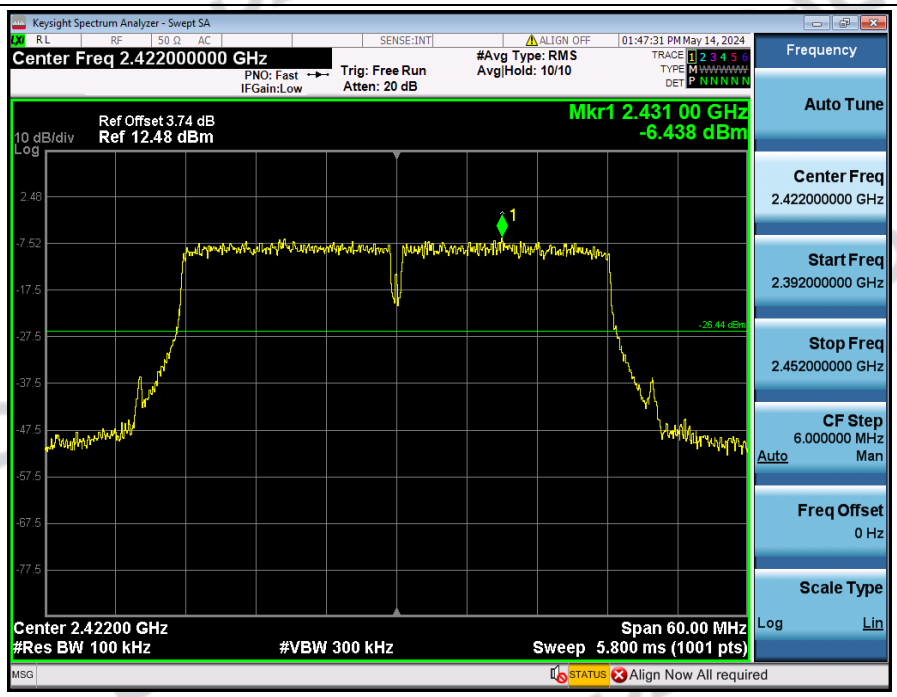
1_Reference_Level_NVNT_ANT1_802_11n(HT20)_2462



2_Bandedge_NVNT_ANT1_802_11n(HT20)_2462



1_Reference_Level_NVNT_ANT1_802_11n(HT40)_2422



2_Bandedge_NVNT_ANT1_802_11n(HT40)_2422

1_Reference_Level_NVNT_ANT1_802_11n(HT40)_2452

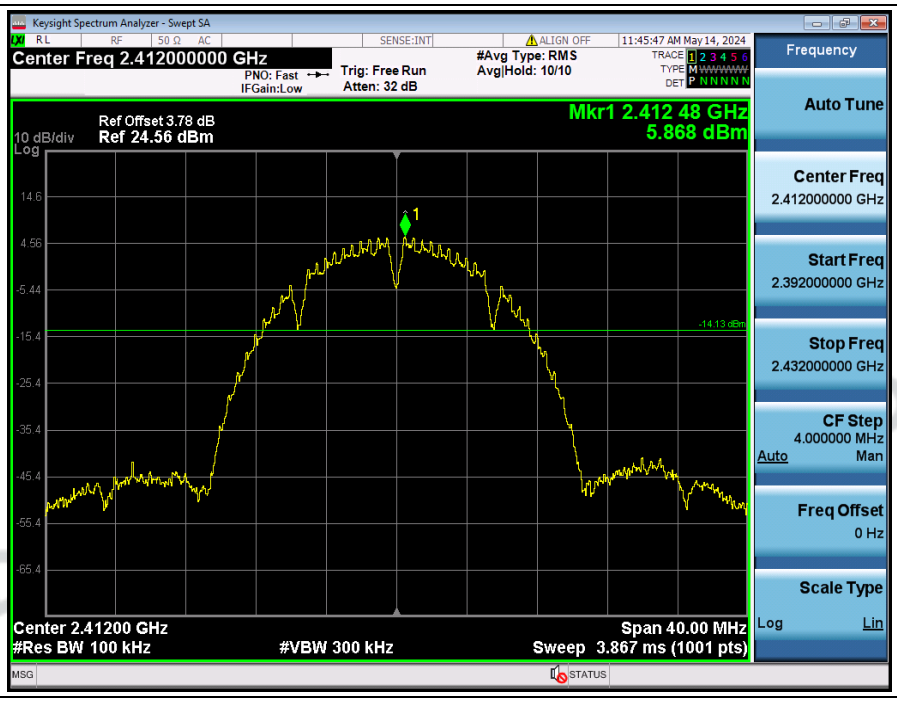
2_Bandedge_NVNT_ANT1_802_11n(HT40)_2452

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.466000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 16 dB
#Avg Type: RMS
Avg|Hold: 10/10
01:53:13 PM May 14, 2024
Ref Offset 3.79 dB
10 dB/div
Ref 8.79 dBm
Log
Mkr3 2.483 544 GHz
-51.848 dBm
-26.42 dBm
Start 2.43200 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 6.533 ms (1001 pts)
1 N 1 f 2.442 404 GHz -6.410 dBm
2 N 1 f 2.483 500 GHz -52.589 dBm
3 N 1 f 2.483 544 GHz -51.848 dBm
Frequency
Auto Tune
Center Freq
2.466000000 GHz
Start Freq
2.432000000 GHz
Stop Freq
2.500000000 GHz
CF Step
6.800000 MHz
Auto Man
Freq Offset
0 Hz
Scale Type
Log Lin
Align Now All required

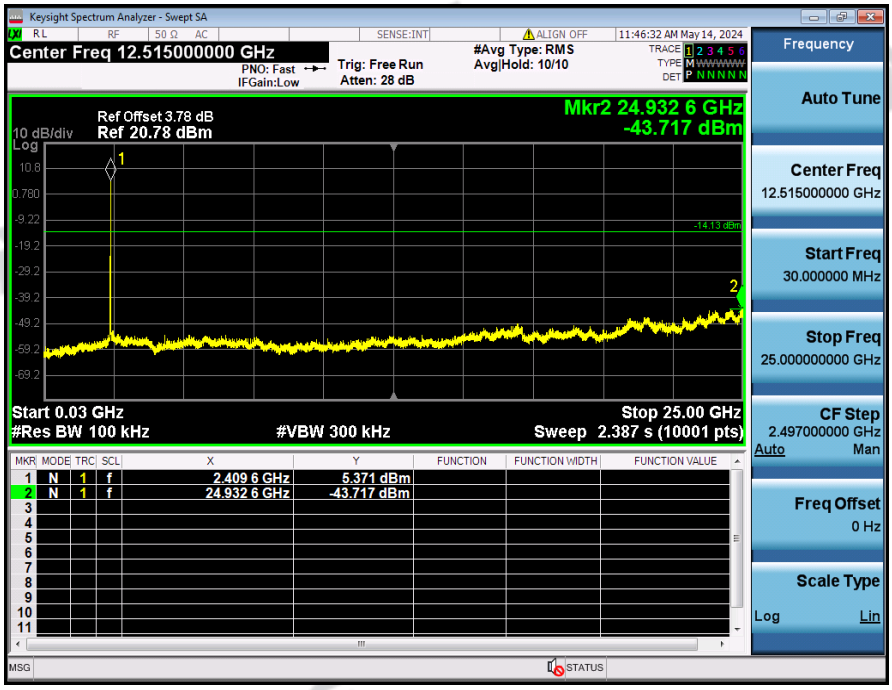
6. Spurious Emission

Condition	Antenna	Modulation	TX_Frequency (MHz)	Max. Mark_frequency(MHz)	Spurious level(dBm)	limit(dBm)	Result
NVNT	ANT1	802.11b	2412.00	24932.581	-43.717	-14.132	Pass
NVNT	ANT1	802.11b	2437.00	24935.078	-43.333	-14.524	Pass
NVNT	ANT1	802.11b	2462.00	24922.593	-43.135	-14.580	Pass
NVNT	ANT1	802.11g	2412.00	24900.120	-55.817	-22.056	Pass
NVNT	ANT1	802.11g	2437.00	24977.527	-51.530	-22.286	Pass
NVNT	ANT1	802.11g	2462.00	24925.090	-51.810	-22.959	Pass
NVNT	ANT1	802.11n(HT20)	2412.00	24930.084	-51.782	-22.511	Pass
NVNT	ANT1	802.11n(HT20)	2437.00	24553.037	-51.657	-22.776	Pass
NVNT	ANT1	802.11n(HT20)	2462.00	24548.043	-57.238	-23.116	Pass
NVNT	ANT1	802.11n(HT40)	2422.00	24897.623	-55.507	-26.438	Pass
NVNT	ANT1	802.11n(HT40)	2437.00	24885.138	-55.579	-26.870	Pass
NVNT	ANT1	802.11n(HT40)	2452.00	24535.558	-55.502	-26.423	Pass

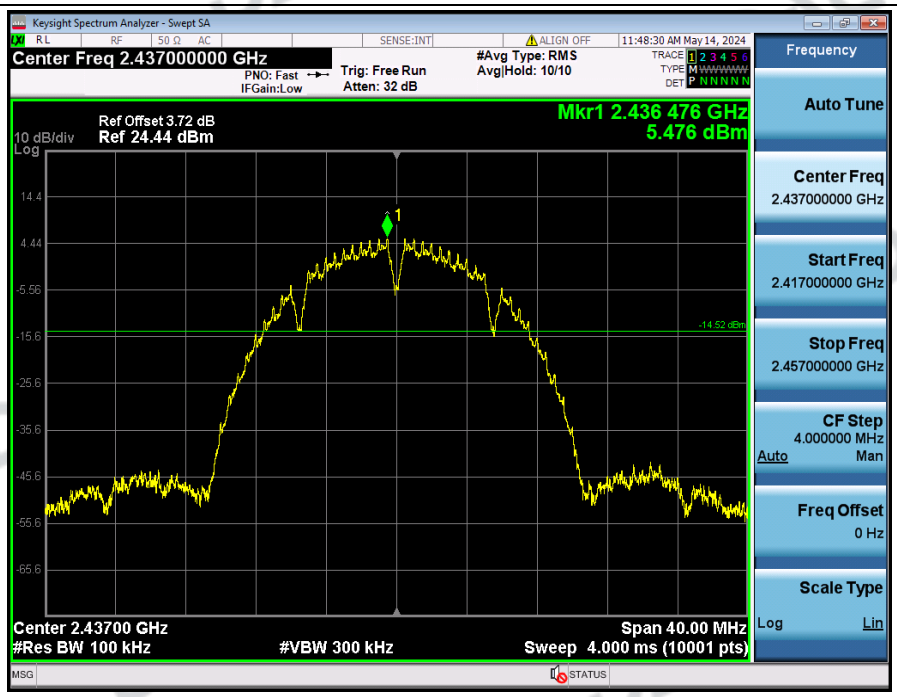
1_Reference_Level_NVNT_ANT1_802_11b_2412



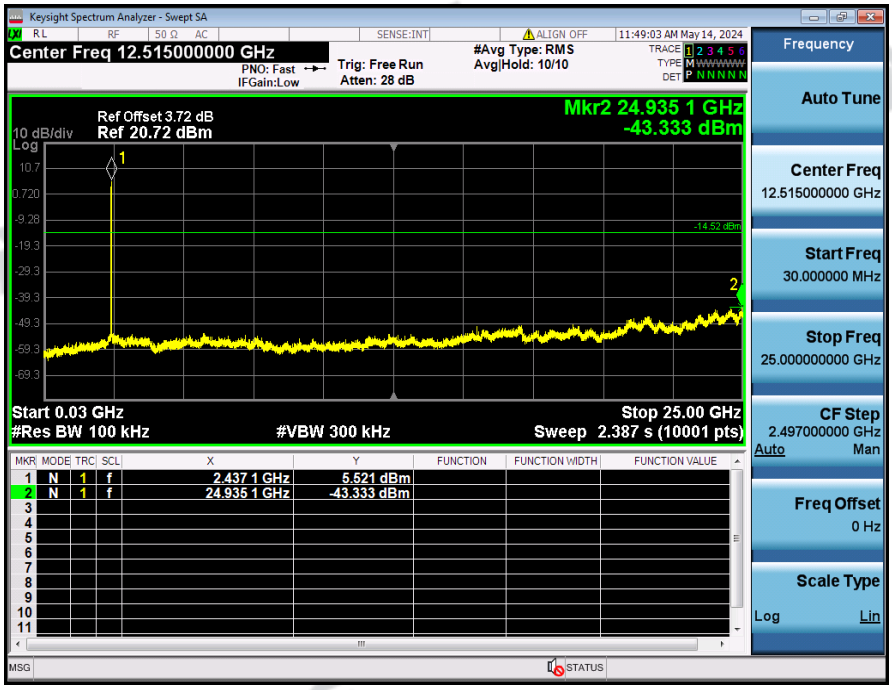
2_Spurious_Emission_NVNT_ANT1_802_11b_2412



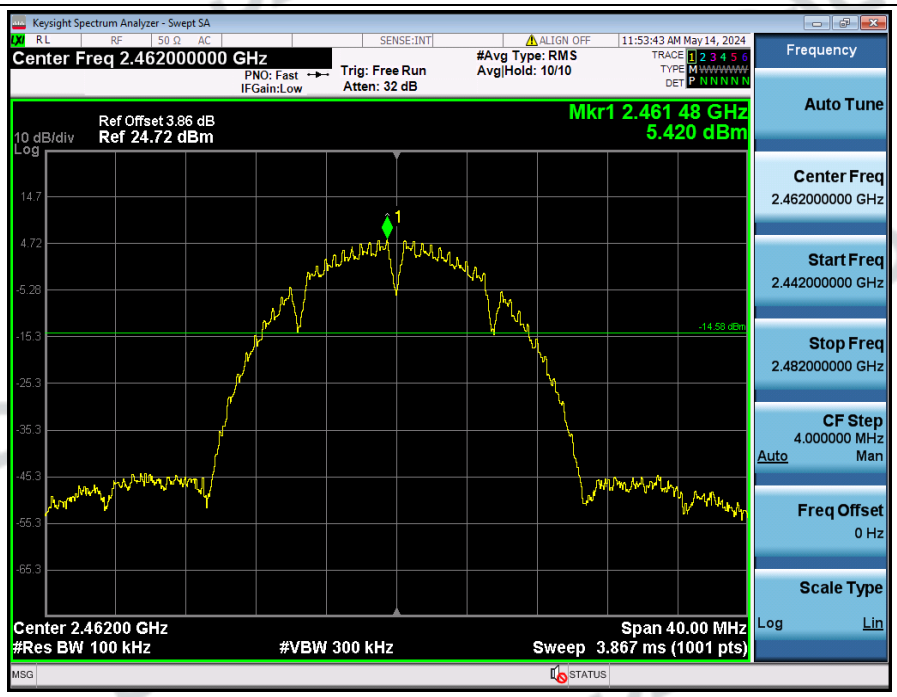
1_Reference_Level_NVNT_ANT1_802_11b_2437



2_Spurious_Emission_NVNT_ANT1_802_11b_2437



1_Reference_Level_NVNT_ANT1_802_11b_2462



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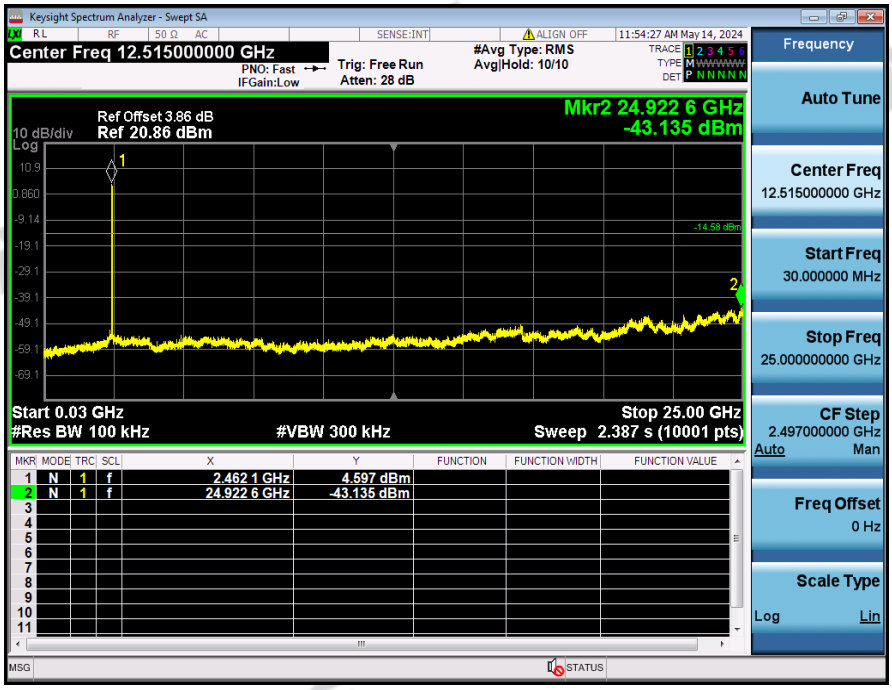

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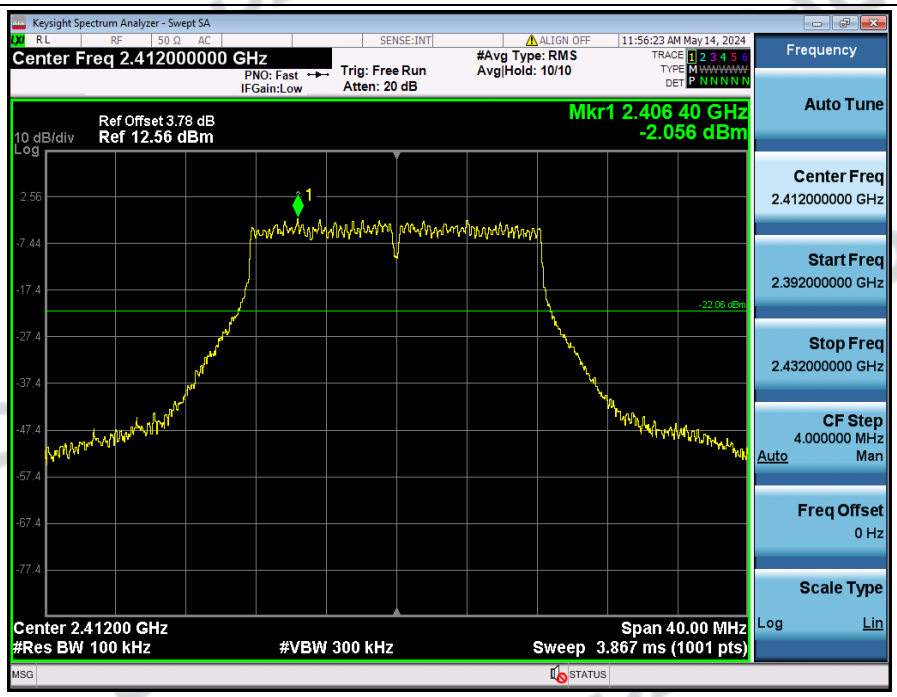

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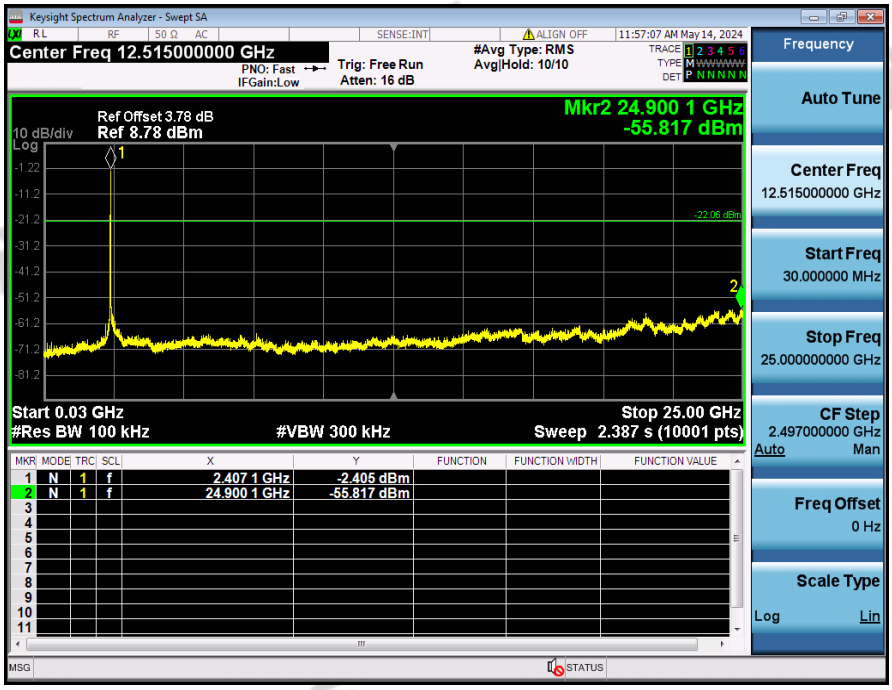

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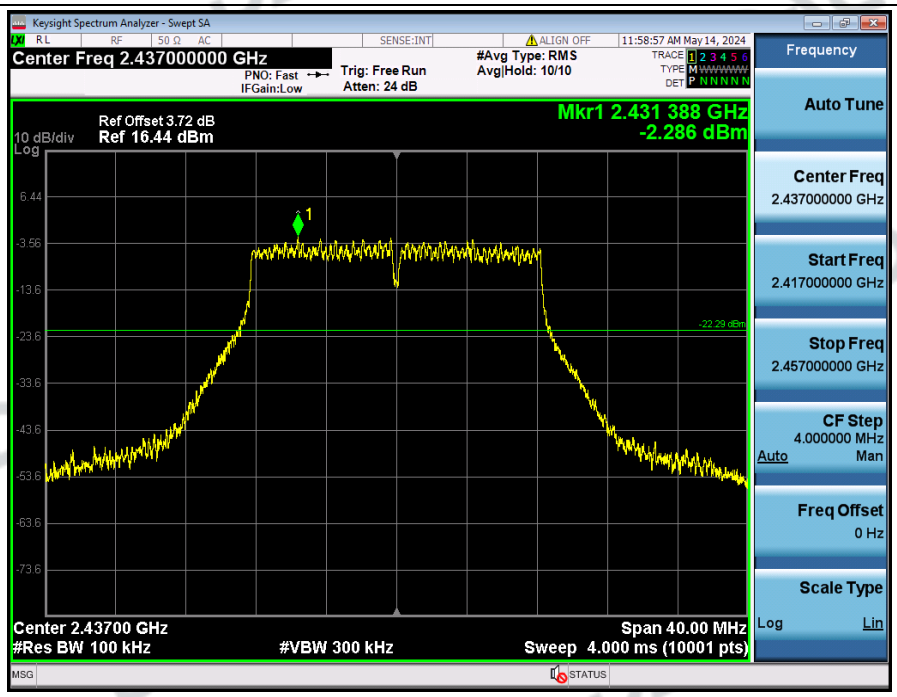

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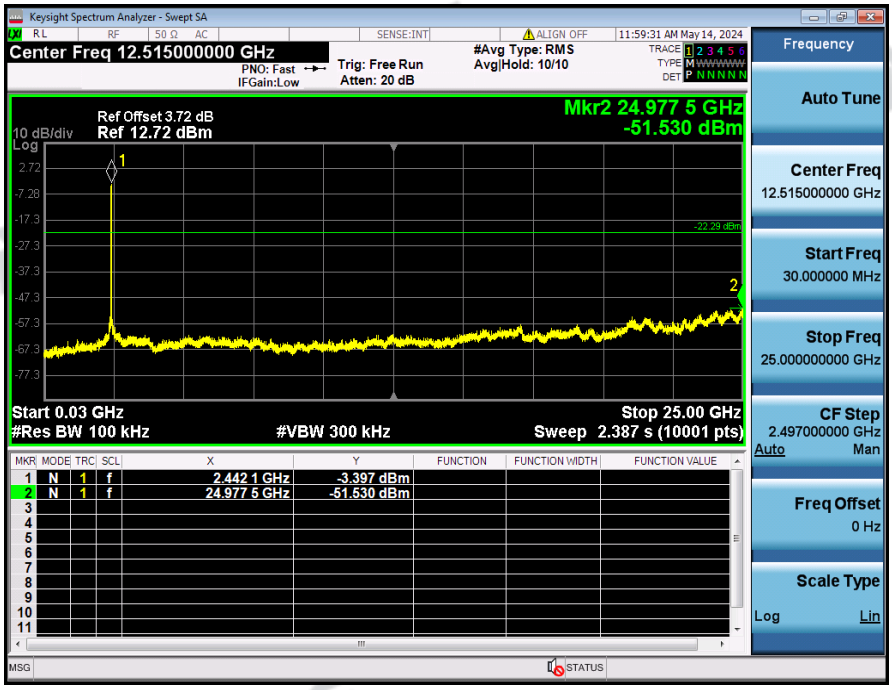
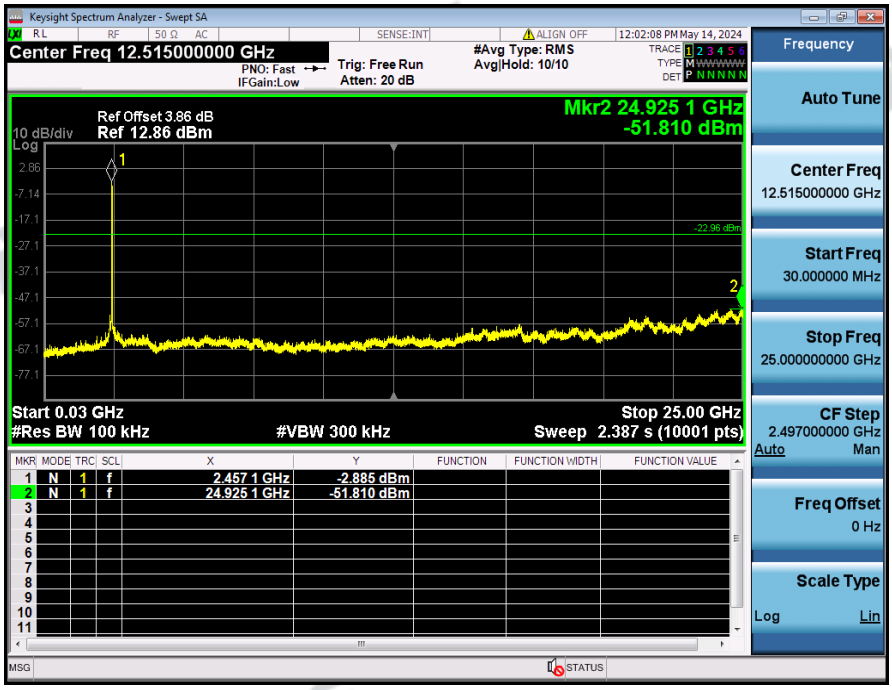
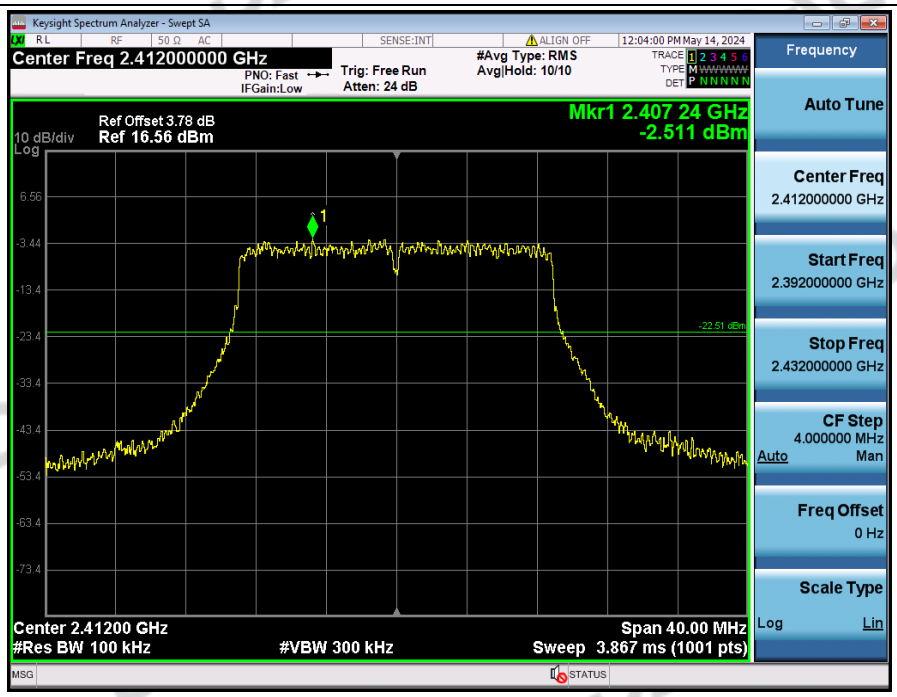


1_Reference_Level_NVNT_ANT1_802_11g_2462

2_Spurious_Emission_NVNT_ANT1_802_11g_2462



1_Reference_Level_NVNT_ANT1_802_11n(HT20)_2412



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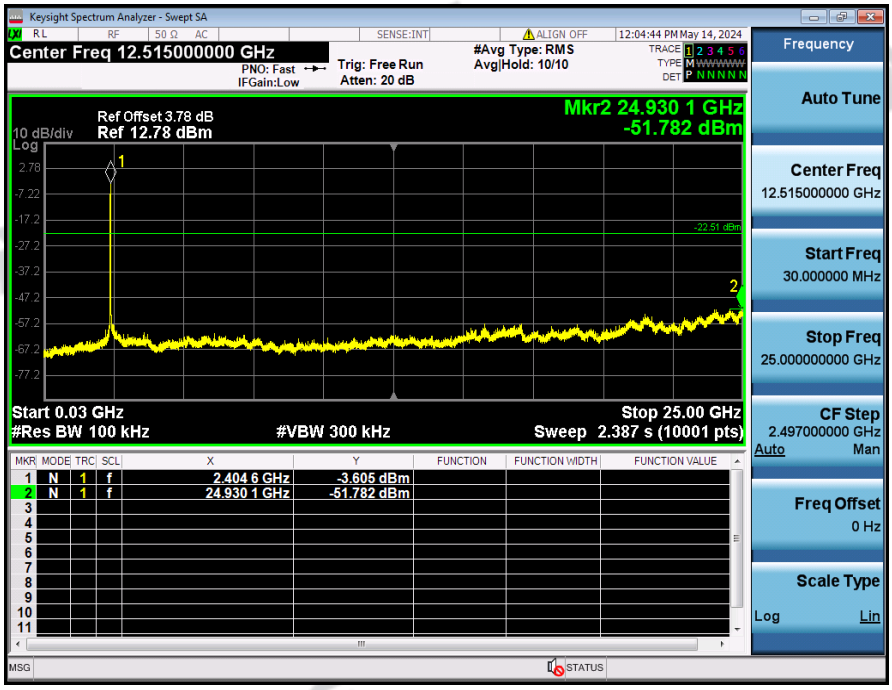

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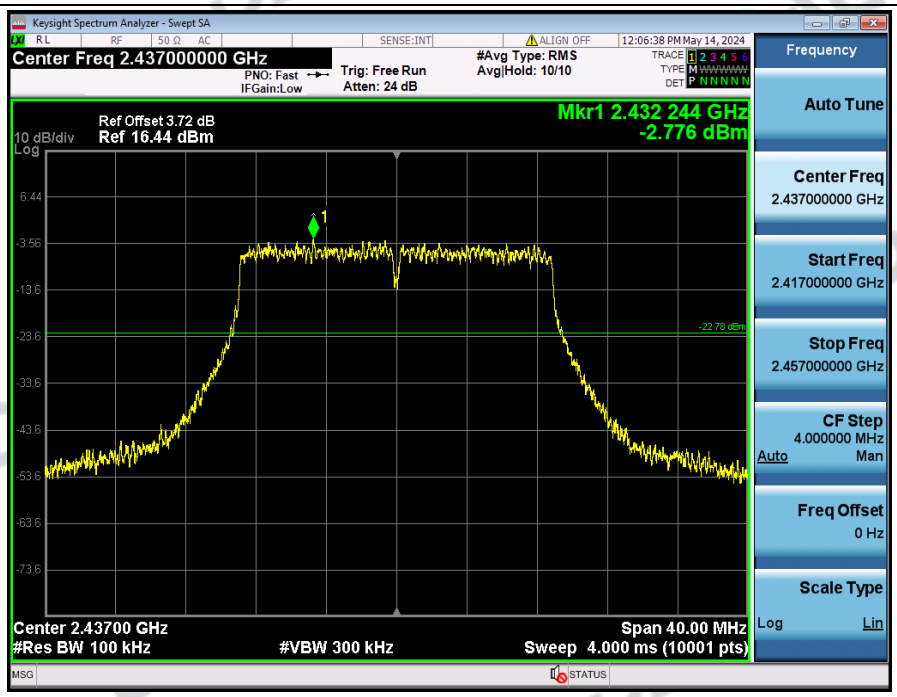

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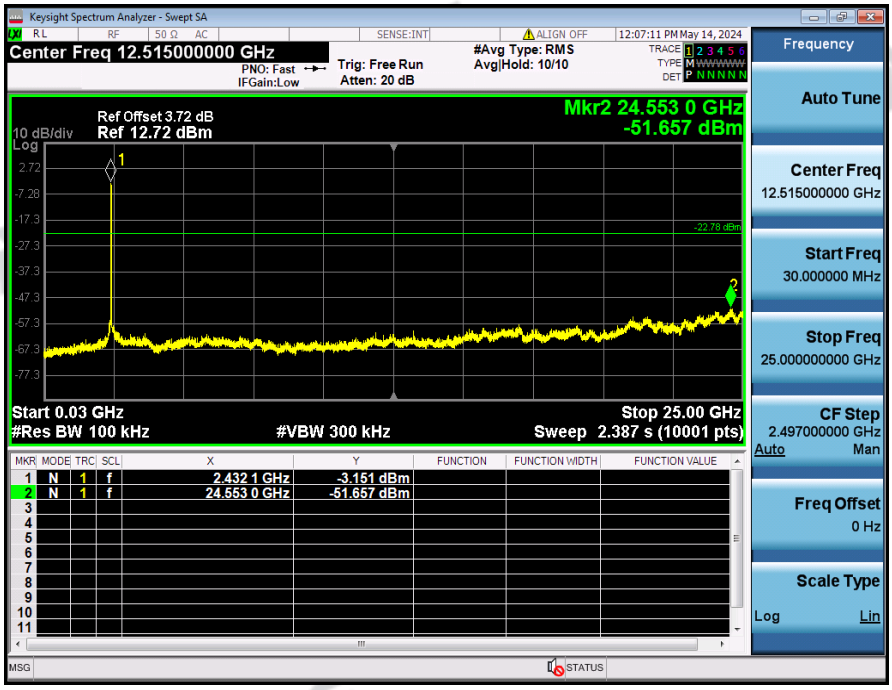

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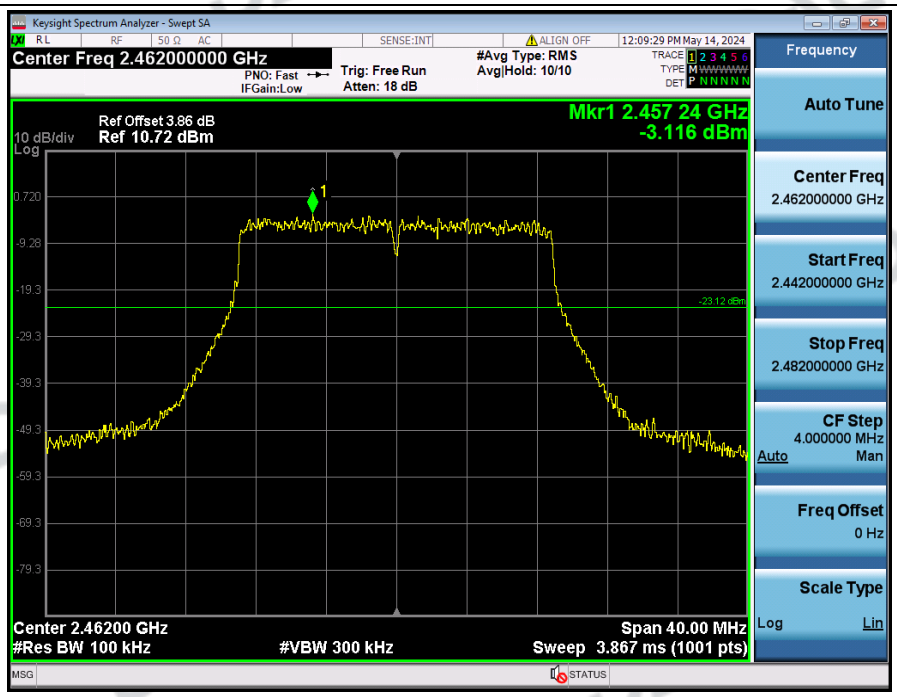
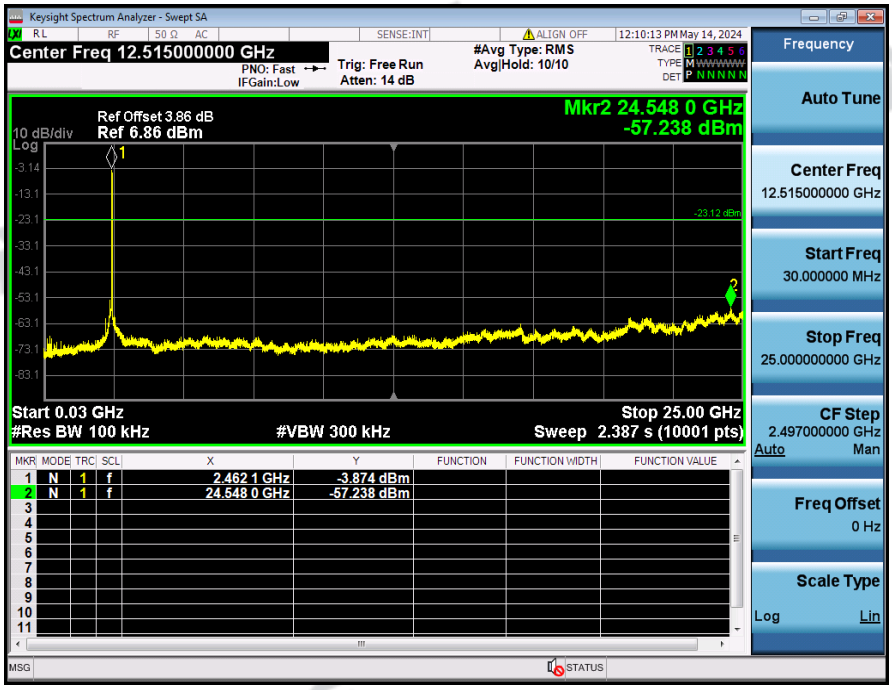
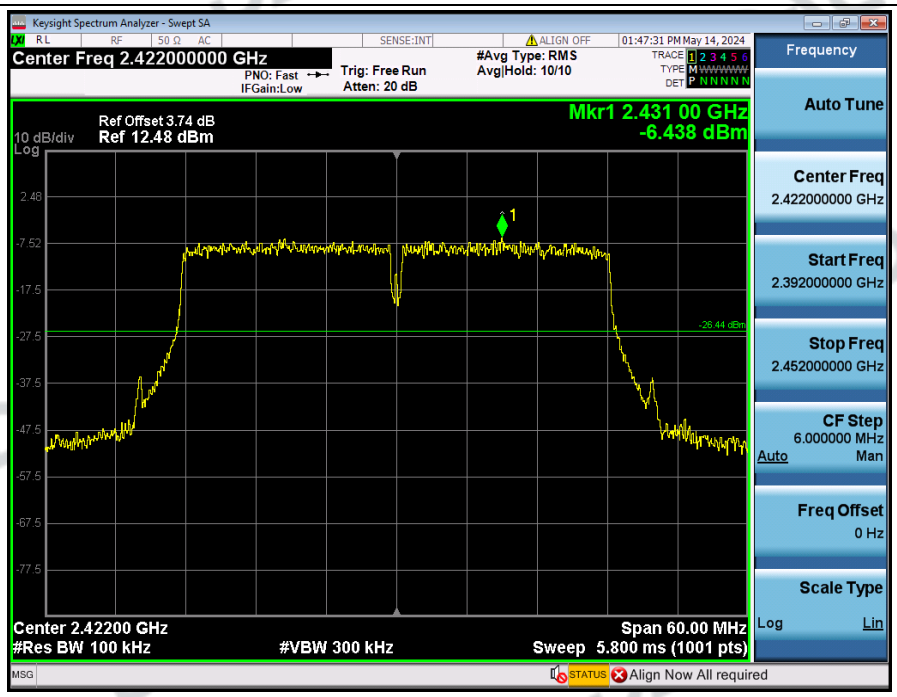


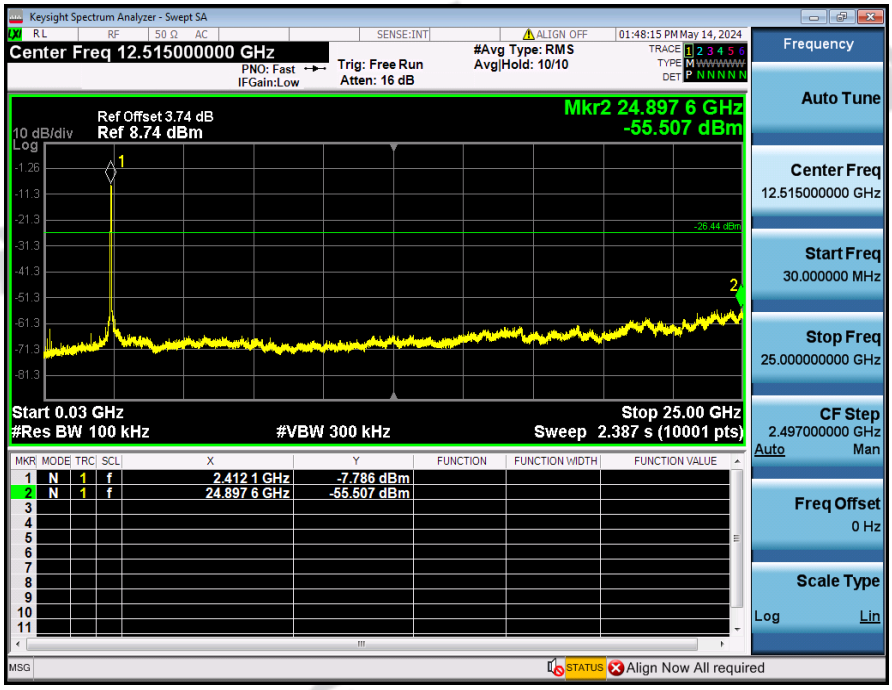
2_Spurious_Emission_NVNT_ANT1_802_11n(HT20)_2462



1_Reference_Level_NVNT_ANT1_802_11n(HT40)_2422



2_Spurious_Emission_NVNT_ANT1_802_11n(HT40)_2422



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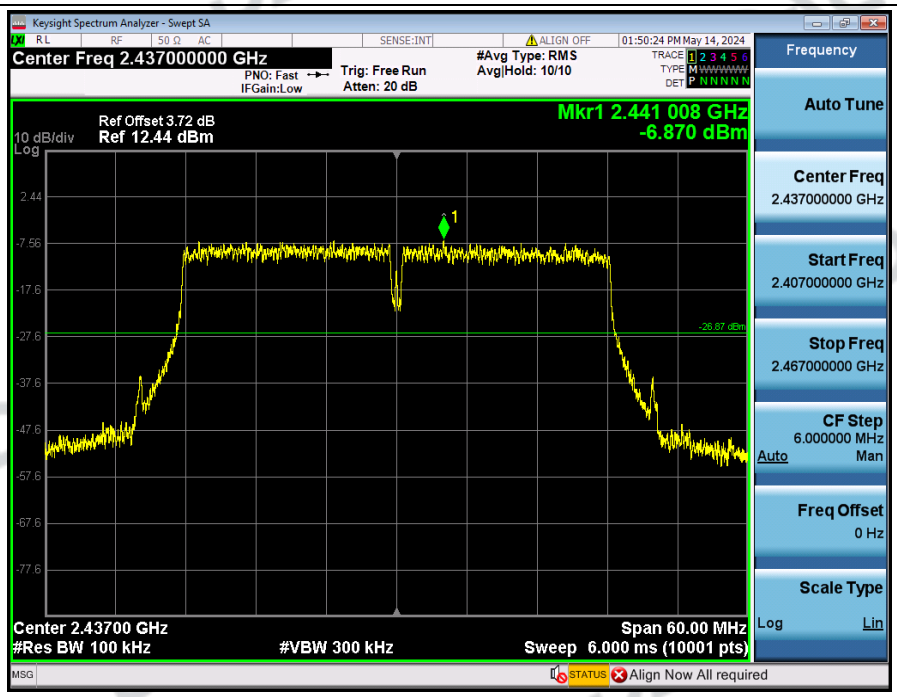
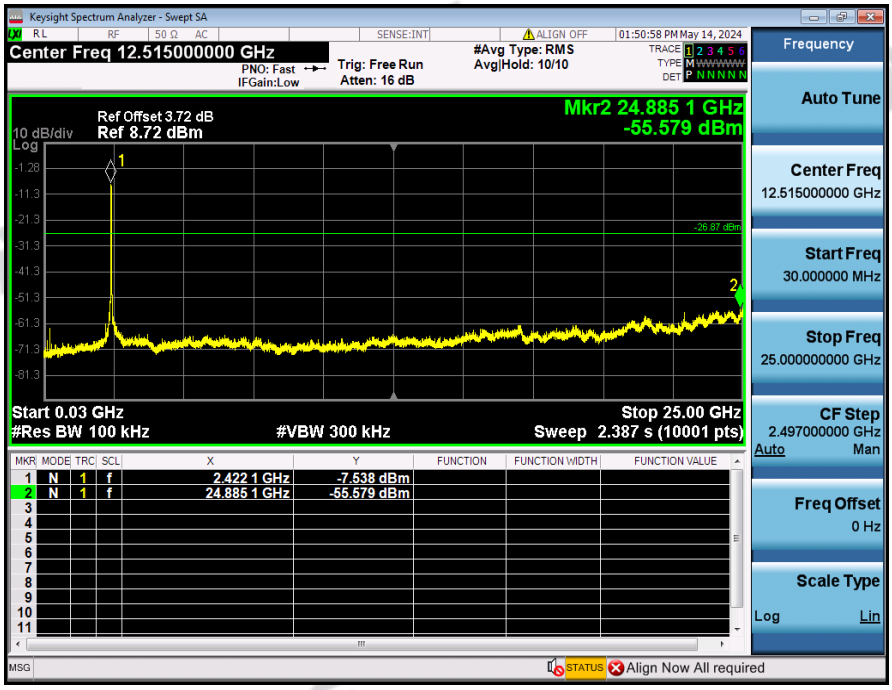
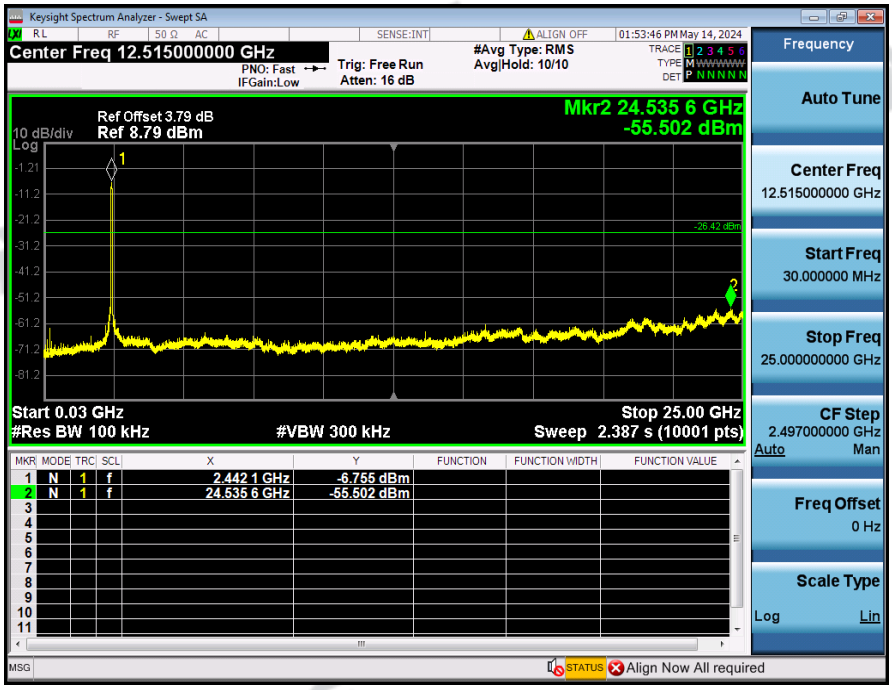


2_Spurious_Emission_NVNT_ANT1_802_11n(HT40)_2437



1_Reference_Level_NVNT_ANT1_802_11n(HT40)_2452

2_Spurious_Emission_NVNT_ANT1_802_11n(HT40)_2452



********** **End of Report** **********